TECHNOLOGY LITERACY: A

PHENOMENOLOGICAL VIEW OF THE TEACHER'S

PERCEPTIONS OF TECHNOLOGY INTEGRATION IN

JORDAN

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CHAPTER I

INTRODUCTION

Recent advances in communication technology have turned the world into a village where events in one corner of the globe can rapidly affect life in all the other corners. Advances in communication due to technology and the Internet have caused rapid social, educational, and economic changes in societies. Thus attention has turned to educational uses of technology as one of the crucial needs of society. Using technology has become one of the priorities of educators all over the world who are interested in improving the quality of learning and teaching and in providing educational opportunity for those seeking it. (Owaydah & Almu'mini, 1996).

Educational technology has played an effective role in the process of modernizing and improving education (Fulton & Honey, 2002). It has helped develop teaching styles that respond to changes in societies' cultures and knowledge. Jonassen's (2000) perspectives on how computers offer a different approach to teaching is a case in point, and Wolfe's (2000) collection of educators' stories about online teaching is another. Technology has also led to a new concept of educational technology as an organized and methodical process of designing, implementing, and evaluating the learning and teaching process based on specified goals coming from research in the different fields of knowledge (Al-Jahoury, 2001).

Of all technologies, the computer and the Internet have become perhaps the most valuable to instruction because of their role as facilitators of communication. Beyond the high-speed receiving, storing, and processing of data, the computer offers to enhance communication in ways not possible with other media such as the television and telephone. Mayer (2002), for example, explores the advantages of information and communication technologies (ICT) in the practicum component of preservice teacher education, and Morrow, Barnhart, and Rooyakkers (2002) investigate the benefits of using technology as a tool in literacy instruction.

In addition to facilitating communication with others, the computer can also function as a "mindtool" to help students communicate with themselves (Jonassen, 2000). By representing their knowledge graphically with a variety of computer programs, students are led to examine how they think and arrange knowledge. Helping students to think critically about what they know, how they have come to know it, and how to communicate what they know to others lies at the heart of the educational process.

However, all this capability and potential use of computers in education depends on students' ability to engage computers effectively. Therefore, teachers must help them develop technology literacy to a degree which will permit them to enjoy the benefits that technology makes possible. For this to happen, teachers must view computers as playing an essential role in education, and computers must be present as a learning tool at every level from elementary through the university. The time has passed when the computer was used only by research centers. In addition to its use in all fields of research and in instructional settings, the computer offers an effective method of self-based learning

because the control which computers afford to students is essential to effective learning (Al-Omari & Eissa, 1988; Al-Yousif, 2001).

Jordan: Contextual Backgrounds to the Study

The large body of literature produced by the developed nations of the world on the benefits of technology to education has caused other nations to seek those advantages for their own educational programs. Jordan has responded to this situation by spending billions of dollars to place computers in schools and to network them as well as connect them to the Internet. According to Abu Sheikha (1994), "the education system in Jordan is based on the whole aspiration to freedom, justice, human and economic development to achieve a significant level of productivity and modernization" (p.13). Guiding this major reform effort is the hope that computer and Internet technology will bring Jordanian education closer to these goals.

However, in order to understand educational reform in Jordan, one needs to understand Jordan's place in the Middle East and in the rest of the world, the foundations of Jordan's economy, and its political realities. Jordan is a small country that was officially established in 1923. It is located in the heart of the Middle East, sharing borders with five countries; Iraq to the east, Palestine and Israel to the west, Saudi Arabia to the southeast, and Syria to the north. Jordan covers a small area, only about 89,287 square kilometers, slightly smaller than Indiana, with a population of about 5.5 million of which 52% are males and 48% are females (The World Fact book, 2004).

The official religion in Jordan is Islam (92%) while 8% are Christians and other religions. The official language is Arabic although English is widely understood among the educated middle and upper classes. The government has been a constitutional

monarchy since Jordan's independence from Britain in 1946. Jordan structures its

society, the interactions of its citizens, and its views on human rights according to Islamic

Law.

Since Jordan is a small country, it suffers from a shortage of natural resources

such as water and oil. In addition, Jordan suffers from the more common problems of

debt, poverty, and unemployment. The total labor force in Jordan, according to The

World Fact Book (2004), is approximately 1.36 million with service occupations

accounting for 82.5%, industry 12.5%, and agriculture 5%.

Jordan also suffers from an imbalance between natural resources and population

growth with the population expected to double by the year 2012. Compounding this

problem is the huge increase in the number of Palestinian refugees seeking shelter in

Jordan as a result of the 1990–91 Gulf Crisis, continuing a trend going back to the 1948

and 1967 Arab-Israeli wars. As a result of these repeated immigrations, non-Jordanian

residents now account for a considerable part of Jordan's population; as much as 50% of

Jordan's population is Palestinian. This sudden increase in its population is a problem,

which the Jordanian educational system has had to deal with (Bermanet & Zash, 1988).

The effect this population growth has had on education in the Middle East is

profound. Under the rule of Turkey and then of Britain, Jordanian education was

suppressed. Once Jordan began self-rule with the end of the British colonial period in the

1950s, education became a priority to supply individuals to administer the country. The

government's push toward universal public education resulted in access to post-

secondary education to more students than Jordan had experienced before. At first

Jordan was able to absorb the larger number of graduates resulting from this push by

increasing the number of public service jobs in the aftermath of decolonization. But as the number of employees rose, the civil service network became more unproductive and actually became a burden on the nation's economy (Eeghen, 2000).

The result is that Jordan has come to play a key role in promoting peace and stability in the Middle East by exporting one national resource which it has in abundance, i.e. highly educated human resources. Without the oil wealth of some of its neighbors and because of the limited rainfall and arable land, Jordan exports doctoral and master's level graduates to work in the Gulf area. These are the teachers, engineers, and doctors that other countries need but have difficulty producing on their own. Currently an estimated half million Jordanians, accounting for about 10% of the population, work in countries throughout the Middle East (Hamzah, 2004).

By exporting highly trained workers skilled in technologies such as medicine, telecommunications, and engineering, Jordan has improved its economy greatly over the past two decades. As a result of this need to produce graduates for export, Jordan has come to value education more than many other Middle Eastern nations (Abu-El-Haija, 2004). This in turn has resulted in the fact that Jordan enjoys one of the highest enrollment proportions in higher education among countries in the Middle East region and one of the highest literacy rates in the world.

Thus the wise leadership of Jordan has come to realize the importance of education to Jordan, but the path to reform has not been an easy one. In the past decade there have been strong political pressures to change the Jordanian educational system. The business sector has become especially interested because Jordan's dominance in an increasingly competitive marketplace has recently begun to slip. This translates into lost

dollars in potential profits. Jordan's economy depends on the demand for its graduates in Saudi Arabia and other Gulf states. At the same time Jordan needs to compete effectively with the West in order to ensure its economic future. Reform, restructuring, and transformation of public education have become part of the current rhetoric.

Research Problem

In today's technology-based society, it is crucial for all students to become technologically literate (Wright, 1999). The integration of technology in education involves using computers and the Internet as tools of education and research to help students develop a level of literacy necessary to function in an increasingly technological world. The success of this effort depends on technology literate teachers to implement these tools and to create such a context (Lowther et al., 1998).

To advance toward this goal Jordan has spent billions of dollars from loans and foreign aid over the past 20 years to place computer and Internet technology in public school classrooms across the country. The intent of this effort was to increase technology literacy among public school students. Jaradat (1989) reported that the most important aspect of this program was to develop a clear strategy for integrating technology in education and to provide for the constant review of this process in order to update and improve it on a regular basis.

In 1988 the Jordanian Minister of Education created a new branch of the ministry called Curriculum and Educational Technology to oversee the integration of technology in the curriculum. Since that time 100,000 computers have been installed in public schools throughout Jordan. The current ratio is one computer for every 16 students (Altawalibah, 2004). Over the last decade Jordan has made steady progress in bringing

technology to education. In 2001 the Ministry of Education mandated that all schools in Jordan have computers, that all schools be connected to the Internet, and that teachers be provided training in technology use. However, mandates may not be sufficient to make technology an integral part of the schools' curriculum. Integrating technology involves multiple factors such as students' interests, teachers' perceptions about technology, and also parents' attitudes toward technology (Al-Bakrie, 2004).

Considering that the expertise of teachers makes their role central to education, teachers' perceptions regarding technology integration may influence students' learning by constituting a part of the hidden curriculum (Fleener, 2002). Since teachers are facilitators of student success and achievement, their perceptions of and attitudes toward technology in education may be closely related to students' engagement with technology (Hadley, Eisenwine, Hakes, & Hines, 2002). However, teachers' own experiences with technology and their perceptions of technology integration have not been studied in any detail in Jordan. For this reason embarking on this research with an open mind offers a chance to clarify possible connections between teacher perceptions of technology and the current situation in Jordanian education. If perception is primary to human experience (Willis, 1991), then an investigation of teachers' perceptions of technology in education may illuminate this question.

Research Questions

- What are Jordanian teachers' perceptions of the value of integrating technology in education?

- What does technology integration mean to Jordanian teachers?

- What are the implications of teachers' viewpoints for Jordanian policy makers?

Purpose of the Study

This study derives from an effort to understand the forces, contexts, and situations influencing the current shape of Jordanian public education, especially the role played by teacher perceptions of the value of technology to education. The purpose of this study is to understand Jordanian teachers' perceptions of technology and of the importance of integration in the current context of a royal mandate to integrate technology in education. Furthermore, this study seeks to illuminate teachers' perceptions of the value of integrating technology in education as well as of the role they play in that process. Using a phenomenological lens to investigate teachers' perceptions of and attitudes toward technology integration, this study provides understanding of whether teacher perceptions and attitudes play a role in the current situation of technology integration in Jordanian public school, and if so, the nature of that role.

Data gathered regarding teachers' lived experiences with technology in the current context of Jordanian education will shed light on their perceptions regarding educational uses of technology as well as their perceptions of the part they play in forming this context. The interpretation of this data will suggest how teachers mediate technology integration plans. It will also foster understanding of the teacher's role in leading students to develop technology literacy.

The information and interpretations derived from this study will ultimately provide a basis for understanding the underlying forces shaping the current state of technology integration in Jordanian public education. This understanding will also suggest ways to respond more effectively to the mandate by the Jordanian Ministry of

Education to raise students' levels of technology literacy through the integration of technology in education.

Research Conceptual Framework

The emphasis of this study on teachers' perceptions suggests phenomenology as an effective lens. Willis (1991) explains that human experience consists of perception, thinking, and taking action, "but it all begins with perceptions" (p. 173). In this view, perception is a purely physical phenomenon consisting of the stimulation of one or more of the senses. This leads to the construction of a representation of the perceived object within the inner life-world. Unable to bring cognitive awareness to bear on external objects, individuals are limited to experiencing their own personal constructions of the external world in their inner life-worlds. Thus, "our initial human consciousness of external perceptions can be considered our perceptions of our perceptions" (p. 175) as they are manifested in individual inner life-worlds.

While initial perception is always of an external phenomenon, experiencing that external phenomenon is an entirely internal process. The inner life-world is the site where the meaning of phenomena is experienced. This experience forms the basis for the construction of understanding about those phenomena.

Phenomenology as a theoretical framework reflects an interpretivist ontology; that is, reality is constructed by individuals in response to their perceptions. Moreover, reality resides not external to people but within the unique life-worlds of each individual (Sipe & Constable, 1996; van Manen, 1990; Willis, 1991). Epistemologically, phenomenology does not seek to construct absolute truth. Instead, it seeks "to understand situations from the point of view of those experiencing the situations" (Sipe & Constable, 1996, p. 158),

and is concerned with what will assist in that effort. Also, since human existence consists of perceiving, thinking, and acting, phenomenology's focus on perception prior to cognitive interpretation of experience constitutes inquiry into "what is primary in human experience" (Willis, 1991, p. 173). Within this context, phenomenology seeks to uncover the meaning of a phenomenon by peeling back or scaffolding the various layers of moral, ethical, social, and cultural influence people encounter in their life-world.

This study seeks to understand teacher-lived experiences regarding integrating technology into teaching. Phenomenology provides a suitable theoretical framework for this effort. Moreover, as a methodology, it offers access to teachers' experiences as mediators of reform and as the vital link between a royal mandate and the students whom that mandate is intended to benefit. Investigating the teaching process from the viewpoint of the teachers has the potential to reveal how teachers' perceptions contribute to the current context in which Jordanian education functions today. Such understanding of the foundations of a situation can provide the basis for directions to take to improve it.

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Research Strategies

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Although the attempt to integrate technology in education in Jordan comes from a state mandate, it is the teachers who must accomplish the integration. If their role is central to the process of technology integration, then insight into teachers' perceptions forms the basis for understanding this process.

Investigating people's perceptions requires a qualitative strategy. Therefore, a hermeneutic phenomenological approach provides an effective way to achieve the goal of this study: to investigate the perceptions of Jordanian teachers with a view to understanding how these affect the ultimate success of technology integration.

Hermeneutic phenomenology, according to van Manen (1990), stands both as a theoretical perspective and as a methodology:

> It is a *descriptive* (phenomenological) methodology because it wants to be attentive to how things appear, it wants to let things speak for themselves; it is an *interpretive* (hermeneutic) methodology because it claims that there are no such things as uninterpreted phenomena. The implied contradiction may be resolved if one acknowledges that the (phenomenological) "facts" of lived experience are always already meaningfully (hermeneutically) experienced. Moreover, even the "facts" of lived experience need to be captured in language . . . and this is inevitably an interpretive process. (pp. 180-181; italics in original)

Therefore, perception alone bears no meaning but becomes meaningful only when it is interpreted. This in turn prompts the hermeneutic concern to address how these perceptions tend to shape understanding about technology on the part of teachers. An examination of teachers' perceptions and of the attitudes deriving from them will therefore illuminate the source of the context framing Jordanian teachers' approach to integrating technology in education. Finally, understanding how this context has come to be will suggest ways to improve the situation in Jordanian education. Therefore, a concern of this study is to provide insightful descriptions of

- The lived experiences of Jordanian teachers considering their perceptions of themselves in the context created by the mandate to integrate technology.
- Their perceptions regarding their ability to enforce the mandate.
- Their suitability to the task.
- Their willingness to act.

According to van Manen (1990) the aim of phenomenology is to produce a textual account of lived experience to reveal essential themes capable of stimulating similar perceptions in the inner life-worlds of others. It is by this text that "a reader is powerfully animated in his or her own lived experience" (p. 36) to construct meanings and understandings which will enlighten them about the perceptions of others. Such a textual description of Jordanian teachers' lived experience will illuminate what produces the current situation in Jordanian education with respect to technology as well as what maintains it, at least as far as this situation derives from the perceptions and attitudes of the teachers.

An important consideration in producing this textual expression of teachers' lived experiences is the contextual nature of experience (van Manen, 1990, pp. 36-37). For this reason it will be important not only to investigate teachers' perceptions of technology in a general sense or even in the specific sense of how it is best used in an educational setting but also to appreciate how their perception is influenced by their place and function in the context created by the introduction of technology in education.

Data Collection

The hermeneutic phenomenological methodology shaping this study will be implemented by combining interviews and observation as the primary means of data collection. Such a combination meets the qualitative research goal of triangulation. Consistencies in multiple accounts by interviewees or multiple observations will provide the themes of this study while inconsistencies that may emerge will provide multiple angles for understanding the findings. Thompson (1989) calls the interview the most powerful way for one to gain an understanding of the experiences of another.

Furthermore, when the effort is to get at lived experience, van Manen (1990) points out that the temporal nature of experience means that it can not be "grasped in its immediate manifestation but only reflectively as past presence" (p. 36). In-depth interviews in this study seek to provide insights into Jordanian teachers' perceptions of educational technology in general as well as of how technology is being integrated in the schools where they currently teach. Multiple one-hour long interviews will be conducted with each participant until new information is no longer added in.

> In addition to in-depth interviews, observation will provide data for this study: Observation is a fundamental and highly important method in all qualitative inquiry: It is used to discover complex interactions in natural social settings. Even in in-depth interview studies, observation plays an important role as the researcher notes the interviewee's body language and affect in addition to her words. (Marshall & Rossman, 1999, p.50)

Among the phenomena I intend to observe is how participants negotiate their teaching routines as a way to reveal what they consider important. To get a feel for this, I anticipate observing each teacher on multiple occasions both in and out of the classroom. In the classroom, I expect to observe patterns in teachers' use of technology or in the techniques they have developed to avoid confronting it. In this way I hope to observe behaviors that may illustrate their perceptions toward technology as well as how they construct their role as educators charged by royal mandate with effecting the integration of technology in education. These observations will provide further opportunity for triangulation as I compare what teachers say in interviews with what they actually do in and out of their classrooms. I also anticipate that their body language and affect during

the interview process may reveal more than their words about how they feel toward the topic being discussed.

Since the purpose of this study is to understand the experience of teachers in Jordan in the context of educational technology, participants will be selected from the population of Jordanian teachers charged with integrating technology in their curriculum. Four teachers will be interviewed: two from the elementary and two from the secondary level. At the elementary level one teacher is selected from urban schools and the other from rural schools. The two secondary teachers will be selected the same way, one from urban schools and the other from rural schools. The reason for selecting participants in this way is to afford the study a broader perspective on the processes taking place in Jordanian education today. To confine the investigation to a narrowly defined context such as only urban teachers or only secondary teachers would be to limit the understanding that the study promises to provide.

The intent to avoid a narrow perspective in the study prompts the decision for a purposeful sampling of participants (Marshall & Rossman, 1999). Furthermore, the decision to select teachers along urban/rural and elementary/secondary guidelines derives from the tendency for urban schools to receive more funding than rural ones and for the topics engaged by secondary school teachers to be different both in kind and in depth from those engaged in by elementary teachers. The perceptions of teachers from more affluent urban schools may differ widely from those practicing in rural areas simply because of the variation in funding available in each context (Payne & Biddle, 1999; Turner, 2000). A similar difference between elementary and secondary teachers may also become evident if any sort of disparity exists in the expectations placed by teachers (or

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by society in general) on secondary students as opposed to elementary students with respect to their need to develop technology literacy or the appropriateness and relevance of technology instruction to their futures.

Another factor influencing the decision for purposeful sampling is the intent to establish consistency against which to detect possible variation. The four schools were selected at random from the four categories of elementary, secondary, urban, and rural. I sought the assistance of the Jordanian Ministry of Education in the selection of these schools. The Ministry also facilitated the selection of participants by advising the principals of the selected schools of the research intent to investigate teachers' use and perceptions of technology in the context of the mandate to integrate technology in Jordanian education.

The aim of the interviews in this study is to understand what it is like to be a teacher dealing with the issue of technology integration in Jordan in a context created by a number of factors such as state mandates, the history of educational reform, and varying levels of competence among teachers with computers and the Internet. The very act of being interviewed leads people to reflect on what they know and understand, and hermeneutic phenomenological reflection tends to transform participants into collaborators in the research as they reflect on the significance of their lived-experiences. A major intent of this approach is to engage interviewees in reflecting on their experiences in order to get at central, deep meanings and themes in the data (van Manen, 1990, pp. 98-99).

Data Analysis

According to van Manen (1990), the reason to collect data is to use that data to construct meaning. This is accomplished by discerning themes emerging from an analysis of the data. It must be clearly understood from the outset, however, that themes are not discovered merely by virtue of their frequency; instead, they result from "insightful invention," from "a free act of 'seeing' meaning" (p. 79).

In this context, the hermeneutic phenomenological approach seeks to describe experience to reveal themes and then to discern meaning in those themes. This notion derives from the idea that themes result from the human tendency to seek meaning and that meanings tend to be grouped into supporting structures of more generalized meaning. Thus, themes exist as simplified statements of meaning (van Manen, 1990, p. 87) constructed in an attempt to capture phenomena through reinforcement and amplification of aspects of those phenomena considered to be most central or important. In this sense themes may be viewed as part of and deriving from the all-encompassing network of predispositions constituting our own life-worlds (Willis, 1991).

Conducting thematic analysis, seeking meaning within the contexts, and determining essential themes will be the focus of this study for data analysis. Particular attention will be paid to how teachers perceive technology, state mandates to integrate technology, and their competence with technology.

Researcher Subjectivity

Researcher subjectivity must be accounted for if any interpretation of themes is to be meaningful. For this reason the analysis of data will be undertaken self-consciously,

bearing in mind that meaning seen as deriving from themes in the data are necessarily moderated by the researcher's network of preconceptions.

Having been raised and educated in Jordan, I have a perspective of Jordanian education that non-Jordanians do not share. My understanding of the culture means that I am able to recognize many of the social forces that currently shape Jordanian education. I am familiar with many of the expectations placed on education which are peculiar to Jordan, such as the concept that education is the source of Jordan's major national resource and the urgency felt by families to educate their children to avoid having them become a burden on society. The fact that I am an insider to Jordanian education will permit me to record a richer, more in-depth account of Jordanian teachers' perceptions of the value of technology in education and of their role as mediators of technology literacy.

At the same time, the years I have spent in the U.S. have given me a perspective that few other Jordanians can share. One such understanding concerns methods for researching processes in order to suggest ways to improve them. Another equally important perspective stems from the fact that studying in a culture foreign to one's own actually constitutes a study of that foreign culture. Learning about U.S. culture, which is in many respects different from Jordanian culture, allows me to view my own culture from the viewpoint of an outsider, a perspective which remains largely unavailable to other Jordanians. This broadened perspective means that I am able to make connections that may not be immediately apparent to Jordanian teachers. It also means that I must therefore guard against the tendency to interpret their perceptions in any context other than their own, shaped by their total body of experience and untainted by knowledge of ways of living that I am aware of but which are not familiar to them.

My awareness of these limitations and assumptions permits me to conduct this research with an open mind that is at the same time both discerning and critical and also intuitive and sympathetic.

Significance of the Study

Much research has been done on the role of teacher perceptions in technology integration in education in the United States; however, few studies have been done on this topic in Jordan. Jordan is currently attempting to gain the benefits of educational technology for its students, but not enough attention is being paid to the role of the teacher in this process and yet the teacher is the key to the success of technology literacy. This research aims to provide understanding in this area to support reform efforts in Jordanian education.

Therefore, this study seeks to address the need for qualitative research about teachers' perceptions about technology and to fill the current gap in research with respect to Jordanian education. Results of this study will inform the Jordanian government about policy reforms based on the perspective of teachers and technology.

Furthermore, the study of the use of computers for instruction and in Jordanian schools will illuminate some aspects of the educational uses of technology. The results will not only provide meaningful guidance to enhance the use of technology in education in Jordan but also offer insights to understand the relationship between teachers' perception and effective technology integration in teaching in general.

Conclusion

Chapter One presented an overview of the current push to integrate technology in Jordanian education. A brief description of Jordanian culture provided a background for

understanding the problem of the lack of research on the role which Jordanian teachers'

perceptions might play in the integration effort. The conceptual framework, the methods

of the study, and the strategies of data collection and analysis were also outlined.

CHAPTER 2

REVIEW OF LITERATURE

Modern society is dominated by the use of technology as evidenced by a plethora of news reports. According to Bybee (2000) nearly half of the major news stories in the USA in the 20th century were concerned with technological issues. As a consequence, some educators see a pressing need for improved technology literacy so that modern citizens are positioned to contribute to technological decision-making (Dyrenfurth, 1984; International Technology Education Association and Technology for All Americans, 2000). In order to address technology literacy, educators in the latter part of the last century have increased their emphasis on technology education as well as on research into technology and technology education. Technology education is now an important research area.

One aspect of technology literacy which has not received much attention but which may be important for this study is addressed by Brewer (2003) and by Aoki (in Pinar and Irwin, 2005), who warn against viewing technology only as a means to an end. To do so, they say, is to subscribe to the Western tendency to seek control of nature, of populations, and even of reality itself. Aoki states that "computer technology is not there to be understood historically, but to be made concretely valid through being interpreted" (Pinar & Irwin, 2005, p. 155). This is the hermeneutic concern about the relationship between the general and the particular. It is one thing to know what a computer is, but it

is another thing to know what the computer means in a variety of particular contexts in each of which the general concept of computer changes to fit the context. The implication of this concern is that one needs to understand the interaction between the general concept and varying contexts. Pinar and Irwin (2005) point out Aoki's argument that the most effective moments of understanding occur when the understanding of the general does not easily inform the particular. What this means for this study is that while an understanding of the general concept of technology integration is necessary, enlightenment will result from understanding the particular context being investigated, that is, Jordanian teachers' perception of technology integration.

Phenomenology provides insight into how teachers' perceptions mold the way they interact with technology. At the same time, hermeneutics provides a way to interpret their reactions. An appreciation of teachers' experiences as well as an ability to account for these experiences provides a basis for understanding the context in which teachers attempt to integrate technology in education. An understanding of this context is essential for decisions about whether the situation should be improved and if so, the direction that efforts for improvement should take.

For this reason this review of the literature on how teachers' perception of technology intersects with its integration in education is divided into two sections. The first section is a general overview of the knowledge that comes out of technology integration efforts in the more developed nations of the world. The second focuses on the particular context of the current effort in Jordan to integrate technology in its public schools.

Educational Technology in Developed Nations

A Short History of Technology Integration

Pea (1997) defines "educational technologies" as the term has progressed from its inception to the age of the computer:

> The term educational technologies has changed over the years. In the broadest
>
> sense it refers to any resource used for activities in education. After World War II
>
> it referred to filmstrips, slide projectors, language learning labs with audio tapes
>
> and television. The 80's used the term to refer to computer based learning such as
>
> interactive videodiscs, CD-ROMS, and networking. Educational technologies has
>
> commonly been used to refer to the most advanced technologies available for
>
> teaching and learning in any particular area. (p. 274)

Jonnasen (2000) sees the history of educational technology in terms of the way it has been implemented by educators. Under the computer aided instruction paradigm of the 1970s, teachers expected their students to learn *from* computers in the form of drill and practice machines, tutorials, and intelligent tutoring systems featuring artificial intelligence. Beginning in the mid 1980s, educators sought to have their students learn *about* computers. They learned how to draw pictures with LOGO and to solve problems with BASIC. This era stressed the need for students to develop computer literacy. Many students ended up being able to name all the parts of a computer in the mistaken belief that "if students memorize the parts and functions of computers and software, then they will understand and be able to use them" (Jonnasen, 2000 p. 7).

Jonassen (2000) claims that teachers should now lead their students to learn *with* computers as mindtools. These are "cognitive amplification and reorganization tools" (p.

10); or more simply put, computers provide a means for students to represent knowledge by allowing them to arrange it in visual schemata. Applications satisfying Jonnasen's conception of mindtools include databases, spreadsheets, multimedia publishing tools, and so on which students use to create graphic representations of their ideas as well as flowcharts of their thoughts and decision making processes. According to Jonassen this use of technology supports knowledge construction by encouraging students to explore the world of knowledge as well as their own body of knowledge. It supports learning by doing and by collaborating with peers. Above all, computers as mindtools prompt reflection, which is essential to learning, by engaging students in figuring out how to articulate what they know, by considering what they have learned and how they have learned it, and by "constructing personal representations of meaning" (p. 9).

Becker (2000) too indicates that the capabilities and instructional possibilities of technology have vastly improved since 1985. As the price of the computer has dropped, the number of computers in schools has gone up. The goal of many school districts became to put a computer on every teacher's desk. However, the primary use of these computers was for word processing which constituted little more than an expensive investment in glorified typewriters (Bollentin, 1998).

Smith (1989) suggests a reason for this situation: "the arrival of the computer in the classroom seems to have preceded analysis of its probable educational role" (p.171). Over the past decade, technology has appeared in the classroom with increasing frequency. It has become a major factor in education reform (Wenglinsky, 2000). If one considers the amount of money spent on technology for education, the return in terms of enhanced student learning is disappointing. The ratio of computers to students has

improved, but teaching and learning have not kept pace with advances in technology. In short, although more technology appears in the schools with each passing year and with each technological innovation, teachers are not using it effectively (Burnett, G. 1994; Darling-Hammond, 1996; Dias, 1999; Levin & Darden, 1999; Mackenzie, 1999a; Morton, 1996; Padgett & Conceicao-Runlee, 2000; Picciano, 1998; Roblyer, & Edwards, 2000).

The Importance of Teacher Perceptions

Because classroom teachers are most intimately involved with enacting the curriculum, their importance to the process of curriculum reform in general and technology integration in particular is difficult to overstate. The medical profession provides a useful analogy. In the operating room it is the surgeon, not the hospital administration, who is ultimately responsible for the success of the operation. Similarly, the central position of the teacher, between the school administration and the students, makes the teacher ultimately responsible for the successful implementation of policies of curriculum.

If their position as enactors of the curriculum makes teachers the vital link between the curriculum planners and the students, then an understanding of the factors determining the success of programs must involve an examination of teacher perceptions, for perceptions are the primary motivators of their attitudes as well as their actions (Willis, 1991). One of the first perceptions when one is confronted with the need to master a new technology involves the advantages one may stand to derive from it.

The most obvious way technology can improve a teacher's job is to shorten the amount of time needed for clerical tasks, thus allowing for more instructional time

(Bohlin, 1998). Of equal importance are the ways technology can help teachers address their students' needs. Carlson and Gadio (2002) point out that technology has the potential to make learning more student-centered, more interdisciplinary, and more adapted to individual learning styles. The development of higher-order thinking and information-reasoning skills are other advantages of technology in the classroom (Kromhout & Butzin, 1993). However, technology has for the most part still not become integrated in education (Bitter & Pierson, 2002).

A review of the relevant literature reveals two aspects of teacher perceptions relevant to this investigation: their perception of technology itself and their perception of their own ability and readiness to engage that technology in order to integrate it in the curriculum. Current literature suggests that teachers perceive computer technology primarily as a teacher aid to clerical work in basic word processing, calculating, keeping grades, and maintaining class rolls (Bollentin, 1998; NCES, 2003; Russell, 1995; Swan, et al., 2002; Swan, Bowman, Holmes, Vargas, & Richardson, 2000). Thus, these teachers view this technology as a teacher productivity tool and not necessarily as a student learning tool.

This perception most likely derives from the second perception regarding their ability to meet the challenges of technology integration. The literature indicates that many teachers feel inadequately prepared for this undertaking (Balick, 1994; Commerce, 2002b; McCannon & Crews, 2000; Smerdon & Cronen, 2000). According to an NCES (2003) report, the number of teachers sharing this perception of their own ability may approach two-thirds of the profession. Most teachers in the above studies cited the lack

of time, technical and administrative support, and opportunity to develop integration skills as the foundation for their perceptions.

This lack of technology training for teachers has serious implications for the relationship of human beings and computer technology (Pinar & Irwin, 2005). The potential for computers and the Internet to fill more roles than they have to date constitutes a "standing reserve" (p. 153) with teachers as the ones to direct this potential usefully. Stated another way, teachers are the ones who must know how to use the technology if it is to do their students any good at all.

Hermeneutically speaking, understanding must precede application (Pinar & Irwin, 2005, p. 154). Therefore, teachers must be able to manipulate the general idea of computer technology to fit the specific context of their classrooms and curricula. It is unlikely that the inner life-worlds of teachers who have not developed a high level of computer literacy hold a conception of technology as filled with many possibilities. If these teachers' inner life-worlds do not hold a viable appreciation for how computer technology can be applied in the curriculum, then their perception of technology in that context will tend to be a muddle and to interrupt the application process. This translates into a need to investigate teachers' perceptions of technology as well as their perception of their ability and readiness to integrate it into their curriculum.

While diffusion theory (Atkisson, 1991; Cope & Ward, 2002; Surry, 1997) might offer some insight into the mechanisms by which new technologies are adopted by teachers, it is the 2.5% of innovators mentioned by Surry (1997) which constitutes the focus of this study. Therefore, diffusion theory does not appear useful to this study. Instead, that which guides this study is insight provided by Parr (as cited in Cope &

Ward, 1999) who suggests that "teachers' perceptions of learning technologies are likely to be vital factors in the successful integration of learning technologies" (p. 72). Ertmer, Addison, Lane, Ross, and Woods (1999) concur, maintaining that professional development is effective only to the extent that it addresses teachers' perceptions about teaching and learning. Ringstaff, Sandholtz, and Dwyer (1991) add that "increasing attention is being paid to the idea that lasting changes in the classroom must be accompanied by changes in teachers' beliefs about the purpose and nature of instruction and that these belief systems are remarkably resistant to change" (p. 7).

A prime factor shaping teacher perceptions is exposure to technology. Furthermore, this exposure must not be limited to school; teachers must encounter technology in multiple contexts if they are to develop the kind of familiarity which leads to the confidence necessary to their willingness to use it in teaching. Indeed, according to Vasu and Atkins (2000), integration will succeed only if teachers are adequately trained to use the technology and if they also have adequate access to technology both at work and at home.

This exposure is accomplished when schools place computers in the hands of teachers as much as possible. To develop a perception of technology as useful to education, teachers need time to interact with the technology as well as resources with which to interact, for it is this type of access to technology which results in teachers' perceptions of it as beneficial to them and to their students. Furthermore, policy makers who are aware of perceptions of teachers are in a better position to make policy and to enact programs. Bronack, Kilbane, Herbert, and McNergney (1999), for example, design and implement a web-based, case-method teaching environment for professional

educators by paying close attention to participants' perceptions about the usefulness of the program.

Teacher Voice and Empowerment

When technology integration began to be a concern of education, the response of many administrators was to place a computer on each teacher's desk with instructions that the teacher use this new technology. Smith (1989) points out that educators appear to have adopted this technology before devising a plan to guide any integrating process and have thus missed an important aspect of this process (Becker, 1994; OTA, 1995).

While it is true that a plan is vital to the success of technology integration efforts (Bray, 1999; Lemke, & Coughlin, 1998; Rodriques, 2000), an important aspect that is missing in many reform efforts is the voices of the teachers themselves. Leaving teachers' voices out of the plan gives it little chance to succeed. When teachers' voices are heard, a clearer picture of how technology integration ought to proceed will emerge. Having one's voice heard is an effective avenue to empowerment, and teachers need to feel empowered in any reform effort (Lew, 2004). A more important aspect of teacher voice is the way it has been found to correlate with student participation. Reisetter and Boris (2004) found that students who were able to perceive the voice of the teacher in the design and conduct of online courses tended to participate more. "The more often students had the opportunity to sense teachers' personalities in the course materials, the more connected they felt to the class" (p. 288).

This correlation is true of technology used in traditional face-to-face instruction as well. Support for this claim comes from teachers' success stories located on the Knowledge Innovation for Technology in Education Project (K.I.T.E.) (2001) website.

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One fifth-grade social studies teacher of 29 years has students create their own board games as a way to study U.S. westward expansion in the nineteenth century. Because the children generally want the games to look good, they request the opportunity to use word processors. The teacher appreciates this request, as it shows students are gaining confidence with the use of computers for learning tasks instead of only technological ones; the "things that come up in their life" (Case 2003G). The students are doing the teacher's assignment, not a computer assignment. Their viewpoint of technology's role in their education is influenced by the viewpoint of their teacher who uses technology "in little ways to . . . supplement what I am doing in other things" (Case 2003G).

The voice of a thirteen-year teacher, also of fifth-grade social studies, is equally apparent to students as they build databases of information about the first 16 presidents of the U.S. which they then introduce with a video they make themselves introducing the databases. In this case the sharing of the projects with other classes illustrates how students are drawn into learning by the teacher's voice: "I knew of no one else that was incorporating film in databases in the district. We showed these to teachers as finished products and they thought it was just really outstanding" (Case 2125G). Having students show their work to other classes reinforces in the students' minds that these are their projects; the teacher is "more of a facilitator, not only [for] learning the technology and how to use that, but also [for learning] information about the presidents" (Case 2125G). This perception on the part of the teacher is likewise apparent to the students as they come to accept technology as something to be learned alongside the "regular" curriculum, as a tool for learning that must be mastered the same as using a typewriter or pencil and paper.

Given the importance of these teachers' roles to their students, and thus to the educational process generally, it is logical that their voices should be heard by those who devise the curriculum they are to enact. The literature reveals some interest in hearing what teachers have to say. An important observation made by teachers is that they learn best not from professional development seminars or from formal classroom instruction but from peer tutoring and technical support in real-life contexts (Robinson, 2002). This echoes Aoki's explanation of understanding as tied integrally to the present context of the interpreter (Pinar & Irwin, 2005, p. 154). An equally important consideration is that teachers generally lack the time to engage technology in a way that might alter their perception of it as a mysterious, esoteric entity to that of a useful educational tool. They feel they need the time to learn about and practice new technology, observe others who are already proficient, and discuss with colleagues methods for managing this new set of resources (Schnackerberg, Luik, Nisan & Servant, 1999).

The fact that teachers are the mediators of curriculum to the students makes them the last and most important link in the chain of curriculum development. But their reluctance, either through ignorance or lack of proper preparation, to embrace educational technology may also potentially makes them the weakest link in that chain.

Jordan's Move toward Educational Technology

History of Educational Technology in Jordan

The development of Jordan's educational system can only be described as dramatic. Starting from almost nothing in the early 1920s, Jordan has forged a comprehensive, high-quality system to develop the human capital of its citizens. By 2004 there were 2787 government schools, 1493 private schools, 48 community colleges, and

19 universities (Ministry of Education, Jordan, 2005). In Jordan, access to basic

education has been emphasized in all the country's development plans. The government

has provided a school for every village and community with 100 or more school-age

children. As a result of this rapid spread of facilities, even citizens in poor and remote

areas have gained access to education (Ministry of Education, Jordan, 2005).

The Jordanian Ministry of Education started introducing computers in education

in 1983 with the purpose of utilizing them in an effective and fruitful way. The 1984/85

school year was the first year that computers were officially introduced in public schools,

being placed in only two schools. In the 1986/87 school year, the number of sites using

computers increased to 30 and included schools distributed all over the Jordanian

Kingdom (Humaisat, 1989).

The 1987 educational development conference focused on the significance of the

use of computers for building a better educational system by achieving several

educational goals. Jaradat (1989) reported the most important recommendations of that

conference:

- To develop and deploy a clear strategy to introduce computers to schools taking

   the following into consideration:

   1. All students should be familiar with the computer culture, what it is and

      how it is used in education.

   2. Computers should be used in the administrative system and specifically in

      the school administration.

   3. Computers should be used in building and developing the structure of

      vocational and professional education in light of their desired targets.

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- To provide a constant review of the content of computer education and working to
  update and improve it on a regular basis according to changes in the field of
  education and technology. (p. 49)

This plan focused on the importance of educational technology and its various uses. The goals set by the plan came as a necessary response to the needs of contemporary life and were in accordance with advances in education and science. However, reference to teachers is conspicuously absent. As mentioned above, efforts at educational reform, such as this push to integrate technology, do not promise to benefit education to any great extent unless they examine this aspect of education. The central position of teachers between programs and the students the programs are intended to benefit requires that their effect on implementation be accounted for.

In 1988, the government launched a ten-year education reform package which cost approximately $1 billion (Ministry of Education, Jordan 2005). The plan aimed to improve the quality and relevance of education by introducing technology to education and linking that knowledge to real life. In that year a new educational administration was formed under the general administration of curriculum and educational technology. Until 1998, this office had been under the curriculum administration's control. This administration has introduced many programs and organized school visits to oversee the use of technology in education and to evaluate students' experiences (Jaradat, 1989).

Although this effort addresses the experience of students, reference to the experiences and perceptions of teachers is still absent. Educational reform to date in Jordan focuses on installing an infrastructure of computer and Internet connectivity. This is a recurrent theme in educational reform. Attention generally focuses on a method

rather than on those affected by and responsible for enacting the method. The search, according to Dudley-Marling (2004), is for ever more stringent, ever more rigorous methodology to apply to education's problems. Taubman (2000) suggests a reason; experience teaches that science has the power to create a better world if only its methodology can be followed rigorously enough. This perspective applied to educational reform is not only misleading, it is also a dangerous position to adopt, for when an effort fails to deliver expected results, then those teachers who were not considered in the formulation and enactment of the plan are often the first ones to be blamed for failing to implement it successfully.

Current State of Technology Integration in Jordan

The current situation in Jordan is that computers are being used in educational institutions—colleges, schools, and universities—but not in the way educators wish to see them used (Ghazzawi, 2000). They constitute an addition to the subjects that students must study as well as a tool for administrative work. However, little has been accomplished in integrating this technology in the form of instructional media that will add joy to the classroom and make learning a series of interesting activities.

Jordan would appear to be between the second and third stages of educational computer awareness as described by Jonassen (2000), who traces the history of computer usage in American education beginning in the 1970s. Jonassen points out how the initial use of this technology involved learning *from* computers in the form of Computer-Assisted Instruction. The1980s saw a shift in the use of technology in education which led to students learning *about* computers. It was in this era that computer literacy became a concern. Students were called on to name the parts of a computer and to identify a list

of computer-related vocabulary words such as "bug," "CPU," and "software" (p. 7). The third stage of computer awareness in education, in Jonassen's view, involves learning *with* computers. This calls for the computer to be used not as an object of study but as a tool of education, what Jonassen refers to as a "mindtool" (p. 9).

As mentioned above, a mindtool is any software which can be used for cognitive development. Using programs like spreadsheets, flowcharting applications, and databases to represent in graphical form their knowledge and understanding leads students not only to consider how their knowledge can be represented but also to reflect on how they store and manipulate knowledge within their own life-worlds. A model for how one thinks and creates new knowledge is an invaluable tool for students, for any context which leads them to be more conscious of how they learn leaves them better prepared to learn.

Alkhateeb (2001) describes a similar view based on an investigation into computer use in Jordan, although the model proposed views the computer as teacher, as subject, and as tool. This researcher's view of the computer as school subject and as teacher is similar to Jonassen's (2000). Viewing the computer as a tool, however, tends to cast it into a more traditional role than Jonassen's "mindtool" in that it becomes a tool which students use to access knowledge rather than to investigate how they construct and manipulate it. Thus computers are programmed with knowledge which is released as students need and can accommodate it.

It is this conception of knowledge as something contained in some set of data stored on a computer which supports the claim that Jordan has yet to discover the use of computers as mindtools. This positivist epistemological lens also tends to keep Jordanian

educators from considering other possibilities for computer use and for their students'

learning. Jordanian education still has far to go before students can begin using

computers as mindtools. More teacher preparation is needed as well as the opportunity

for students to see computers as commonplace in school, which translates into more

computers placed in classrooms rather than limiting computers to labs.

While I was not able to locate any references in the literature concerning

Jordanian teachers' perception of computers, I did observe a suggestive pattern of usage

during my last visit to Jordan in the summer of 2005. According to my observations,

teachers in Jordan have their students spend more time learning how to use the computer

than actually using it for tasks.

As part of a class I took in the summer of 2004, I visited three schools in Amman,

Jordan: an elementary, a middle, and a secondary school. As is the case with most

schools in Jordan, each school had a lab, and no computers were in any classrooms. On

average, eight computers in each lab served classes of about 35 students, so there were

four or five students at each computer. The elementary teacher had the students using the

Internet to study the geography of Asia, and they were to provide details about Asian

countries such as size, population, principle exports, and so on. The teachers at the other

two levels employed a similar approach by having their students use the computer to

locate information.

It was apparent that the teacher had not succeeded in instructing the students in

how to operate a computer, as they waited for the teacher to offer detailed instructions on

how to click the mouse, open files, and run programs. They had many questions and

waited for teacher approval before taking each action. The teacher also did not appear to

be comfortable with the computer. She read each instruction from a script, keeping each student on the same step of instructions until they were all ready to proceed to the next. I had the strong impression that this teacher would have been extremely uncomfortable with the idea of permitting one or a few students to progress beyond the rest of the class and then share with their peers their insights into how to proceed.

Computer Use among Teachers in Jordan

Willis (1991) states that human experience includes perceiving, thinking, and acting, "but it all begins with perceptions" (p. 173). Given the lack of studies of teacher perceptions, interviewing teachers and observing how they use computers and technology has the potential to illuminate their perceptions about this technology.

The situation for teachers in Jordan is similar to that for teachers in the West. Lack of training, equipment, time, and support limits teachers' exposure to technology as well as their opportunity to develop literacy with new technologies (Al-Dabassi, 1983; Al-Habib, 1992; Al-Shair, 1993; Mahran, 1993). Almekhlafi (2004), in a study of preservice and inservice teachers' computer use in Jordan and other Arab countries, finds that teachers' use computers correlates with the number of hours per day they are able to use them, the number of years they have been using them, and any technology courses they have either taken or taught.

This study suggests that teachers with more time and experience in technology as well as teachers who have either taken or taught a technology course tend to use computers more extensively and for more varied purposes than do other teachers. The highest scores are related to multimedia authoring, creating databases/spreadsheets, word processing/desktop publishing, and computer-assisted learning.

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Like teachers in other parts of the world, Jordanian teachers also need to formulate a conception in their own inner life-worlds of the potential of computer technology for education if they are to develop the understanding necessary to mediate its use in useful directions. There exists, therefore, the need for teachers to develop technology literacy, but the goal of such preparation ought to be to bring teachers to a level of familiarity with computer technology that they begin to be the ones to formulate approaches to integration. This is the implication of the infusion model of technology integration (Hadley, et al., 2002) in which technology ceases to be the major concern once it is familiar enough to teachers that they can consider it in ways similar to how they consider the chalk board, the overhead projector, and other classroom items instead of a mystery to be conquered before it can be used.

Conclusion

In the more developed nations of the world as well as in the Middle-East, computers have been placed in schools with the best of intentions and the highest of hopes but without adequate training or support for the teachers who are expected to incorporate them in their daily instruction. In addition to this oversight, curriculum planners have failed to pay adequate heed to teachers' voices. Their voices are important to students because this is the one aspect of instruction to which they most readily respond. Their voices should also be important to curriculum designers because teachers are the ones ultimately responsible for enacting curriculum. The study intends to listen to teachers' voices with their implications for curriculum planners.

An important reason to listen to teachers' voices is to understand how they perceive, experience, and make sense of technological integration. Aoki provides a

theoretical analysis of how general understanding is modified to accommodate a present

context (Pinar & Irwin, 2005), and Willis (1991) points out that perception is

foundational to understanding. It would follow that the success of curriculum programs

hinges on teacher perceptions and the meanings they make out of their teaching

situations. However, little qualitative data exists, specifically relating to Jordanian

teachers, to provide any in-depth understanding of teachers' views, experiences, and

meaning-making efforts regarding technological integration. This study intends to fill

this gap by using interviews and observations to understand teachers' own experiences

and voices.

The significance of my study is that investigating Jordanian teachers' perceptions

and experiences of technology can provide insights that will lead to suggestions for

policy makers to make the integration efforts in Jordan more successful. In doing so, I

will make both theoretical and methodological contributions to the study of technology

integration in schools.

CHAPTER 3

METHODOLOGY

This chapter is devoted to the methodology guiding the study. According to van Manen (1990), methodology is "the theory behind the method" (pp.27-28) and the force determining which method is most appropriate to the study. Research traditions from hermeneutic phenomenology form the theoretical frame for this study of Jordanian teachers' perceptions of the integration of technology in education.

The focus of this study is to understand Jordanian teachers' perceptions of technology and of the meaning of integration in the current context of a royal mandate to integrate technology in education. Furthermore, this study seeks to illuminate teachers' perceptions of the value of integrating technology in education by examining the role they should play in that process. By focusing on teachers' perceptions about technology in education, this study looks at those factors that influence how technology is actually used in their classrooms. The following describes the design and methods used to answer the research questions posed in Chapter One. To review, those questions were:

- What are Jordanian teachers' perceptions of the value of integrating technology in education?

- What does technology integration mean to Jordanian teachers?

- What are the implications of teachers' viewpoints for Jordanian policy makers?

Theoretical Assumptions and Traditions

This study is guided by insights into phenomenology provided by Willis (1991) and van Manen (1990). Willis explains the basic assumptions of phenomenology:

- Perception is primary to human experience, which consists of perceiving, thinking, and acting, "but it all begins with perceptions" (p. 173).

- Reality resides not external to people but within the inner life-worlds unique to each individual.

- Phenomenology seeks to uncover the meaning of a phenomenon by peeling back or scaffolding the various layers of moral, ethical, social, and cultural influence people encounter in their life-worlds.

According to van Manen (1990), the aim of phenomenology is to produce a textual account of lived experience to reveal essential themes capable of stimulating similar perceptions in the inner life-worlds of others. Hermeneutic phenomenology, according to van Manen stands both as a theoretical perspective and as a methodology. It is descriptive (phenomenological) because it seeks to describe things as they are. It is interpretive (hermeneutic) because it seeks to describe phenomena with language, which is an inherently interpretive process.

In the course of this study, I attempted to discover Jordanian teachers' perceptions about technology in education. The interviews permitted teachers to speak for themselves. In their own words, they expressed their perceptions about what it is like to teach in Jordan today and what it means to embark on the unfamiliar road to technology integration. The observations permitted me to determine whether the actions

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demonstrated by the teachers actually matched their descriptions of how they experienced technology in education.

Researcher

Van Manen (1990) maintains that "to do research is always to question the way we experience the world" (p.5). My interest in the current project began in the class I took in the summer of 2004 where I visited three schools in Amman, Jordan an elementary, a middle, and a secondary school. Back in 2001the Jordanian government issued a mandate to the teachers of Jordan to integrate technology in their teaching at a time when those teachers knew little about technology in general and next to nothing about computer and Internet technology specifically. At that time, I was able to see the most obvious problems with this situation, but after studying in the U.S., I have come to see that phenomena gain their shape not from surface features only but even more from the deeper details which are generally never questioned or even considered. The knowledge I have gained during my studies in the U.S. about the integration of technology in education raised for me the question of what Jordanian teachers' experiences are in this situation. The phenomenological view is that experience is the source of reality for individuals, so understanding the experience of Jordanian teachers promises to enlighten me about the reality of teaching in Jordan.

My exposure to contemporary educational philosophy and theory has opened up for me the possibility for suggesting how Jordanian education might be improved. The understanding I have developed concerning epistemology, theoretical perspective, and research strategies offers to answer the question that occurs to me in response to my exposure to the two educational systems, in the U.S. and in Jordan: how might I most

effectively bring change back to Jordan's educational system regarding technology in education?

The overriding question in positioning myself as a researcher, however, is how to keep my own perceptions from coloring my understanding of the perceptions of the teachers I interview and observe. My own expanded understanding of how technology is best used by education as well as my insight into the meaning inherent in the phenomenon I hope to illuminate may prejudice my interpretation of the data by blinding me to insights not fully consistent with the current level of understanding that I bring to the phenomenon. I must, therefore, take care to identify and interrogate answers suggested by my own prior experience.

I want to know what the experience of teachers in Jordan is with respect to the integration of technology. I want to understand how their experiences are shaped by their level of knowledge about technology, by their attitudes toward the mandate, and by their perception of their own agency in the effort to integrate technology in their teaching. Answers to these questions stand to inform the effort itself by providing feedback to policy makers and by helping teachers understand more about what they are attempting to accomplish with technology in their classrooms.

Participants

In order to assure that the responses given during the interviews were as honest as possible, I sought to establish in the interviewees the perception that they were indeed participants in the study rather than subjects of study. I began by explaining to the teachers that I needed his or her help to understand the current situation in Jordanian education. Asking the teachers to consider themselves as experts whom I needed to

consult gave them a feeling of ownership in the study. At the same time, informal

discussions with teachers both before and after the interviews demonstrated that they

viewed me as an authority as well. They questioned me about education in the U.S.,

specifically asking whether U.S. schools actually have computers in the classrooms and if

students actually have computers that they do not have to share with others. As a result

of such interactions, my relationship with participants became more collaborative.

Since the purpose of this study was to understand the experience of teachers in

Jordan in the context of educational technology, participants were selected from the

population of Jordanian teachers charged with integrating technology in their curriculum.

Participants for this study were chosen based on specific criteria. Four teachers, two

from the elementary and two from the secondary level, were interviewed in order to

represent the variety which exists among educators in any educational community.

At the elementary level, one teacher was selected from urban schools and the

other from rural schools. The two secondary teachers were similarly chosen to reflect the

difference between urban and rural perspectives. Selecting participants in this way

afforded the study a broader perspective on the educational processes taking place in

Jordanian education today. To confine the investigation to a narrowly defined context

such as only urban teachers or only secondary teachers would have been to limit the

understanding promised by the study.

The principals of both the urban and the rural school districts which participated

in the study provided me with a list of elementary and secondary teachers from which to

select participants. The selection was purposeful to the extent that general information

provided by the principals about teachers' use of technology caused me to define a

population based on technology use among teachers. I then chose participants from this population to represent a two-by-two grid with each teacher representing either elementary or secondary and either urban or rural.

The qualitative researcher attempts to secure rich descriptions of participants while still protecting their anonymity. The following descriptions of participants attempt to satisfy both these ends. Each participant has been assigned a pseudonym.

- Sameer is a secondary math teacher in an urban school with more than ten years of experience. He has used technology starting with calculators and incorporated computer technology as soon as computers became available. He believes computers and the Internet offer Jordanian students the resources they need to survive in the modern world. He also believes that teachers should be able to provide this advantage to their students.

- Hana, who also teaches in an urban school, has been teaching English to Arabic-speaking students at the elementary level for about twenty years. She regularly browses the Internet to find material for class. She also has her students use computers to compose writing assignments and to translate using software which translates between English and Arabic. Hana uses helpful tools such as spell check and grammar correction to help her students learn from as well as fix their mistakes. She also has taught her students about various websites which aid in proper pronunciation and usage of words.

- Eman has been teaching elementary-level biology in a rural school for about six years. In addition to incorporating CD-based lessons in her teaching, she also assists other faculty and office personnel in maintaining grades and attendance

records, contacting the ministry of education, and maintaining communication

with other schools, primarily through email. She often utilizes computer

programs such as Microsoft Office to help generate tables and spreadsheets which

faculty members can use to organize data. Other programs such as Outlook allow

her to monitor her email, receive incoming announcements, set up meetings, and

communicate with staff.

- Ahmed has taught chemistry in a rural secondary school for more than eight

  years. He taught himself to be computer literate while in college at a time before

  computer use in education had gained popularity. He believes the computer can

  not substitute for a teacher, but it is a powerful tool teachers can use to keep

  current in their fields as well as to further their students' learning. Ahmed

  believes that students should always have access to proper, credible resources.

  Therefore, he provides links that students can visit for extra information needed in

  their class projects.

Data Collection and Procedures

The aim of this study, as it appeared in Chapter one, is to understand the situation

in Jordanian education relating to the integration of technology. To do this, I have

investigated Jordanian teachers' responses to this situation as a way to gain insight into

how they perceive it. By examining teachers' life-texts collected through interview and

observation, I expect to gain an understanding about their perceptions of technology

integration. The two months I spent in Jordan allowed each participant to be interviewed

two to three times with about a week between interviews and to be observed twice.

Following the approval of the university's Institutional Review Board in 2006, I conducted eight interviews during the summer: an initial interview with each of the four participants and then a follow-up interview with each. Owing to the participants' different schedules, the interviews took place at a variety of times and in a variety of locations. The first interview with each participant took place in the computer lab at each school. This decision resulted from the suggestion made by each of the principals because the lab is central to the phenomenon of technology integration. According to the principals, the lab is where the technology is located; therefore, it is the site where all the advantages and problems are made evident. In the same way that interviewing sports figures on the playing field or in the locker room is inherently different than interviewing them at home or in a restaurant or in any context other than the one contributing the most to the question one seeks to address, interviewing teachers in the midst of the technology which has been placed at their disposal stood to be more revealing than interviewing them anyplace else.

The second interview took place in a wider variety of locations: in the lab, and in the participants' classrooms. This was appropriate since it afforded me the opportunity to observe them in a variety of contexts. Observations also were conducted in the labs and the participants' classrooms. In the following sections, I provide details about interviews, setting, observation, and data analysis procedures.

Interviews

Data collected by interviews illuminated the perceptions of Jordanian teachers about technology in education. The sharing of information between individuals is an appropriate way for one to gain insight into the life-world of another (Willis, 1991). The

interview, as a highly formalized form of communication, is the most powerful way to learn about the perceptions of others (Thompson, 1989). Analysis of the initial interviews suggested themes, which then formed the topics of subsequent interviews.

I began with semi-structured interviews (see interview questions in Appendix A: Interview Protocol) to confine the topic of discussion to teachers' perceptions of technology. However, each interview tended to evolve into an open-ended format as participants' answers began to suggest the need for a more conversational approach in order to pursue details about the deeper aspects of their perceptions. Using a few leading questions to guide the topic of each interview allowed me to probe the significance of responses and to build a deeper appreciation of possible themes to arise from the interview process.

The process described above resulted from my attempt to collect data initially on a broad basis to define the context of this investigation while permitting the close examination of details contained within that context. I believe that engaging in semi-structured interview methods avoided "interview material that is skimpy and that lacks sufficient concreteness" (van Manen, 1990), which would tend to lead to "over-interpretations, speculations, or an over-reliance on personal opinions and personal experiences" (p. 67). Instead, I hoped to focus on themes to arise from a discussion of such experiences and to interpret them in light of the context established by the research questions themselves.

Setting

Four schools were selected for this study, two rural and two urban. Elementary and secondary teachers were selected such that there was one elementary teacher from a

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rural and one from an urban school and one secondary teacher from an urban and one

from a rural school. I chose this arrangement to ensure that I did not end with

perceptions shaped more by environment than by the teachers functioning in that

environment.

The names of the schools (pseudonyms) were Mosa'ab School (urban), Malek

School (rural), Omar School (urban), and Khaled School (rural). The schools were all in

the Northwest Region (also a pseudonym).

Interviews were conducted in computer labs and in classrooms, as these provided

sufficient privacy and a noise level low enough to be conducive communication. While

the participants eagerly engaged the interview questions, two factors appeared to result in

reluctance and hesitancy on their part. First, the participants initially viewed me as an

outsider come to examine the source of their agency and authority. Second, political

concerns contributed to their reluctance to address certain government-related topics.

To get to know the participants, and for them to know me, I gave myself time to

be in the school for the whole school day, and I spent time with them during their lunch

breaks. I also tried as much as possible to convince them that in doing this research I was

not representing any political opinion, but I was seeking their help in understanding, not

to prescribe to them some formula for action or to judge their performance. My main aim

was to bring Jordanian teachers' voices to the public light.

This strategy worked to the advantage both of this study and of the participants.

They discussed in a relatively open manner their concerns about the problems they have

encountered while attempting to comply with the mandate to integrate technology in their

teaching. They also suggested much that administrators and the government need to be

aware of which would improve the chances of success for the push to integrate.

Observation

Marshall & Rossman (1999) stress the importance of observation in qualitative

inquiry. During the interviews, I noted the participants' body language and affect in

addition to their words. I also scheduled two observations with each participant, one in

the classroom and one in a computer lab. During theses observations, I witnessed the

participants' performing those actions they discussed in the interviews.

The combination of these observations with interviews provided for triangulation

of the data by enabling me to check "information that has been collected from different

sources . . . for consistency of evidence across sources of data" (Mertens, 1998, p. 183).

Although some nuances of meaning emanating from their actions did not appear to be

entirely consistent with their discussions, I found no significant differences between what

they said and what they actually did.

Data Analysis Procedures

The purpose of data is to form the foundation for meaning to come out of a study

(van Manen, 1990). However, the meaning that emanates from raw data is chaotic.

Significance arises only when connections in the meaning arise. These connections

constitute themes in the data.

Once the data have been collected, data analysis produces the themes which will

inform the study. The researcher constructs themes in an attempt to capture phenomena

through reinforcement and amplification of aspects of those phenomena considered to be

most central or important to a study (van Manen, 1990; Willis, 1991). In this sense

themes may be viewed as part of and deriving from the networks of predispositions constituting individual life-worlds. Since individuals are distinct from one another, the detection of themes as consistencies in the texts of several individuals provides a way to go beyond individual perceptions of a phenomenon to illuminate the phenomenon itself.

In this context, the hermeneutic phenomenological approach seeks to describe experience to reveal themes and then to discern meaning in those themes. This flows from the idea that people tend to define the world in themes which bring structure to the chaos of meaning in order to make it usable. Thus, themes exist as simplified statements of meaning (van Manen, 1990, p. 87) constructed in an attempt to capture phenomena.

Van Manen (1990) suggests a three-tiered strategy for identifying themes: the wholistic or sententious (considering the whole of the text), the selective or highlighting (considering telling phrases of the text), and the detailed or line-by-line (seeking to attach significance to parts of the text which relate to the phenomenon under investigation). This insight will guide my identification of themes suggested by the data.

Rigor of the Study

Rigor in qualitative research does not refer to close adherence to method, as it does in the positivist viewpoint. Instead, as suggested by Guba and Lincoln (1998), rigor deals with trustworthiness: credibility, transferability, dependability, and confirmability (p. 213). In my study, I focus on the first two criteria, credibility and transferability.

Credibility

According to Guba and Lincoln (1989), the criterion of credibility in qualitative investigation replaces the positivist idea of "isomorphism between findings and an objective reality" with "isomorphism between constructed realities of participants and the

reconstructions attributed to them" (pp. 236-237) by the researcher. This study seeks to establish its credibility by triangulation, prolonged engagement, persistent observations, and member checks. Since triangulation was mentioned earlier, I focus below on these other aspects.

Prolonged Engagement is defined as "substantial involvement at the site of the inquiry . . . to establish the rapport and build the trust necessary to uncover constructions" (p. 237) reflecting the reality of the phenomenon being investigated as constructed by the participants in the study. The two months I worked with the four teachers who participated in this study enabled me to build a relationship with them which facilitated my understanding of their perceptions.

Persistent Observation is made possible by prolonged engagement and enables the researcher to "identify those characteristics and elements" (p. 237) of the phenomenon which are most telling and relevant to the study. I took every opportunity to observe the participants, not only during interviews and scheduled observations, but also during informal meetings and on other occasions. This practice allowed for further triangulation of the data beyond that afforded by interview and scheduled observations, since I was able to observe their actions and hear sentiments expressed external to both of those contexts.

Member Checks involves "testing hypotheses, data, preliminary categories, and interpretations" (p. 238) with the participants in the study. Its primary purpose is to assure that facts cited and quotations offered accurately depict the perceptions and positions of those who made them. It can also stimulate participants to further insight into their own situation by giving them an outsider's view of the phenomenon.

I provided each participant with transcriptions of the interviews in both Arabic and in English to assure accuracy both of the transcriptions and of the translations. While all the participants agreed on the accuracy, several did appear surprised at what they had said during the interview. It was similar to the experience of hearing one's voice on a tape recorder for the first time. Hearing one's voice the way others hear it can be a shocking experience since it sounds nothing at all like what one has become used to by hearing one's voice from the inside. It is the same with perceptions. Some of the participants were surprised at the frustration which was evident in their responses. One participant realized only after reading the transcript that she had been telling me of the problems she had to deal with as though I were some sort of administrator charged with fixing them. Two of the participants commented that they did not intend at first to divulge the full range of their true feelings about the situation, but they ended by discussing more than they ever intended to. In the end, however, all of the participants approved the text of their transcriptions.

Transferability

Transferability in qualitative research involves "checking the degree of similarity between sending and receiving contexts" (Guba & Lincoln, 1989, p. 241). In addition, the burden of proof for transferability is on the receiver instead of on the investigator. What this means is that:

> The object of the game in making transferability judgments is to set out all the working hypotheses for *this* study, and to provide an extensive and careful description of the time, the place, the context, the culture in which those hypotheses were found to be salient. (pp. 241-242, italics in original)

Said differently, the effort of the investigator is to provide sufficiently "thick description" (p. 241) of the present study to permit others to decide whether that study is applicable to their own investigations.

Concerning phenomenology specifically, van Manen (1991) explains that phenomenology is "the study of essences," in a "search for what it means to be human" (pp. 11-12), suggesting that the result of a phenomenological study can be applied at a general level. This search leads the researcher into an investigation of human experience on a primal level (p. 13). This primal aspect of experience, which is at the heart of phenomenological inquiry, along with the search for what is essential in human experience, strongly suggests that what is phenomenologically true of part of humanity is also true of the rest of humanity.

According to Willis (1991), this search for essence is not the primary function of phenomenology. Instead, he calls the "transcendental search for the 'essences' of human experience" an "unhelpful legacy" (p. 177) of the phenomenological philosophical tradition, from which the phenomenology applied to curriculum inquiry derives:

> This approach thus suggests that if one can appropriately discern one's own
>
> perceptual life-world, there is no need to inquire about the life-worlds of others;
>
> indeed, such inquiry would be futile, since one cannot experience another
>
> person's life-world, which in any case, is essentially like one's own. (p. 177)

Instead, Willis maintains that the purpose of investigating the perceptions of others is for "expanding and refining the perceptions of the inquirer," who is then enabled to "render metaphorically what the inquirer has perceived about the life-world perceptions" (p. 175) of others. This he calls the most basic form of phenomenological inquiry.

My intent is not to resolve the philosophical-theoretical differences between Willis and van Manen. Instead, I attempt to provide thick descriptions of themes that arose out of the interviews and observations of the teachers chosen for this study.

Conclusion

This study into the phenomenon of Jordanian teachers' perceptions of technology in education uses qualitative methodology, taking van Manen (1990) and Guba and Lincoln (1998) as guides for both the methodology and the rigor of the study.

CHAPTER 4

DATA ANALYSIS

The purpose of this study is to understand Jordanian teachers' perceptions of technology and of the importance of integration in the current context of a royal mandate to integrate technology in education. In seeking to illuminate teachers' perceptions of the value of integrating technology in education as well as of the role they play in that process, this study breaks some new ground because few studies have directly investigated Jordanian teachers' perceptions of technology.

Thematic Analysis: An Overview

To address the research questions, this study sought first to characterize the current state of technology integration in Jordanian education relating specifically to computers and the Internet. This current state is best characterized in terms of themes to arise out of the interviews and the observations conducted for the study.

According to van Manen (1990), the researcher makes sense of the data through theme analysis. Identifying themes, in this view, arises from the need to understand a phenomenon. The themes are also that which is understood. Understanding is facilitated by the notion that theme analysis constitutes the openness to a phenomenon. In short, theme is a process of invention in response to discovery (p. 88).

Stated more simply, my own understanding of themes is that they are consistencies in experience. Themes arise in the form of familiar feelings, in sensations

that one has done a thing before, and in the confidence that one has achieved a deep understanding of an experience. Themes also arise in the form of consistencies in the experience of multiple individuals.

Van Manen (1990) suggests three approaches to discerning themes: the wholistic or sententious, the selective or highlighting, and the detailed or line-by-line (pp. 92-93). The wholistic approach results in a statement about the entirety of a text. The selective approach seeks to identify utterances which are particularly telling about the phenomenon under investigation. The detailed approach attempts to determine what significance the sentences or sentence clusters identified in the previous stage reveal about the phenomenon.

Following his suggestion, I first read the texts of the participants' interviews to generate a response on my part to the phenomena discussed. I then extracted those sentences which appeared most revealing about the phenomena. These statements by the participants then formed the basis for the themes I identified as arising out of the investigation.

A first, wholistic reading of the texts of the interviews suggests that the experience of teachers in Jordan today is best described in terms of frustration. This frustration was evident as participants described the gap between their understanding of how technology could be used to benefit students and how it is currently being used. Indeed, the source of their frustration is their understanding of the potential of technology to increase student learning and to prepare their students to live in a globalized society. At the same time, however, they must attempt to secure these advantages with outdated and unreliable equipment. Their situation is analogous to someone who realizes that a

2006 Mercedes could convey them reliably, aesthetically, and economically to any place they wish to go, but who are stuck with a 1979 Ford which gets only eight miles per gallon and breaks down with alarming regularity.

Each of the participants voiced this same concern about the potential of technology in the face of their inability to use it to their students' benefit. Sameer stated that many of the teachers in his school "complain about lack of time to even learn to use the computer" and doubted "if they use it at all" because of the lack of time to learn this technology. Hana commented on the lack of resources available to teachers when she wished she could learn PowerPoint so that she could build more interesting lessons for her students, "but in our schools they haven't started using it yet." Ahmed echoed the sentiments of all the participants about the lack of support when he suggested that "teachers should educate themselves in using technology; they should not wait until the Ministry of Education provides free training for them." He also added that those who are interested in learning about technology should ask for the support of administrators in this regard.

In fact, all of the participants had trained themselves in technology and in doing so had discovered many new possibilities for integration. It is ironic that their literacy in this technology is the source for their dissatisfaction with what they have been able to do to introduce technology in Jordanian education. In this way, the four participants illustrate a consistent byproduct of the development of technology literacy—indeed, the development of any skill—that abilities learned but not put into use can be a source of tremendous frustration.

In a second, selective reading of the texts, I concentrated on identifying those sentences that were most revealing of the frustration suggested by the previous wholistic reading; in a third reading, I analyzed the texts line-by line. I came to view this approach not as a set of steps to be taken in order, as the description suggests; instead, I found that I tended to engage all three approaches (wholistic, selective, and detailed) in varying degrees during each reading. This raised some concern, but I soon realized that each approach is not exclusive of the others. For example, when I did a wholistic reading of the data to understand what such a reading might reveal, in fact, I simultaneously came to understand how the participants' words combined into sentences and phrases and ultimately into a whole text. Said a different way, I have gained an understanding of how a whole text gains its character from the specific parts which make it up. This insight, in turn, helped me to discern those parts of the text which were most telling.

The texts of the participants each told a similar story of inadequate technical training, of malfunctioning equipment with no one on site qualified to repair it, of not enough computers for students, and of the need for administrative and technical support. However, these very obstacles led these teachers to discover their own agency as they devised means to overcome them. The situations that these participants found themselves in empowered them to implement the policy with minimal support and minimal resources. During this process of data analysis, I was struck by how closely the Jordanian teachers' concerns mirrored the barriers to the integration of technology in U.S. schools as identified by Lemeke (1998), Bray (1999), and Smerdon (2000). According to these three studies, the major barriers comprise deficiencies in the areas of time, resources, and support. The fact that the consistencies in the stories of the four

participants in this study called to my mind the substance of those prior studies strongly suggested that these themes merited further examination. They thus formed the context within which to understand more about how Jordanian teachers perceive technology integration, what value they attach to it, and what implications these perceptions might have for Jordanian decision makers. Central to the idea that these teachers' perceptions might have importance for Jordanian decision makers is the concept that causing others to hear these teachers' voices constitutes empowerment for them. These teachers practiced agency in their determination to secure their own training and to envision the advantages of technology integration for their students despite difficulties in getting their voices heard. For this reason, the third or detailed stage of analysis concentrated on the four themes which the participants demonstrated in their daily practices: time, resources, support (the lack of which currently hinders Jordan's efforts at integrating technology in education), and finally agency.

It is appropriate at this point to insert a note on the transcription of the research data. Although most educated Jordanians are at least functionally literate in English, I decided to conduct the interviews in Arabic. This decision was prompted by the desire for truly fluent accounts, both linguistically and perceptually. My belief is that people are able to provide more detailed and telling accounts when language becomes as transparent as possible, and the need to use any language other than one's native tongue tends to disrupt rather than facilitate communication.

After transcribing the Arabic version of the interviews, I hired an expert linguist in Jordan to translate the data into English. Throughout the observation process, I took the field notes in Arabic, translated them into English, and typed them myself. I then

examined the English translations to assure that the participants' accounts in the English version maintained the accuracy and vitality of the originals. Some fine points did require adjusting, however. One such case was the use of the term "media" to translate what should clearly have been translated as "technology." I made some other minor adjustments involving the choice of prepositions, which tend not to translate well between any two languages.

I observed each of the participants in a variety of settings and times: in the classroom, in the computer lab, and in the teacher lounge, and generally before, after, and between classes. These observations helped me to understand something of how these people interact with their classes, with each other, and with technology on a daily basis. The aim was to provide a broad context for understanding the participants' interaction with technology beyond what would have been provided by observing them in the classroom or in the computer lab alone. From the interview and the observation data, four themes emerged: (a) lack of time, (b) lack of resources, (c) lack of support, and (d) empowerment.

Lack of Time

The first theme to come out of the data is the lack of time for teachers and students to engage technology. Eman expressed dismay that her students "are lucky if they use a computer once a week" in the computer lab, and Sameer stated that the teachers at his school all complain "about lack of time to even learn to use the computer." He continued that because they do not have time to learn about computers, many teachers do not "use it at all."

All the participants also spoke of learning about computers and the Internet on their own. Ahmed and Eman said their learning began with university courses when they were pre-service teachers, but all participants reported that they gained most of their literacy with computers at Internet cafes. They also observed that many teachers who have not had the same opportunities to learn about this technology do not show any interest in integrating this technology in their own teaching.

Each of the participants appeared to perceive the school administration and the government as in control of the amount of time teachers are able to devote to learning technology. Sameer, Hana, and Eman each stated that even though workshops and training sessions occur once per year at their schools, the quality of the training is compromised because the trainer usually has a large number of teachers to train and is not able to offer them individualized attention. Therefore, according to these participants, these training sessions do not benefit the teachers. Because they are "offered free of charge and obligatory for every teacher," and the number of teachers is large, quality is low.

Offering a more direct connection, Sameer stated that if the administrators "could understand the importance of technology in teaching," then they would create more time for teachers to learn about it. Hana suggested that "school administrators and the government should make our lives more flexible by forgetting about this daily routine that turns our lives into nightmares." Hana's statement did not refer to the school day in general; it referred instead to the red tape involved in reserving time in a computer lab.

These last comments demonstrate that these teachers' perceptions of the larger context of the teaching profession itself actively shape their perceptions about the

integration of technology. Hana's comment especially goes to the heart of a profession in which professionals are dictated to about what rooms they are to be in at which times. Ahmed's comment also suggests much about the value that teachers generally attach to mandatory meetings. Although each participant agreed that the government mandate to integrate technology was good for education, each also expressed reservations because the government did not appear to be aware of teachers' needs with respect not only to the time needed for training with the technology but also to the support needed to implement the mandate. Sameer had this to say:

> I think the policy makers don't know what the conditions of the classrooms and computer labs are. They need to know that the class period is not enough for integrating technology in the way we are doing, and are being asked to do. I mean we can not keep running from the classroom to the computer lab, back to the classroom wasting time with each move. They need to know that with their mandate, they need several other mandates that make it possible for a real integration to happen.

Eman echoed Sameer's sentiments. The time issue to which Sameer referred is not just class time, he also felt that the mandate should cover time for students to use computers outside class, and he was also concerned about the time teachers waste running between the lab and the classroom. Sameer seemed to believe that if students had time to use computers outside class, they might come to class with more skills and therefore the teacher could use the computer as a tool for learning. Eman echoed Sameer's sentiments:

> I think the mandate is a good first step. There should be mandates asking the schools to provide computers in the classrooms, and most importantly there

should be ways for the students to use the computers outside schools. The
government should provide each school with more technicians, better equipment,
and more training opportunities, especially for the older teachers who are not so
excited about new technologies.

Hana stated,

There is a big problem with the computer lab being used by several teachers in a
row. The students will flock into the computer lab, and spend about 15 minutes
of the 50 minute class period trying to log in, etc. Then they couldn't do much
work before another group wants to use the lab.

As these statements show, the participants cited a number of challenges; however,
time was a major concern for each of them. They also expressed concerns about the
government mandate. To them the mandate should also cover the use of computers by
students and teachers outside the class time.

According to my observations, teachers are hindered by lack of time in several
ways. First is the lack of release time for teachers to learn how to use computers. Second
is the fact that there is no time regularly scheduled for students to use computers. Third,
since there is no time scheduled for students to visit the computer lab, which is the only
place they have the chance to use computers because there are none in the classrooms,
teachers must reserve time in the lab for their classes. This process of reserving lab time
is time consuming, and once this is done, actually getting the students set up in the lab
can easily take one quarter of the time allotted to the class.

The teachers I interviewed and observed had full teaching schedules, a situation
which appears to be a constant in education: teachers historically have little time for

anything other than teaching. The teaching day generally does not include time to meet with colleagues to discuss the relative merits of methods and approaches or to add the experiences of others to one's own repertoire. In this way teaching is different from professions in the medical, legal, and technical fields. Those professionals tend to spend more time discussing problems with one another than they do addressing the problems themselves. Teachers, on the other hand, address the problem of how to facilitate their students' learning while hardly ever having the opportunity to discuss that task with their colleagues.

Given this lack of time inherent in the teaching profession itself, it is perhaps inevitable that the participants learned about technology on their own due to the inadequacy of the once-per-year training sessions and workshops. On the other hand, this means these teachers sacrificed their own time and learned about technology not in school but primarily in the many Internet cafes available to the public in Jordan.

Visiting all the teachers I observed in the computer lab involved scheduling time in the lab because there is only one lab for the whole school. The teacher's first stop for scheduling time in the lab is the office secretary. This person adds the teacher's class to an existing schedule for the lab. The teacher is then told when the time will be. If anything prevents a class from using the lab at the scheduled time such as the Internet not being available, technicians needing to work on the computers, or one of the frequent power outages—then the teacher for that class has the option to take the next available time. This requires that all the following times be shifted down. It also requires that each teacher be notified of the change in time. If such a change in time does not permit the class to do what they have planned, then the teacher for that class will have to start the

scheduling process all over again. Once in the lab, teachers often have to wait for the

Internet to come up, which may take as long as five minutes. When the inevitable non-

working computer is discovered, students must be shuffled to a working one.

I observed Hana's class in the urban elementary school on a day when they were

scheduled to go to the lab. When I arrived, Hana explained to the students that I was

there to observe them as they went to the lab. She joked that "he wants to see how smart

you are." The students immediately showed signs of excitement by verbalizing their

approval; some even stood up to cheer. Throughout the morning, since none of the

classrooms I visited had a wall clock, students frequently asked if it was time to go to the

lab yet. When it was finally time to go to the lab, the students gathered their books and

other materials more quickly than I observed them doing so during the rest of the time I

observed the class.

The behavior of the students illustrates their readiness to learn about this

technology and their eagerness to engage that learning. One of the problems of teaching

is to gain students' attention, for then a teacher can teach them just about anything.

Hana's students were clearly ready to learn.

Once in the lab, Hana assigned the forty-four students to thirteen groups, one for

each of the thirteen computers in the lab. She asked each group to report whether the

computer was working or not. Six groups reported that their computer would not start,

that it was not responsive (locked up), or that it was in some other way not usable. Hana

then reassigned the students to seven groups, one for each of the seven working

computers.

Hana explained to me that she decided who should be in each group by taking into account the relative expertise of each student. She had asked them at the beginning of the year which of them had access to a computer at home. She also requested that anyone who did not start the year with a computer at home should let her know if that changed any time during the year. She then assigned groups such that each group had at least one student who had a computer at home, or who she knew had some experience with computers. Hana expected these students to address most of the simpler questions to arise from the group about how to get the computer to do something, thus freeing her to address the more complicated tasks she wanted the students to perform.

By the time the students were finally situated with from six to seven students at each computer, and the Internet was finally functioning, ten minutes of the forty-five minute class time had passed. Hana then started the lesson, which I later discovered was part of a larger lesson in English. The class had already learned something about tourist attractions in Paris. Now they were going to search the Internet to find more information.

Hana told the groups to begin by opening the web browser and to browse to Google's search page. She then told them to use the words "tourist attraction" and "Paris" as the search terms. At this point hands started going up all over the room. Students wanted to know if they were on the right page, if they were "doing it right," or how to open the web browser. Hana went to each group to make sure they had their web browser open, that they had gone to Google's search page, and that they had used the right search terms. I noted that most of the students were not able to type the search terms because the terms were in English, and the students had not yet learned enough

about the language to type the words. Therefore, Hana typed the search terms for each of the groups. For several groups, Hana had also opened the web browser.

After another thirty minutes of constant hand raising, students asking for directions, and Hana micromanaging the students' efforts, each group had a web page on its computer showing information about tourist attractions in Paris. Each group then printed the page to hand in as part of the assignment. Although Hana did not have to click the print icon to print the pages, each group waited until she was watching them before they attempted to print.

Given these students' eagerness to engage this technology, I was somewhat surprised to see this behavior. On the other hand, I at no time observed any of the teachers turning their students loose in the lab to see what they would do. Instead, each dictated the sequence of steps the students should take to complete the assignment. I can only surmise that this approach results from their concern with the time limitation. When they are allowed in the lab as little as one or two class periods per week, and for each visit at least a quarter of the time is spent just getting the students situated at the machines, there is not enough time to let students experiment with computers which might break down.

I noted that during the regular class, Hana depended on lesson plans which described the goals and objectives for the class in general terms. In the lab, however, Hana used a script listing each step that the students were to take in the order they were to take them. She would then go to each group to see if the students had done each step, and once she was satisfied they had, she would check off that step in the script.

Once again, the prime reason for this script is time. Hana could not afford to waste any of the limited time available to her class in the computer lab, so she used the script to make sure students were able to do the most in the least amount of time. Another reason for using a script is suggested by the fact that she used the script in the computer lab but not in her regular classroom. This suggests that Hana's perception of technology, at least in the context of teaching her students how to use it, was similar to that of a driver on a trip into unknown territory. One familiar with the road simply drives to the destination while one unfamiliar with the route must drive with one hand while the other holds a map for constant reference and reassurance.

Lack of time is a phenomenon teachers experience in two dimensions. Schools do not allocate time for them to become familiar with the technology they have been mandated to integrate in their teaching. However, teachers themselves contribute to this lack of time as well. I found Hana's case to be not very different from that of the other participants I observed since they also used script. In the case of each of the participants, for all their self training, the use of the script and a micro-management approach demonstrates that they are not yet confident enough in their ability with technology to allow their students to explore the possibilities of this technology on their own. This perception appears to be transferred to the students so that instead of engaging this technology as a natural part of their own education, students feel they must wait to be reassured by the teacher.

At this point, these teachers appear to perceive computer and Internet technology as fundamentally different from the other technologies they use in their regular classrooms such as the overhead, filmstrip, and film projectors. Time, therefore, is one of

the obstacles these teachers face. Schnackerberg et al. (1999) explain that teachers need time to learn about the new possibilities offered by instructional technology and to learn how to connect these possibilities to learning. There is no reason to suspect that Jordanian teachers are different in this context from teachers in the West, on whom the Schnackerberg study concentrated. While the addition of new education technology courses may enable pre-service teachers to develop higher levels of technology literacy, practicing teachers have little time to become familiar with hardware and software or to learn to integrate new technologies into their lessons (President's Committee of Advisors on Science and Technology, 1997). With more time to familiarize themselves with this technology, the participants can be expected to alter their perception of technology in education.

Lack of Resources

The participants discussed two aspects of lack of adequate resources: availability and access. Hana and Eman bought computers so they could learn about them at home, but Sameer and Ahmed have to borrow computers from friends or relatives. They also use the computers at the Internet cafes. The fact that half the participants had to borrow computers demonstrates the problem of availability facing Jordanian teachers generally, deriving from a combination of high prices for obsolescent technology and low teacher salaries.

Access refers primarily to the fact that computers in the schools are in labs instead of in the classrooms. They are thus available, but securing access requires scheduling time in the lab. Considering that each school has only one lab, scheduling is a highly competitive process. Once a class does make it into a lab, availability again becomes a

concern because the labs generally contain between fifteen and twenty computers while class sizes generally range from thirty students up to fifty.

In this context, Sameer commented on availability: "I had a relative who studied outside the country and was able to buy a computer. So she lets me use it from time to time." Sameer's perception of availability of technology in Jordan is demonstrated by his relating the ability to buy a computer with "outside the country." He uses the computer to write lesson plans and to write letters and to use the Internet at a friend's house. "I wish I could do the same here, but this school is not completely wired; the Internet connection is not very good."

Due to the availability issue, Sameer could cite few successful experiences with using the computer in class "because the computers we have we never get to use them that much." He maintains that there need to be more computers in schools so that teachers and students can have them in the classrooms. On the other hand, Sameer encourages his students to type papers on the computer, and he uses the computer to write lesson plans.

Ahmed, who also was not able to buy a computer of his own because they are too expensive, addresses availability by borrowing: "since we don't have computers in the classroom, I bring, when it's needed, my friend's laptop. And because of the lack of projectors, I use the computer's screen to project for students."

Eman regretted the limited access her students have to computers. Her perception of the value of technology to her students is evident in her wish that she could have a computer in her classroom. "In my class, we devote some time to work in the biology lab where they use a microscope and also go to the computer lab to look for information or

pictures but most of the time we don't have an Internet." The need to go to two labs instead of having computers available in the biology lab was a problem for Eman. It is interesting to note here that although Eman does not use the standard terminology, her complaint about the absence of computers in the classroom and the need to have her students use them in a context other than the classroom reveals her perception of what it means for technology to be integrated.

Hana was the most visionary of all the participants. She demonstrated her perception of the potential that technology holds for education by complaining that "the computer and Internet are almost the only available kinds of technology used by our students." Her perception is that a wider variety of technology is needed. She understands that technology "will facilitate the learning process and make it more attractive for students" but adds that "we need to have more computers and better labs."

> At a time when almost everything around us relies on technology, our government is, unfortunately, still not looking at this matter as one of its priorities. As a teacher, I believe that learning how to deal with technology has become a must. Using computers could really facilitate the teaching and the learning process as well. Our administration does give us a little computer training, though I believe it is the only way to achieve this goal. If they truly care about teaching us technology, they should train us during the working hours. Otherwise, neither my colleagues nor me would be able to do anything in this concern.

Even though the number of computers in Jordanian schools has greatly increased, most schools still do not have enough computers for students to do substantial work with them. The problem in Jordan is even more pronounced than that pointed out by

Anderson and Ronnkvist (1999) in U.S. schools. Although schools have computers now, much of this equipment is substandard and many of these computers have limited processing power, storage capability, and connectivity. Also these computers are unable to run most multimedia software and are unable to access most graphics files from the Internet. This was also stated by the participants, especially Hana, who had this to say:

> There is a sharp shortage in available resources which makes technology sources not easy to reach. At work, we have one computer in the administration office and thirteen other computers in the computer lab. All of these are still running under significantly old non-supported operating systems. We are still using a dial-up Internet provider where we need to share the school main phone line to access the worldwide web. No technology magazines are available in the area.

In all four schools I visited, two urban and two rural, I found obsolete computers, about half of which were nonfunctional, partly because finding parts for old computers is no easy task. Also, few people are trained to repair computers, so schools must wait sometimes many months for repairs.

Exacerbating this problem, the environment in the computer labs was anything but conducive to learning. The rooms were neither air-conditioned in the summer nor heated in the winter. This condition was not limited to the labs, however: the entire building at each of the four schools had no heat or air-conditioning. This is true of most schools in Jordan, so it is not exceptional. Instead, I mention this facet of Jordanian education merely to characterize more fully the reality of teaching in Jordan.

Smeardon (2000) notes that the availability of technology in the classroom is related to teachers' use of technology generally. Teachers with more computers in their

classrooms generally use technologies more often in more varied ways than teachers with access to fewer computers. The lack of adequate computers and release time for teachers to acquire the needed technology skills are two of the biggest barriers to teachers integrating instructional technology into their classrooms (Smerdon, 2000).

Lack of Support

Support is an extensive and all-encompassing concept. Illustrating the interdependency of the themes discussed so far, it may be noted that the lack of time discussed above constitutes a lack of support in the form of release time for teachers to learn about technology as well as time for students to engage technology as a part of the regular school day. The provision of adequate resources is another way to support the integration of technology. The lack of such resources, therefore, constitutes a lack of support demonstrated in obsolete and nonfunctioning equipment. The specific expressions of support addressed in this section concern that afforded by enlightened leadership, technical support, and training. Training, in turn, takes two directions: technical training and pedagogical preparation. The lack of technical and pedagogical assistance is perhaps the greatest barrier to the integration of technology (Schnackerberg et al., 1999). Indeed, Zhao & Bryant (2006) stress the need for one-on-one follow up training after in-service training sessions to help teachers to "digest and implement" the information they obtain from such sessions, "to better prepare them in addressing challenges in using technology, and to guide them to utilize technology and technological resources to enhance teaching and student learning more frequently and effectively" (p. 60).

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All the participants have experienced the lack of support in the form of training since they all trained themselves in computer and Internet technology. Furthermore, they each indicated that if they had not trained on their own, they would not have learned about technology because of the inadequacy of the once-per-year workshops offered by their schools. However, as Sameer said, "right now, what we know is what we taught ourselves, and that is not enough to run a program." Hana, on the other hand, demonstrated the value of self-training:

> As an English teacher, I need to read a lot to enhance my language. I like to read newspapers, anything about computers. I always read them online since I can't afford to subscribe to such newspapers. I also like to use the online dictionaries such as Encarta. This is in addition to the articles written on education that always attract me.

Her extensive reading of current research has made Hana aware of the potential that technology holds for education. She has begun teaching herself how to use Microsoft Word and Excel, and she wishes she could also learn how to use Power Point. However, she sees the impetus for the push toward integration to be outside her own locus of control:

> They [the government and school administrators] need to understand that technology use has become a priority and subsequently they should provide students with more computers and more suitable labs. They should provide teachers with more training and workshops. They also need to train our technicians to allow them to fulfill their duties.

Sameer agrees with this assessment, both in the duty of administrators and the government to provide enlightened leadership as well as in the feeling of powerlessness to effect change in the absence of such support:

> I wish the administration could understand the importance of technology in teaching because if they did, then they would be able to create time for teachers to learn more about how to use technology to improve teaching and learning.

Ahmed judges the training that his school does offer as largely ineffectual because it is not geared to support teaching skills among teachers. For this reason he sees other teachers frequently struggling to determine the right tool to use for each course:

> Neither our school administration, nor our government focus a lot on technology matters. As I told you before they do not consider this a priority. They still look at it as secondary factors in the learning process. While we hear there is a computer for each student in most of the Western schools, we only have few computers for the whole school. Moreover, half of them are not working or need to be fixed. Our school administration and our government as well need to give more attention and bigger budget to this problem in order to be able to solve it. Increasing the number of computers provided to schools could solve part of the problem, especially if they provide us with better and more advanced computers. They also need to train the teachers to use the computers to allow them to use them in the teaching process. They need to train more technicians so that they could make a regular maintenance for the computers. They need to provide us with good labs.

Eman provides the most detailed perception of the problem deriving from lack of support. She complains that there is no technician in the computer lab. Not having computers in each classroom is "a big problem" because "we can not spend the whole class period in the lab." Another problem is that students do not have computers at home.

Central to Eman's complaint is that training seminars held only once per year are ineffective in either building technology literacy among teachers or in techniques for integration. She believes that the mandate about technology in education is good, but the mandate should include a training requirement as well. Each school teacher should be provided the skills necessary to operate computers and integrate them in teaching:

In addition, the old-fashioned principals do not meet nowadays needs. School principals need to be well trained in order to be able to do the administration work and support. They need to understand that times have changed and subsequently students' needs have also changed. Our administrators need to focus on things and factors that could help both teachers and students to achieve better results in the learning and teaching process rather than focusing on bureaucratic stuff. I heard that Western countries provide teachers with a regular training to allow them to better accomplish their duties. I am wondering how could our principals understand our real need of technology training if they do not recognize its importance in the learning process. People usually hate what they do not know or understand and so do our principals; they hate to talk about computers because they do not know how to use them. But if they learn how to deal with today's technology, they will appreciate them. Secondly, I would like to mention the lack of maintenance issue. Here in Jordan, we still look at technicians like uneducated

people. And this is a result of their unprofessional work. As far as I know, technicians get a very good education in Western countries and they rely on them in many fields of life. Again, here in Jordan they need better education, training, and workshops to allow them to do a better job.

My observations confirm that Jordanian schools have virtually no access to technical and pedagogical support. The reason so many computers remain nonfunctional is that no one is available to repair them. And the reason teachers must depend on scripts, as I observed above, to incorporate technology in their lessons is that no one is available to help familiarize them with appropriate paths to technology integration.

In Jordan, this deficiency is even more pronounced. The case is not that administrators do not want to support their teachers; I believe they do very much want to, but they are simply ill prepared to do so. The administrators I encountered in Jordan generally have received no more technical training than the teachers. It is a matter of affluence. In the U.S. many teachers own computers and are connected to the Internet through their homes. This is a rarity in Jordan because connecting to the Internet is prohibitively expensive, and a far lower percentage of households have computers in Jordan than in the U.S. As a result, neither teachers nor administrators have had the opportunity to build on their own any appreciable degree of technology literacy that they can then share with their colleagues.

It is also a matter of maturity. These technologies have been embraced and explored in the U.S. for over twenty years, but Jordan has been experimenting with them only since the year 2001 when the mandate to integrate became effective. This translates into a tremendous lack of experience for Jordan with respect to how to procure

computers, how to provide for their repair, how to use them, and above all, how to enable

education to enjoy the advantages of this technology. Like a teenager first attempting to

do an adult's job, Jordan has experienced a number of false starts and missed steps. Only

by learning from these mistakes will Jordan finally be able to claim membership in the

exclusive club of nations which are on the frontier of understanding about how

technology stands to become a useful tool of education.

Adequate training in technology is therefore almost non-existent in Jordan. The

teachers I interviewed were exceptional but not because they had been offered more

training than their colleagues; they had not. Indeed, they had learned about computers on

their own precisely because of the lack of training offered to them in teacher education or

in workshops.

This lack of technology training is a pattern in Jordanian education: computers are

placed in schools, teachers are instructed to use them in their teaching, but teachers are

not giving the training which would permit them to comply with this directive. I heard

this same account not only from the four teachers I interviewed and observed, but also in

informal conversations with administrators and a number of teachers I did not interview.

Supportive leadership is an important factor affecting the use of technology in

classrooms (Byroms, 1998). Principals who support best-practice instruction and

assessment with regards to technology are able to provide guidance to teachers.

Principals must actively participate in professional development activities related to

educational technology and provide opportunities for teachers to learn how to use

technology in instruction (Smerdon, 2000). Unfortunately, in today's schools, teachers

often receive little administrative guidance (President's Committee of Advisors on

Science and Technology, 1997). This lack of leadership is a barrier for many teachers.

When in existence, a community of leadership in a school is the cornerstone to successful

implementation (Catchings, 2000). These studies address Western education, but they

apply to Jordanian education as well.

<div align="center">**Empowerment: Overcoming the Obstacles**</div>

Hana differs from the other participants in the degree to which she translates her

idealism into actual practice. Reflecting on Hana's text caused me to revisit the texts of

the other participants. In doing so, I found that each spoke of overcoming the obstacles

of lack of time, resources, and support. While attempting to understand how the

participants dealt with their limited agency as teachers involved in integrating technology

in their teaching, I became impressed not just by the obstacles these teachers described

but even more so by the resourcefulness which each demonstrated in tackling them.

Their descriptions of how they dealt with these obstacles demonstrate their ability

to summon resources to function in an educational environment which would be

considered primitive in the Western world. The fact that they have been called on to

negotiate these problems demonstrates their determination to advance education to

compete effectively with education in the Western world.

Thus, the theme suggested is one of empowerment and teacher agency. Hana

brings a creative spirit to the effort to integrate technology. Since most of her students do

not own computers, she encourages them to spend time at the Internet cafes or to share

computers together, she assigns her students tasks to complete on the computer, and she

engages them in discussions about what they have found and how they might have found

more.

When asked to relate a successful experience using technology in her teaching, Hana became more exuberant, gesturing with her hands, widening her eyes, speaking faster, and increasing the number of hand gestures:

It was when I asked them to do research online. I divided them into groups. The school provided us with few computers, but we were able to organize ourselves. It was great to see them excited and very interested in gathering the requested information and materials for their research.

She also acknowledged the difficulty both she and her students face with technology:

It was a long process to convince the administration that you need some computers for the research. They ask you to fill out many papers and applications to allow you to use them. Some of the computers were not working well and we had to wait till they found someone professional to fix them and since no one was available, I was forced to bring my own computer to school and to encourage those who own any to share them with us at school. Also, some of the students still have no idea about how to deal with technology. They look at computers like if they are miracles or something. Put yourself in my place and imagine how difficult it could be. However, we were able to overcome these problems together and we had a very successful experience. It needs some patience, but you will do it!

Eman echoed Hana overcoming the problem:

Although we have few computers compared to the number of students, I managed to make each student use the computer at least once a week by making a schedule where students rotate on who uses the computer and who watches.

This theme of overcoming obstacles is evident in each of the participants' texts. Ahmed is a proponent of "student self-learning," which he explains to mean that students discover and create their own learning. He uses PowerPoint as often as he can because its use encourages students "to be active in the class, not only receivers for ready information." To overcome the obstacle of not having a computer in the classroom, as well as no way to project the computer screen for the class to view, Ahmed brings "when it is needed, my friend's laptop. And because of the lack of projectors, I use the computer's screen to project for students."

Sameer did not have a ready story of success during the interview; however, I did observe his class in the computer lab. He was having his class post mathematical problems to an intranet connecting Jordanian schools through the Ministry of Education. They did this to find out different ways to solve the problems and to see if they had solved the problems correctly. Some of the students on the day I observed were also engaged in live chat with students from other schools. They were comparing notes on how to solve the mathematical problems.

Although Sameer's students do not often have access to the Internet in the lab, and computers often need to be shared by as many as eight students at a time, Sameer still manages to keep student interest high by having them engage technology as often and as extensively as possible. He devises ways to use effectively what little is available to his students.

Eman shows creativity and a willingness to think outside the classroom. During a lesson on DNA, one of her students mentioned having seen a television documentary about how a murder victim, who had been burned beyond recognition, was identified, and

the murderer caught by the work of forensic scientists. DNA had figured prominently in the case. Seeing the interest the other students displayed, and in keeping with her view that students need to remain "aware of what is going on around them," Eman seized on this opportunity to have her class use the lab time to find out all they could about DNA on the Internet.

For Eman, getting students to learn not only from textbooks is important: "If students learn only from textbooks, they tend to think of school knowledge as knowledge meant for preparing them for tests only. But when they see it in some other sources, they know it is real usable knowledge." This perspective is what prompts Eman to overcome whatever obstacles she and her students encounter on their way to engaging technology in their learning.

The theme suggested here deals with teacher empowerment and teacher agency. The empowerment of the participants comes from within each as shown in the decision to train themselves instead of waiting for training to be provided by the system. The knowledge they derived from their self training is the basis of their agency in promoting changes in the way technology is integrated in their schools. Their agency is demonstrated in how they surmount the obstacles of lack of time, resources, and training. That knowledge may continue to empower them to help train their colleagues to see those same benefits.

Conclusion

The themes that emerged from this study indicate action that needs to be taken in Jordanian education in the near future.

The four participants were not empowered by external factors; they summoned their own power from within in response to the obstacles they encountered in their efforts to integrate technology in their teaching. Addressing the lack of time to learn the technology, that is, to develop literacy with it sufficient to permit them to use it effectively, they all reported that they had learned about technology on their own. While developing this literacy, each also developed a concept of how technology might be used in teaching as well as the benefit that might be expected from such use. The one time constraint with which all the participants still struggled was getting the time for their students to engage the technology.

This last concern derives from the lack of resources. Each of the participants is required to assign between five and seven students to each computer on those days when they do manage time to get their classes in the computer lab. The limitation on resources stems primarily from the fact that computers are only in labs and not in classrooms, suggesting that lack of access resulting from a lack of resources is also a concern.

As in the case of the other themes, support is also a multifaceted topic. The first kind of support is administrative leadership, the lack of which derives from inability rather than from decision. According to the participants, school administrators and government officials are not in a position to support teachers' efforts to integrate technology and most of them have received no more training than the teachers.

Training is a type of support. Building a scaffold of understanding must precede attempts to function in any context. When that context is the integration of technology in education, the scaffold is an understanding of technology in general. The participants in this study have built much of that scaffold on their own initiative: however, another area

of preparation needs to be addressed. If the first area is technical—how to use the technology in a general sense—then this other area is pedagogical—how to have students engage the technology in a way to enhance their learning. Most teachers in Jordan would benefit greatly from more preparation in both these areas.

Concerning the source of empowerment as evident in the interview texts and educational practices of the participants, they all viewed the workshops offered by their schools as largely ineffective. The literacy they developed as a result of their self training began to suggest how they might use technology in their teaching. Thus their increased knowledge, which is the very foundation of literacy, came to suggest to them new ways to use technology in their teaching. Understanding how they might use technology became the source of their empowerment to the extent that they began to act on and in accordance with that understanding. Furthermore, that empowerment was suggested in the ways they dealt with the obstacles to integration they encountered every day.

I must note here that I detected no substantial differences in the perceptions of the participants related to their locale, either urban or rural, or to the level they teach, either elementary or secondary. All of the participants' texts were similar on each of the points comprising the themes discussed in this chapter.

Contrary to the expectation expressed in Chapter One, financial differences between urban and rural schools appeared to have little impact. Although urban schools' class sizes tend to be smaller than those of rural schools (35 to 45 students per class in urban schools compared to 40 to 50 students in rural schools) and although the labs in urban schools tended to have more working computers than those in rural schools (10 to 11 in urban labs compared to seven to eight in rural labs) the effects of these differences

were in no way substantial. Whether four or seven students must share a computer,

securing a lab, getting the students situated in the lab and ready to engage a lesson, and

actually conducting the lesson took about the same amount of time in both rural and

urban schools.

Furthermore, access to the technology for the teachers was similar. The

participants in both the urban and rural schools, whether elementary or secondary level,

were required to reserve the lab a week in advance. Also, none of the participants had a

computer in the classroom. The scope of the study mainly concerned teachers' expertise

with technology, and the findings indicate no significant differences regardless of how

the schools were financed or even where the schools were located; teachers, in all the

schools I worked with, were not well trained on how to use technology.

I can only surmise that the reason that elementary/secondary and rural/urban

factors appeared to make no appreciable difference in the perceptions of the participants

is that the integration effort in Jordan has not yet progressed to a point which would lead

teachers in these different contexts to significantly different experiences with technology.

CHAPTER 5

DISCUSSION, IMPLICATIONS AND RECOMMENDATIONS

The purpose of this study was to describe and interpret Jordanian teachers'

perceptions and experiences relevant to the government mandate to integrate technology

in their curriculum. The three research questions were:

1. What are Jordanian teachers' perceptions of the value of integrating technology in

   education?

2. What does technology integration mean to Jordanian teachers?

3. What are the implications of teachers' viewpoints for Jordanian policy makers?

The lens employed in the effort to address the above questions was phenomenology.

Data were gathered through interview and observation, and their interpretation was

guided by van Manen's (1990) concepts about hermeneutic phenomenology.

A study guided by phenomenology is an investigation into perceptions and

meanings (van Manen, 1990). The focus of this study is the lived experience of teachers

faced with a need to develop technical literacy in their students using technology which

has significantly altered the world in which those students will need to function.

In the sections below, I focus on the meaning which technology integration has

for Jordanian teachers as well as their perception of the value of integration. I then

discuss the implications of the findings of this study for the integration effort in Jordan as well as recommendations to further that effort.

Discussion

As in the U.S., teachers in Jordan have been instructed to embrace current technology for the benefit of their students. Also as in the U.S., they are expected to learn how to use this technology. This extends not only to how to operate the computers and navigate the Internet but also to how to use computers in their teaching. The fact that Jordanian teachers are inadequately trained in both these areas sets up a tension in them since they sincerely desire to comply with this mandate.

The tension which the participants in this study demonstrated is expressed in the themes identified in Chapter Four: empowerment deriving from their attempts to integrate technology in their teaching while being hindered by a lack of the time, resources, and support for their efforts to succeed. Their empowerment is thus a positive aspect of this tension. A negative aspect is reflected in the attitudes that the participants demonstrated toward the position they are forced into by the mandate. On the one hand, they sincerely desire to see technology integrated in their schools. On the other hand, they experience frustration in the way the mandate has been implemented so far. This tension presents a delicate balance. At present, the participants in this study continue to maintain their enthusiasm for the mandate. However, if the current situation persists with no changes, then the continued need for them to overcome obstacles may cause their enthusiasm and thus their agency to wane.

In the following sections, I discuss the meaning which technology integration holds for Jordanian teachers and their perception of its value.

The Meaning of Technology Integration

I begin with the second research question because it appears to address a more primary issue than the first question. This question sought to illuminate the participants' perceptions of what integration looks like. That is to say, I wanted to know what they thought constituted integration and how one might tell whether technology is actually integrated.

While empowerment figured prominently in the reaction of teachers to the obstacles they faced in complying with the mandate, they spoke more at length about how technology integration could not be achieved because of these obstacles. However, as seems to be constant with teachers, they all spoke not of the value of technology to themselves directly but only how it empowered them to teach their students more effectively.

Technology has the potential to empower them by offering them a multipurpose tool for teaching, instruction, and research. Technology can offer students a window to the outside world, thus broadening their horizons to include a view of a globalized society in which technology is of great importance. Technology also facilitates the learning process and empowers teachers by helping them maintain student interest and enhance active learning for students.

That all of the teachers undertook to enhance their literacy with technology by learning about it on their own strongly implies that they started out with a perception about its importance to themselves as teachers as well as to education generally. Regardless of how ill-defined that perception may have been initially, it was obviously clarified and refined as a result of increased knowledge about technology. Thus they

were able to speak about how technology enhances communication and makes them better teachers by making lessons more effective and granting their students access to otherwise inaccessible knowledge.

However, compared to much of the current knowledge about technology integration, the participants' perceptions addressed primarily the surface of this issue, which is understandable, given that Jordanian education is only now taking its first steps in that direction. The West has had many years to try numerous approaches to integration and has managed to build a sizeable repository of knowledge on the subject in the form of studies published in peer-reviewed journals. At present, Jordanian teachers have virtually no access to peer-reviewed journal articles, primarily due to the fact no journals devoted to technology integration are published in Arabic. While it is true that teachers in the West do not generally read peer-reviewed journals unless they happen to be studying for an advanced degree, the fact remains that they can access such articles if they perceive the need to do so; if Jordanian teachers wish to access such information, they are not able to do so, and more to the point, scholars in Jordan, whose perspectives shape education there, are also hindered by this limitation.

Furthermore, Arabic trade magazines devoted to education bear little resemblance to those published in other countries. They usually publish articles based on out-of-date information or devoted to surface issues rather than to the substantive concerns found in most trade magazines in the rest of the world. The participants' perceptions reflected this limitation. Jordanian teachers would benefit from such a forum where they could publish stories from their teaching experience to share with other teachers nationwide.

Their responses to the question relating to the meaning of technology integration suggest that their perception of what constitutes integration is not well defined. They spoke of using several computer applications such as PowerPoint and DataShow, but they were not able to address the concept of integration in any detail. Indeed, their perceptions appear not to include any of the attributes suggested, for example, by Hadley, Eisenwine, Hakes, and Hines (2002), according to whose infusion model, technology is integrated into a program to create opportunities for learning not possible except for the presence of technology. The participants in this study made no reference to such an idea, nor did any of their other responses suggest that they harbored any such concept.

The Value of Technology Integration

According to the verbal reports, the participant's perception of the value of technology integration involves advantages for their students which their self training has enabled them to envision. Technology offers the potential to change people's lives. The Internet, specifically email, can enhance communication, make collaboration possible, and enable publication among students as scholars. Technology can also facilitate the learning process and make it more attractive for students. In short, technology literacy stands to empower teachers because, in the context of globalization, this literacy is a prerequisite for being well educated.

According to the participants, technology is also important for the future of education in Jordan. Students need to be prepared for a technological future. Indeed, for Jordan to establish itself on a par with the rest of the world, its educational centers need to turn out generations that understand technology, the language of the future.

For each of the teachers, technology had the potential to make learning easier and more meaningful for students. It was a doorway through which students could access the advantages of a technology-driven world. It could empower students by granting them access to information and by enabling them to communicate with each other as well as with experts in their fields of study.

My observations of these teachers' efforts to employ technology in their teaching agree closely with their verbal account of their perception of the value of technology. The fact that they attempt to integrate technology with such energy while simultaneously hindered by the almost complete lack of any support indicates the strength of their perception of technology as valuable to education. The lack of adequate equipment, little time to learn about and engage technology, and virtually no technical or pedagogical assistance constitute seemingly insurmountable obstacles to integration which these teachers take on, not with dread but with energy and eagerness. This challenge they meet daily on behalf of their students, for their perception of the value of technology integration is entirely in terms of the advantages it holds for their students.

As with the previous question about what constitutes integration, the participants' perceptions of the value of integration appear to address only the surface of the concept. Again, this is likely due to the newness of the concept both to the teachers and to Jordanian education in general. Once they have managed to gain more experience with integration, the participants can be expected to address the assumptions underlying the push to integration not only in Jordan but in the rest of the world as well.

An example of the rationale for the use of technology in education is Jonassen's (2000) concept of mindtools. While his discussion offers only a single facet of the

argument that can be made for integration, it is a powerful and easily accepted one. According to Jonassen, a computer is a mindtool when it calls upon students to consider their knowledge in ways that few people tend to do naturally. It requires them to assess what dependencies exist in their structures of understanding, what knowledge is subordinated to other knowledge, and what is superordinated. Thus, using mindtools tends to enhance critical thinking skills.

The participants' perceptions do not appear to extend to this level of understanding about the advantages of technology integration. Nonetheless, all the participants agree that advantages do exist and should be secured for their students.

Implications and Recommendations

The teachers interviewed agreed that the mandate to integrate technology in Jordan's schools is a good idea, but each also agrees that more needs to be done. The sentiment shared by all four teachers is that administrators, The Ministry of Education, and the Jordanian Government are the ones who must take action. Each teacher referred to steps that these individuals and agencies need to take and to facts and situations they need to understand.

The importance that the participants attach to the successful integration of technology is expressed, once again, in terms of how it stands to benefit their students. One of the major benefits of integration is that their students need to gain a perspective of the world beyond Jordan. The education of Jordanian students cannot afford to neglect technology since this is their only viable window on the rest of the world. Through this window, they can access knowledge from a wide variety of sources, knowledge which is necessary for them to compete in a globalized society.

The message of the participants is that those who have issued the mandate and those who oversee the teachers charged with implementing it have all engaged in a worthy effort. What they need to do now is to assess that effort and make needed adjustments. Policy makers and administrators need to do this so they can understand the implications of what they are requiring teachers to do.

A perception shared by all the participants is that those responsible for creating policy do not understand the implications which integration holds for students. Said differently, their perception is that policy makers who desire to improve education through the integration of technology do not yet understand how to attain that goal. Since teachers are the ones attempting to integrate technology, teachers are the ones whom policy makers need to hear.

This shared perception of policy makers on the part of the participants suggests that the policy makers need to learn that teachers need more than mere mandate. Below is a list of actions that can be taken to further the aims of the mandate to integrate technology. This list mainly derives from the perspectives of teachers who have been charged with the responsibility of complying with the mandate:

- Provide teachers more technology training and prepare them better pedagogically
- Provide more access to technology for students and teachers
- Provide more time for teachers to learn technology and for students to engage technology
- Provide a means for teachers to share information with one another about the pedagogical implications of technology

- Policy makers need to understand more about teachers' perspectives on curriculum change and adjust their policies to teachers' needs.

Training

Training falls into two main areas. The first is technology literacy. Teachers need to be trained on how to use the technology they are expected to use in their teaching. The second is pedagogical preparation. Teachers need to be exposed to examples of successful integration so they can begin to adapt proven methods to their own specific contexts.

Access

Students need access to technology. Placing computers only in labs means that students have access to them only outside the regular classroom, and even then, each computer must be shared among as many as eight students at a time. I recommend that computers be both in the lab and in the classrooms to minimize the waste of time taken by teachers and students going to the lab and also reserving lab time for their classes. Having computers both in the classroom and the lab gives students the perception that this technology is a part of their everyday experience and not something added onto regular learning. As the participants suggest, many more computers need to be placed in schools, and they need to be placed in classrooms instead of only in labs.

Time

Additionally, both teachers and students must have time to engage technology in education. Teachers need time to learn how to use the technology as well as to learn how it can be integrated in their teaching. Students need time to interact with computers in a

variety of contexts if the integration of technology is to result in their confidence with technology rather than in the fear of it which I witnessed during all of my observations.

Information Sharing

Another aspect of the perceptions of the participants becomes important at this point. The first three recommendations derive entirely from the perceptions of these teachers. What they said in interviews as well as what their actions implied during observations revealed much about the importance of training, access, and time. The fourth point derives from implications of what the participants did not say, for what gets left out of their texts can be even more important than what is included.

The importance of this point has been impressed upon me by my own experience. My study of education and of technology integration has resulted in increased understanding of those concepts. However, my use of technology in many of the courses I have taken toward my degree has had a greater effect on my perception of technology integration than my classroom learning. To illustrate, I offer the following anecdote.

I recently sent an email to a friend asking for a favor. I realized when I received the reply that when I sent the email, I was not thinking about the technology which makes that possible; I was thinking about the help I needed. This is a subtle but important point about technology integration. When I first began to use technology to accomplish tasks, I recall thinking more about how the technology worked than how to perform the task. I needed to make sure I was doing it right so I could get the desired result. Indeed, many times, especially when the task was related to a course I was taking, the only reason I used technology was that I was assigned to.

Over time, however, my focus has come to rest on the task instead of on the technology which makes performing the task possible. I have changed as a result of my use of technology. My level of literacy with it has increased to a point that many uses of technology no longer command my attention. It is like driving an automobile. As I am driving my car, I am not concerned at all with the inner workings of the car. My major concern is to move from one place to another, and the car is merely one means I can use to facilitate that effort. To understand the full importance of this phenomenon, one needs only to consider that a process as familiar and simple as walking becomes all but impossible when one begins to focus on how to control the arms and legs rather than on getting from one place to another, which is the whole reason for walking in the first place.

When how to use technology in education remains a primary concern, students and teachers alike must focus on how the technology works instead of on the tasks which the technology makes possible. However, when technology ceases to be a primary concern, then the focus can settle on the tasks at hand, where it needs to be, rather than on the means to achieve them. That the participants' perception of technology has not advanced to the point that it ceases to be a primary concern but still obscures the completion of tasks by diverting their focus away from the tasks and toward the workings of the technology is shown by their focus on the technology rather than on what it can make possible. Nowhere was this more evident than in their use of a checklist when instructing students in the computer labs. They were drivers in unfamiliar territory who needed to rely on a map. Moreover, when asked about the benefits that technology held for their students, each spoke of its ability to change people's lives or to facilitate the

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learning process, but they did not elaborate by stating how these results might be achieved. When asked about how they use technology with their students, each spoke of some software or hardware but not of the effect that the use of each might have on students.

This situation is understandable given that these Jordanian teachers have not had the time to familiarize themselves with technology that teachers in other nations have. As pointed out in Chapter Four, they are in the beginning stage of developing technology literacy. In fairness to them, they can not be expected to possess the insight of teachers in nations where access to technology in schools is an everyday reality.

Until relevant research becomes available to Jordanian teachers, and until access to technology becomes a reality in their classrooms, they will never be able to give their students the capability to function in a globalized society, much less to compete in it. This is a more pressing reason that policy makers must provide Jordanian teachers and students alike access to computers as well as access to research. Beyond that, teachers should be encouraged to conduct their own research and to publish it in journals supported by the Ministry of Education or by the nation's universities. This is important because knowledge created by Jordanian teachers to be shared with other Jordanian teachers offers a distinct advantage deriving from the inherent difference between knowledge one is told and knowledge one constructs as a result of experience.

Access to research might begin with the translation of selected studies published in Western peer-reviewed journals from English to Arabic. Access to this existing body of knowledge might well spur original research on the part of Jordanian scholars. At the very least, providing a peer-reviewed journal devoted to the educational uses of

technology could prompt teachers to begin sharing their experiences with one another

beyond the confines of individual school buildings. After all, the sharing of what one has

learned about how to use technology in education is the culminating step in the

technology learning cycle suggested by Marra, Howland, Wedman, and Diggs (2003).

Implications for Policy Makers

Those who devise policy work in an atmosphere completely different from those

who enact it. This is because the enactors receive feedback on the process as a result of

their attempts while policy makers are able to see only the result of those attempts.

Said differently, generals moving pins on a map do not determine how a

campaign goes; the people in the field do that. The map only represents the desire, which

is to say the overall result sought. It is the same with education. This is why the voices

of the teachers I interviewed need to be heard by those responsible for making policy.

Currently, the mandate stands little chance of being fully implemented. The reason is

straightforward: if teachers are the ones charged with fulfilling the mandate, then any

obstacles teachers cannot surmount become obstacles to the implementation of the

mandate itself. It also follows that if they are the ones who ultimately determine the

success of the drive to integrate technology, then teachers are the only ones who can

provide information about how the effort is going and what needs to change in order for

the effort to succeed. To reap the benefit of teachers' experience and perceptions,

administrators, the Ministry of Education, and the appropriate representatives of the

Jordanian Government need to begin actively seeking teachers' experiences as they

attempt to comply with the mandate. Only in this way will these policy makers develop

the type of understanding needed to revise the integration effort in ways that will assure its success.

Contributions and Limitations of the Study

A limitation of this study resulted from the need to enlist the aid of the Ministry of Education and the school principals in selecting schools and teachers to participate. Instead of letting me choose, the Ministry chose the four schools I would visit. This along with the fact that the principals gave me a list of teachers to choose from for interview and observation suggests that the schools desired to portray the integration effort in the best possible light, which stood to bias the data of the study. This limitation results from government restrictions on what is allowed and not allowed while doing research in Jordan. I discuss the need to assess the perceptions of school principals in the section below on further research. Another limitation comes from the difficulty of using follow-up procedures after I came back to the United States when writing my dissertation due to the inconvenience of international communication.

Despite these limitations, I do believe this study has the potential to contribute to the body of research on the integration of technology in education. Because most such research has been conducted in the West and little has been done in Jordan, this study fills a gap in knowledge about integration in Jordan as well as about Jordanian education generally. Understanding the specific contexts within which technology integration efforts are undertaken contributes to the understanding of the process of technology integration in general. Although the variety of contexts emerging from diverse school systems in the West is quite broad, the addition of the Jordanian context to this mix stands to increase understanding over what has been derived from studies conducted only

in the West. This study also contributes by considering a different cultural context and negotiating the researcher's positionality when conducting qualitative research outside of Western countries.

Further Research

One hopes that researching a problem results in increased knowledge. Accompanying such an increase of knowledge, more questions may emerge. Conducting this investigation has suggested several questions that can be addressed in future studies. For instance, it would be interesting to find out the perceptions of the teachers in the schools that were not selected by the principals to participate in the study, and also to know the technology situation in the schools that were not selected by the Ministry of Education to participate in the study. Further, it would be of interest to know if those schools and teachers who participated in the study were representing their own positions or were told what to say and therefore were representing the status quo.

This investigation has suggested what more needs to be done to further the cause of the mandate to integrate technology. Since teachers were selected to participate in this study because their relative familiarity with technology, a different investigation might illuminate this question further by focusing on the perceptions of some teachers that keep them from using technology. Such an investigation might suggest ways to motivate these teachers.

Another question that might be investigated is the perceptions of school administrators. The principals with whom I interacted appeared to feel that having only a small number of their faculty use technology constituted integration. The fact that each of the principals limited my choice of teachers to those few who do use technology points

to the possibility of this perception. Understanding the source and nature of this

perception might suggest ways to transform school leadership in ways that move it

toward recognizing that technology is integrated when students use it as a learning tool,

as I maintained earlier in this chapter, and that this goal cannot be accomplished when

students encounter it in only a few teachers' classes and then only in labs instead of in

their classrooms.

The school community's view is another area which might be investigated to see

its effect on the extent to which a school accepts technology as an effective tool of

education. I know from experience that most families in Jordan do not have computers in

their homes. What might be the effect on the effort to integrate of the perceptions of this

majority of families for whom computers and the Internet exist only in the many Internet

cafes in Jordan?

Finally, I think the question of the official view of what constitutes integration

needs to be addressed. Do the policy makers in Jordan believe that placing computers

only in school labs and not in the classrooms is sufficient to secure the benefits of

technology for students? If so, then what is the source of this opinion, and how does this

opinion stack up against the research that has been done on the subject? On a lower

level, there is a need for research to discover what perceptions drive Jordanian education

in general. How do these perceptions differ from those driving Western education, and

what do these differences imply for ways to implement new educational programs in

Jordan?

Conclusion

The many hours that I spent with the Jordanian teachers resulted not only in increased understanding on my part of their perceptions about technology; the teachers also learned much about me as well. At first, they were reluctant to share information with me because they wondered about my intent. Was I there to judge their efforts, to report back on their weaknesses? Eventually they came to understand that I was there to gather information that might result in improving their situation by furthering the effort to integrate technology. More computers, better Internet access, and improved understanding of what still needs to be done will be the vehicles of this change.

Initially viewing me as an outsider to their situation, the Jordanian teachers who participated in this study confirmed my assessment of my own subjectivity in Chapter One as representing somewhat of a mixture of cultures. At the same time that our common language facilitated our mutual understanding, the Western perspective under which I was operating threatened to cloud that understanding. This illustrates the difficulty in sharing ideas between cultures, one sign of which was provided in the school principals' choosing the teachers for me to interview. The fact that my perspective, if not my language and cultural origins, was foreign caused them to perceive me as an outsider. I believe this was the reason they attempted to portray the situation in the best light possible by permitting me to interview only those teachers whose involvement in technology was the highest.

This chapter has discussed the significance of the findings of this study and has recommended actions which, if taken by the policy makers in Jordan, promise to secure the benefits which other nations have reported from technology integration. If this study

receives the serious consideration of the Jordanian Ministry of Education and of the

government, then I am confident that I will not disappoint the friends I have made during

the course of this investigation.

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APPENDIX A

INTERVIEW QUESTIONS

Interview Questions

(These questions are used as a springboard for interviewing and more interview questions are generated from the interaction between the researcher and participants)

1. Tell me about the kinds of technology that are available for your students to use.
2. Tell me about how you learned how to use technology in the classroom.
3. Tell me how you have used technology in places other than school.
4. How do other teachers use technology with their students?
5. What is most important about having technology available for your students?
6. What difference in learning do you think this technology will make for your students?
7. What do you do with your students in the classroom with technology?
8. Did you have any successful experiences with technology in teaching? What were they and what made them successful?
9. Did you have any difficulty with technology integration in the classroom? Why?
10. What impact do you hope technology will have on your students, and what impact have you seen so far?
11. What does technology integration mean to you?
12. What skills and knowledge do you find important to draw on in using technology in your classroom?
13. What is your opinion of the mandate calling for teachers to make technology a part of their teaching?
14. Is there anything that can be done at the policy level to help with the efforts of technology integration from a teacher's point of view?
15. Can you think of anything that the policy makers might not be aware of but need to know about your situation as a teacher?

APPENDIX B

IRB APPROVAL FORM

Oklahoma State University Institutional Review Board

Date: Friday, May 05, 2006

IRB Application No   ED06130

Proposal Title: Technology Literacy: A Phenomenological View of the Teacher's Role in Technology Integration in Jordan

Reviewed and   Expedited
Processed as:

Status Recommended by Reviewer(s): Approved   Protocol Expires: 5/4/2007

Principal
Investigator(s

Aymen Kassaimih   Hongyu Wang
36 S. Univ. Place Apt. 2   239 Willard
Stillwater, OK 74075   Stillwater, OK 74078

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.
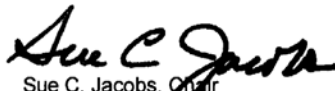
☒ The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval.
2. Submit a request for continuation if the study extends beyond the approval period of one calendar year. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of this research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact Beth McTernan in 415 Whitehurst (phone: 405-744-5700, beth.mcternan@okstate.edu).

Sincerely,

Sue C. Jacobs, Chair
Institutional Review Board

VITA

Aymen Kassaimih

Candidate for the Degree of

Doctor of Philosophy

Thesis: TECHNOLOGY LITERACY: A PHENOMENOLOGICAL VIEW OF THE
TEACHER'S ROLE IN TECHNOLOGY INTEGRATION IN JORDAN

Major Field: Curriculum and Social Foundation

Biographical:

Education: Received Bachelor of Arts degree in Political Science from Oklahoma
State University, Stillwater, Oklahoma in May, 1997. Received Master of
Arts degree in Curriculum and Instruction from Oklahoma State
University, Stillwater, Oklahoma in May, 2002. Completed the
requirements for the Doctor of Education degree at Oklahoma State
University, Stillwater, Oklahoma in December, 2006.

Experience: Employed as research assistant by the Oklahoma State University
College of Education from 2003 to 2005. Assisted with research on DAC
and K.I.T.E research projects.

Professional Memberships: Oklahoma State University Alumni Organization.
College of Education Alumni Association.