Technology Integration: The Use of Computers by Elementary School Kuwaiti Teachers

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Abstract: This qualitative research discusses the use of computers by Kuwaiti teachers. The study was carried out in two Kuwaiti public elementary schools. A total of six female teachers were interviewed using open-ended questions. The study shows that the extent by which the teachers view computers as advantageous, consistent with their needs and easy to handle, influences how often they use them. However, public schools suffer from lack of computers in the classrooms. In addition, teachers do not have the skills needed for technology, nevertheless those who were able to afford a personal laptop had more exposure and used it frequently for instruction. Students showed an increase in performance, they interacted more with the teachers, and were motivated to learn when teachers used computers in instruction.

Introduction and Purpose of Study

The emergence of computers and information technologies has been perhaps one of the most discussed topics during the past three decades (Al-Ghatani, 2003). Educational institutions are striving to adapt new technological innovations due to the rapid developments in technology over the last several decades. Bates (2000) points out ‘the impact of new technology in education’ as one of the most important reasons lead the educational institutions to change. Thus there is an increased interest and emphasis on how and in what way should technology be integrated in teaching (Hofer & Swan, 2008). This can be seen by the substantial financial investments that have been and are being spent by governments in this context. For example, between 2001 and 2004, the US federal expenditure on educational technologies, like software and equipment, was about $28 billion (O'Dwyer, Russell, & Bebell, 2005). Despite these investments in technology in schools, a considerable body of literature indicates that U.S. public schools teachers have not effectively used technology to enhance student learning (Cuban, 2001; Culp, Honey, & Mandinach, 2005; Pittler, 2006). Similarly, we find that a similar situation occurs in Kuwait. In his study, Safar (2001) found that technology adoption and integration is still limited in the educational sector in Kuwait despite the recognized awareness that the use of computers and other technologies is crucial for teaching and learning.
The state of Kuwait is located in the Middle East bordering the Arabian Gulf between Iraq and Saudi Arabia. The Arab Gulf States are Saudi Arabia, Qatar, Oman, Bahrain, Kuwait, and the United Arab Emirates. The total population of Kuwait as of 31st of December 2010 is 3484881 out of which only 1118911 are Kuwaitis (The Central Census Administration, 2010). It is a small country; its area is only 17,818 sq. km. (i.e., 6,880 sq. mi.). Petroleum is the main, or even the sole, economic product, and it has made Kuwait a classic welfare country. Due to the massive revenues gained from petroleum, Kuwait has become a tax-free country where education, health, housing, and other public services, such as building roads, are free (Alqahtani, 2007). The Ministry of Education (MOE) supervises the Education in Kuwait, which is divided into 3 formal educational systems; 1) public (government), 2) qualitative (religious) and 3) private education (The National Report: Development of Education, 2004-2008). Public education is free and segregated. The educational structure is 5 years of primary stage (age 6-10), 4 years in intermediate stage (age 11-14) and 3 years in the secondary stage (age 15-17). There are approximately 30 students per class. Subject areas taught in public schools are based on the national curriculum guide of Kuwait.

Education is viewed in Kuwait as a keystone for the development and progress of both individuals and society and like many modern countries, has given great attention to education in order to keep its society economically and culturally strong (Al-Sahel, 2005). Oil profits have allowed Kuwait to build a broad based educational system; the literacy rate is 93% (The National Report: Development of Education in the State of Kuwait, 2004-2008). Kuwait has invested a huge amount of the state revenues to develop ambitious plans to for public education (Alqahtani, 2007). Nevertheless, Kuwait’s education faces several challenges, which include both cognitive and technological challenges (The National Report: Development of Education, 2004-2008). The educational system of Kuwait has been criticized about its traditional teaching styles, which concentrate on rote memorization, the attainment of basic knowledge, and the lack of technological tools (Aldhafeeri, Almulla, & Alraqas, 2006).

Authors have indicated that there is a lack of studies carried out regarding the use of technology in education specifically in schools in the Arab Gulf Cooperation Countries (GCC) and the Middle East (Farag, 2005). According to Ali (2004), research on IT adaption in the Middle East is very limited. It is due to the lack of use of technology, which consequently affected the amount of research investigations carried out within this field. Thus, there is a need to understand the reason behind the lack of use of computer technologies in these schools and accordingly in this culture. The literature suggests that the slow IT diffusion in developing
countries like those in the Middle East could be attributed to poor infrastructure, high costs, language barriers, social factors, and politics contributing impediments to the process (Marghalani, 1987). Authors like Shaw (2002) argue that it becomes a question whether the “state of readiness of the locals, the expectations of parents and the availability of equipment and the underlying cultural assumptions really offer favorable conditions for adoption” (p. 45). Therefore the understanding of the social context, in which the integration of technology occurs, needs to be taken into consideration.

**Viewpoints on Technology Integration**

Technology Integration in the K-12 education is broad and many scholars have different perspectives and viewpoints on its meaning and function. Some authors look at technology integration generically from different perspectives. Cuban, Kirkpatrick and Peck (2001), for example, talk about the extent of use of computer technologies by teachers in the classroom, focusing on high access and low-end use of technologies. Lim, et al. (2003), on the other hand, view technology in terms of how teachers use it to develop students’ performance by creating a conducive learning environment. Hew and Brush (2007) summed up that the use of technology in education as prescribed by most authors in the literature consists of a common element, the use of computers for instruction. Other authors provide definitions and are more specific in describing it. Hennessy, Ruthven and Brindley (2005), for example, define technology use in education as “how teachers use technology to carry out familiar activities more quickly, reliably, broadly, productively, interactively and how much use is re-shaping these activities” (p.155). While Belland (2009) defines it “as the sustainable and persistent change in the social system of K-12 schools caused by the adoption of technology to help students construct knowledge” (p. 354).

Although (Bebell, Russell, & O'Dwyer, 2004) agree that the effects of learning must be placed on the context of teacher and student use, they, also, believe that there is no clear standard definition of technology integration in K-12 schools similar to Belland’s. They argue that the collected technology-related data are in most cases lumped up in one generic variable, ‘technology use’, which is not enough to understand the extent of technology use in education and its impact on learning outcomes. They believe that it is important to define the types or categories of ‘technology use’ to gain a deeper insight into how these uses vary across settings. An example would be when investigating students’ use of technology, issues related to ‘where they use it’, and ‘for what purpose’ should be measured and addressed separately. Thus for the purpose of this study technology use will refer to the use of computers by elementary schools.
Kuwaiti teachers to enhance students’ learning in a primary classroom setting.

Statement of the Problem

The adoption of technologies in schools leads to school reforms and thus change must be viewed as a direct impact on individuals (Alshammari, 2000). To understand how technology is diffused and what kind of adaptation is needed, it is important to understand the context of the technology and education in the larger culture. Which requires insightful and open research (Holloway, 1996). Studies have shown that the individual’s attitude and perceptions on innovations are determining factors in its implementation (Mosley, 2005; Zhao & Frank, 2003; Sooknanan, Melkote, & Skinner, 2002). The purpose of this study is to gain an understanding of the use of computer technology in public schools by Kuwaiti teachers. The following research questions and sub questions were explored:

1. What is the nature of the use of computer technology by Kuwaiti elementary school teachers?
2. How do Kuwaiti elementary school teachers perceive the use of computer technology?
   - Do the teachers see computer use as being advantageous to their teaching?
   - Do the teachers see computer use as consistent with their existing beliefs and needs?
   - Do the teachers have the opportunity to experiment with computers?
   - Do the teachers see computer use as easy to handle and work with?
   - What changes do the teachers witness when using computers?

The Theoretical Framework

The study of adoption, diffusion, implementation, and institutionalization of an innovation is essential and thus there is a need to understand the underlying aspects involved (Surry & Ely, 2002). The literature shows that many factors combine to determine if an innovation is adopted and effectively utilized (Surry & Farquhar, 1995) and thus being aware of these factors at the adoption and diffusion phase would improve the chances of successfully implementing the innovation. These factors include, for example, individual, organizational, and economic factors. For the needs of this paper, focus will be on the individual factors. Surry and Farquhar (1995) stated that individual factors include skills, attitudes, perceptions and knowledge possessed by technology users. These include both ‘user characteristics’ and ‘perceived attributes’. The former includes characteristics such as knowledge, prior experience, skill level, anxiety, and
motivation while the latter deals with how the innovation is perceived by the adopters, which is the main focus of this study. The perception of the potential adopter towards an innovation is present in several models like that of Davis (1981) and Moore and Benbasat (1991) and predicts the rate of adoption of an innovation. Rogers (1995) theory of perceived attributes of an innovation is that there are five main characteristics that impact the rate of adoption of innovations, which are relative advantage, compatibility, trialability, observability and complexity.

The first characteristic is the relative advantage. It basically is related to the degree to which an individual perceives an innovation to be superior to previous methods. Economic advantage, social prestige, convenience, and satisfaction are important factors that should not be neglected, however an individual must perceive the innovation as advantageous so as to adapt it. Therefore, the speed of adaption of the innovations depends on how great an individual perceives their advantages. The second relatively important characteristic is compatibility. Innovation needs to be consistent with the needs, experience, and values of an individual. The more compatible the innovation is with the individual needs the faster it will be adapted compared to the less compatible ones. The third characteristic is complexity, which refers to the difficulty of understanding and using the innovation. The more complicated the innovation is, the slower it will be adapted. Simple innovations that are easy to understand and use are likely to be accepted and adapted by the different individuals easily. Fourth, trialability is essential in the process because an innovation should be used and tested on a limited basis to check its suitability. These trials increase the likelihood of the adaption of the innovation by decreasing ambiguity towards its use. Finally, observability is another important characteristic since it shows how visible the results of the innovation are to other individuals. It is natural that people tend to adapt innovations that have obvious benefit and clear results rather than those having less obvious, less fruitful ones. In summary innovations perceived by individuals to have greater advantage, compatibility, trialability, observability, and less complexity are adopted faster than other innovations. Previous research indicated that these five characteristics are important in explaining how fast an innovation will be adapted (Rogers, 1995).

**Methodology**

**Study Population and Sampling Procedure**

The current study focused on elementary schools due to the following reasons: 1) Elementary schools form the largest public sector in Kuwait comprising 43% of all public schools (Education Statistical Group, 2010), 2) The use of computer technology has revolutionized the
education sector and using it in elementary classroom exposes the pupils early to technology which eventually increases their confidence and enhance their abilities, 3) The use of computers ingrains in the elementary school pupils an aspect of informed attitude to embracing advanced future technology (Jeffels, 2010).

Capital district contains 44 elementary schools. Although schools are segregated by students’ gender, all teachers in elementary schools are females except in (3) schools. In fact, all elementary schools in Kuwait (n=249) are taught by female teachers except (19) schools that are planned to be feminized within few years (Education Statistical Group, 2010). Permission was obtained from the Ministry of Education in Kuwait to visit (7) elementary public schools in the district selected randomly. A preliminary visit was made to these schools and a survey was distributed to the teachers. Data from the survey were used to decrease the number of participants fulfill the purpose of this study.

For the purpose of this study, and based on the data obtained from the survey, two schools out of the seven were chosen to be part of the study. Both schools follow the national curriculum, which is composed of 10 subject areas. Each school has approximately 65 teachers and 400 students. Teachers are provided with a mandatory training program known as the ICDL (International Computer Driving License) offered by the MOE in Kuwait for teachers to acquire skills in the use of computers. The training program is mandatory for teachers to teach in schools and/or get promoted and is composed of 7 units: 1) Information Technology; 2) Using Computer and Managing Files; 3) Word Processing; 4) Spread sheets; 5) Presentations; 6) Database and 7) Email and Internet (AlKhezzi & Alqahtani, 2010).

In this study, a purposeful sampling approach was employed. According to Patton (1990), purposeful sampling seeks information-rich cases which can be studied in depth. The focus was on a specific criterion: 1) Kuwaiti teachers teaching various subject areas excluding computer, art, music and physical education, 2) Teachers who have (4-8) years of teaching work experience, and 3) Teachers well-skilled in computers (Table 1). Information about the research study was orally disseminated through researchers contact with the school administrators of each school. After being informed about the study, chosen participants were provided with a consent form that was verbally translated to provide explanation of what the interviews would entail.
Data Procedure and Analysis

Standardized open-ended interviews where utilized with six participants (three from each school) to identify and describe to what extent is technology integrated in their classrooms. Teachers were given pseudonyms for their names for confidentiality purposes. According to Yates (2004), interview allows people to develop a shared perspective and understanding. It allows the researcher to gain insight into educational and other social issues by understanding the experience of the individuals whose lives reflect those issues (Seidman, 2006). The interviews conducted lasted approximately 35-40 minutes and consisted of 15 questions. The questions focused on the teachers’ actual use of computers, the nature of their profession and the software applications they use. Moreover, a survey was administrated prior to the interview. The reason behind using the survey is to focus on factual information about individuals and establish a solid base of fact from which to draw conclusions and make interpretations.

The interviews were transcribed and the process of analysis involved looking for common patterns in answers thus allowing the researcher to come up with themes that explain teachers’ viewpoints and ideas on computer use from each school, in addition to their familiarity and know-how of computers. This process of analyzing the data by identifying important statements to gain a deeper understanding of the participants experience is recommended in qualitative studies (Creswell, 2003). During all phases of the analysis, field notes were maintained addressing the data and personal reactions to the participants’ responses to increase reflexivity.

Findings

The results showed that Kuwaiti elementary school teachers’ use of computer technology was mainly for 1) professional use and 2) use with students. These two distinctions will be discussed subsequently

A) Professional Use of Computers by Teachers

The most utilized applications by teachers in both schools were: Word, PowerPoint, and the Internet while the least used was Excel. Priority was for preparing teacher-related documents (word), for instructional purposes (presentations), for locating material (Internet) then for data entry of students’ grades (excel). Similarly, AlKhezzi and Alqahtani (2010) found that spreadsheets were the least used as teachers had no much use for them in their work. This contradicts (Abougamos & Al-Harsh, 2004), who’s study showed that the following applications
are used in the following order: spreadsheets, word processing then presentations. The order of use was related to teachers’ work priority. Priority was for data entry of students’ grades (excel), then preparing teacher-related documents (word) and then for instructional purposes (presentations). Internet use is not a major application in either of the two studies, which contradicts the findings of this study. Walaa, the English teacher explained that she uses Word for “lesson preparation and inserting pictures, Power Point for “inserting songs and animation”, the Internet for “information searching” and Excel for entering students’ grades.

The following issues arose for those teachers who viewed the use of computers as important in their profession:

i) **Benefit and Need**

There is a high correlation between compatibility and relative advantage (Al-Gahtani, 2003; Moore & Benbasat, 1991). Roger (2003) stated that individuals when confronted with new innovations would show resistance at first before making their final decision whether to adopt them or not. Studies have shown that teachers’ beliefs and attitudes towards a certain technology influence its integration in schools (Oncu, et al., 2008; Wozney, Venkatesh, & Abrami, 2006; Yildirim, 2000). Perceived usefulness of technology was linked to teachers’ expectations and beliefs on the benefit of technology in enhancing lessons, providing convenience and fostering student learning and understanding (Oncu, Delialioglu, & Brown, 2008). In this study, Kuwaiti elementary school teachers see computers as being beneficial as they allow quick access to information, overcome administrative delays, and improve storage and retrieval of students’ records. In addition, teachers found computers to save time when preparing materials and motivated the students to learn. Compatibility also was evident in this study as the Kuwaiti teachers perceived computers to match their curriculum goals, reliable and accurate, and made up for limited classroom time. One of the teachers described that through the use of computers, “it is easier and faster to do things and it saves time”. Other teachers emphasized that computers “facilitates lesson preparation” and so they use it a lot for this purpose. Despite the lack of computers in the classroom, some of these teachers used their own personal laptops for class presentations, and others found means of accessing and using them either at home or in school computer labs when available.

Another issue related to compatibility was that the subject areas taught influenced whether computers are used and the type of computer applications used. For example, the
Arabic teacher did not see the benefit of using presentations in class instruction, but would use Word for preparing daily worksheets. These findings are similar to the study by Alkhezzi and Alqahtani, (2010) who found that the use of spreadsheets was used by teachers in the science department and not by those in the art department as they are more related to Science and Math needs. Similarly, Al-Hageri (1989) found that teachers believed that the use of technological tools is not suitable when teaching topics like social studies. This supports Oncu, et al. (2008) who emphasized on “applicability”. That is, it is more likely teacher will adapt technology if the supporting technology and the topic of the lesson match. Thus, the more teachers perceive technology as beneficial and applicable, the more likely they will use it (Rogers, 2003; Yates, 2001).

**ii) Difficulty of Use**

Teachers face the problem of dealing with troubleshooting and malfunctions. Teachers try to deal with simple problems like wire connections but resort to their peers or call a technician when they cannot resolve it themselves. Some teachers stated they receive help from their husbands like Hana, the Social Studies teacher “my husband helps me if I do not know how to”. As for the use of computer applications, teachers indicated that the ICDL assisted them in knowing how to use the computers and thus do not perceive computers as being difficult to use. One teacher stated “I receive help if I have difficulty with downloading some items, but dealing with hardware is more difficult than software”.

**iii) Professional Development**

The ICDL training program shows that it develops teachers’ computer skills and that technology-interested teachers apply these skills in their classroom. Thus, the issue of complexity had a positive influence on the Kuwaiti teachers’ use of computers as the ICDL training program provided them with the skills needed to operate computers and use its applications. Furthermore, teachers’ previous experience with computers during college encouraged them to use them in the school. Nevertheless, the study also showed that some teachers attended the ICDL training for promotion concerns and did not rely or depend on computers in instruction or class preparations. Others felt that the ICDL did not benefit them much. Karima, the Arabic teacher stated, “The ICDL is for beginners only, I have more practical experience and so I did not take”. This supports Al-Helsa (2005) who found that teachers attended the ICDL training for reasons other than attaining skills. They attended the training for monetary incentives and bonuses and being able to get access to and use computers.
Training can also be linked to the issue of visibility, which is the physical presence of an innovation in a setting (Moore & Benbasat, 1991). Being exposed to computers through training programs, would encourage teachers to see them, use them, and see their benefit. Thus, access to technology is important not by being able to afford it, but by making it accessible for the users at all times (Fabry & Higgs, 1997; Oncu, et al., 2008). Jaber and Moore (1999) emphasize that instructional activities and frequency of use are influenced by access to computers. This shows that if computers were present in the classroom, Kuwaiti teachers would get encouraged to utilize them and would have more favorable attitudes towards them and thus become potential adopters. Having computers in the computer lab would not guarantee constant usage as when they are accessible in the classroom where individuals can demonstrate with them (Al-Gahtani, 2003). Computers in labs also do not guarantee access for all teachers due to scheduling of laboratory time and in some cases authorizations for security reasons (Oncu, et al., 2008; Zhao, Pugh, Sheldon, & Byers, 2002). This was supported in this study as teachers had lack of computer in classrooms and did not have continuous access to the computer lab due to scheduling reasons as all the classes had to share the computer labs.

**B) Teachers Use of Computers with Students**

Due to the lack of computers in classrooms, students are not exposed to computerized hands-on-activities, but they learn their skills via the computer lab sessions, which are offered once or twice a week, whereby they learn basic operations like how to turn on a computer, use the mouse and keyboard, as well as learn how to surf the Internet. Nevertheless, some teachers experienced positive results on their students.

Observability was evident in this study as the Kuwaiti teachers were able to recognize an increased difference in students’ attention and enjoyment level than when using the traditional methods of teaching. In addition, students’ level of performance increased as they were motivated to learn the class topic attracted by the multimedia contents of the presentation i.e. animation, audio and text (the legibility of words than handwritten text on blackboard). In addition the weekly computer lab sessions lessened students’ negative attitudes towards computers. Karima, the Arabic teacher stated that students tend to memorize the information more easily when computers are used:

“The students get attracted to the computers and I noticed that there is an increase in the level of their performance. The students interact more with me and they learn the words easily and so I do not need to repeat myself”.
Discussion and Conclusion

This study investigates the extent of computer technology by Kuwaiti teachers in two primary public schools in the Capital district in Kuwait. Technology integration is a broad topic and thus the focus was primarily on teachers, the benefits gained, and constraints of the use of computers. This study revealed two core aspects related to computer technology adoption and integration that will be discussed subsequently.

The first aspect is that the characteristic of an innovation and how an individual relates to it plays a role on whether these innovations are adopted or not. As shown in the study, issues like accessibility and availability of computers, ease of use, benefits and need were all contributing elements on 1) teachers’ perception towards using or not using computers and 2) the nature of use of the computers. This supports Rogers (2003) concept of perceived attributes of an innovation whereby he emphasized that the perception of the potential adopter towards an innovation predicts the rate of adoption of innovations.

The second aspect is that computer use is still not prevalent in these two schools due to lack of technical support and resources. For example in this study, despite the fact that computer labs are present, teachers face some challenges on using them with their students due to 1) the lack of connection reliability, 2) the lack of frequent computer maintenance, 3) insufficient number of computers for each student, and 4) the lack of electrical jackets that allow all computers to be connected. This results support Ghazzawi and Al-Awadi's claim (1992) who argue that even with sufficient technologies, teachers’ use is hindered by the absence of technical support and the lack of educational software that meet their curriculum goals.

Third, the lack of computers in the classrooms as well as difficulty in scheduling lab time for students who need extra assistance with class work, limited teachers ability to demonstrate with their students to what extent is computers useful to them and accordingly to decide whether to adopt or reject its use. This shows that visibility and accessibility are important constructs to be taken into account and included in future studies, as it is more applicable in the Kuwaiti school contexts.

Due to the limited school resources, teachers are aware that they do not have the opportunity to expand their use of computers and other technologies in instruction but are hoping that in the future things will improve. All female teachers participating in the study have
suggested the need of having a computer in each classroom to facilitate students learning and their time in class preparation. Therefore, we can conclude that there is a need for more computers machines and peripherals, curriculum-based courseware and technical support to facilitate teachers’ use of computers.

Research Limitations

There are various limitations that need to be acknowledged and addressed regarding the present study. The first is related to the limited amount of time allotted for the interviews, which may have reduced our ability to explore participant responses in greater depth. As such, this constraint may not have given us enough time to engage the participants fully. Second, due to time limitation, there was no opportunity to interview teachers of other subject areas to be aware of how the use of computers reflects on their teaching. Third, it would have been also beneficial to interview teachers that teach the same subject area to be able to identify similarities and differences in regards to the use of computers in both schools.

Implications for Research

This study begins to fill the gap in the literature on Kuwaiti elementary school teachers using computer technology. A researcher could continue this study by enlarging the sample size and conducting additional interviews with participants to obtain a more detailed description of that experience. The current study focused on Kuwaiti elementary teachers in the public school systems, which are mainly females. Future studies could be conducted across genders and other school levels to see whether there are similarities or difference the nature of how computer technology is used and the contributing elements to its adoption or rejection. In addition future studies can include all other types of technology other than computers.
References


Appendices:

Tables

Table 1. Participants Demographics

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<th>Work Experience</th>
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