THE INTEGRATION OF TECHNOLOGY INTO SCHOOL CURRICULUM IN SAUDI ARABIA: FACTORS AFFECTING TECHNOLOGY IMPLEMENTATION IN THE CLASSROOM

By

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ABSTRACT

There are a number of factors that influence technology implementation in the classroom including teachers' concerns; barriers; and intrinsic incentives. These factors give classroom teachers a chance to make a shift in their thinking and practice to help them properly integrate technology across the curriculum. This study was designed to assess:

1. Teachers' concerns toward technology integration into curriculum,
2. If there are significant differences in stages of concern among teachers with different gender and school programs,
3. Barriers that teachers face when integrating technology into curriculum, and
4. Whether teachers are internally motivated to integrate technology into their teaching.

A total of 274 classroom teachers were selected from 15 public schools of varying programs, gender, and grade levels across one School District located at Medina, Saudi Arabia. This study was descriptive in nature and its data were collected using the Stages of Concern Questionnaire along with an addendum questionnaire. Both were administered manually. The data were quantitatively analyzed using the SPSS and FTN95 computer software applications.

The study found that classroom teachers are highly motivated to the potential that technology brings into the teaching and learning process. Despite their motivations, the study found that these teachers are burdened with eight significant barriers to technology integration. These barriers were descendingly ranked according to percentages of teachers who were in accord with the barriers as follows: (a) insufficient in-service training, (b) large number of students in the computer lab and learning resources center,

(c) poor in-service training, (d) insufficient pre-service training, (e) broken-down technology equipment, (f) lack of teacher time, (g) lack of technology equipment, and (h) old technology equipment. Interpretation of the Stages of Concern profiles for the total sample, gender, and school program showed that teachers' concerns were most intense in the areas of awareness, informational, and personal concerns. According to the multivariate analysis of variance results, female self concerns were found to be significantly more intense than the male ones, and higher awareness concerns were found to be significant for Tatweer program teachers relative to other colleagues employed in the Alraeda and Regular programs.

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CHAPTER 1

INTRODUCTION

Saudi Arabia has a public educational system providing free education from elementary through university to all residents except higher education for aliens. The system also provides students from elementary through secondary level with free textbooks. The management of the education system in Saudi Arabia is mainly undertaken by three authorities: (a) the Ministry of Education, which supervises all types of schools such as public, private, adult, and international schools for boys and girls from preschool through the secondary level; (b) the Ministry of Higher Education, which is responsible for universities; and (c) the General Organization for Technical Education and Vocational Training, which is accountable for technical and vocational colleges. Also, there are authorities such as the Ministry of Defense and Aviation, the Presidency of the National Guard, the Ministry of the Interior, and other organizations and corporations in the private sector, which provide their affiliates and children with education from preschool through secondary, and adult education as well, and follow the same educational ladder, study plans, and curricula formulated by the Ministry of Education. The study of Islamic religion and Arabic language are central parts of the Saudi educational system. Saudi education is segregated by gender and has an academic year consisting of two terms.

A rapid major change in the 21st century economy, and its reliance entirely on technology, makes the use of technology in the field of education momentous. The recent period of time has seen an explosion of technology in the workplace, bringing about new theoretical procedures and technical skills in the world of learning that can be enhanced if

educational institution staff and students address the demands of technology and exploit its benefits in an efficient manner. Technology should be grasped and mastered by school staff and students in order to have a positive outcome on teaching and learning processes (Al-Batainah, Anderson, Toledo, & Wellinski, 2008). Teachers must be ready for future events enriched with cutting-edge technology and be aware of up-to-date techniques, so they can infuse their instruction with suitable technological resources and practices (Valdez, 2005). Dockstader (1999) stated that "the teacher of the future must be not only accomplished in instructional techniques and technology, but also in the integration of technology into the curriculum" (p. 73).

There is no sufficient definition which can thoroughly describe the term "technology integration." However, in a few words, the integration of technology refers to incorporating technology resources and practices effectively within the existing curriculum (Jackson, 2002). The National Center for Educational Statistics (NCES, 2002) defined technology integration as "the incorporation of technology resources and technology-based practices into the daily routines, work, and management of schools" (p. 75). Technology has a variety of valuable practices inside the school environment. It can be utilized in the preparation of a study session, teaching material, assessment of students, management of classrooms, online testing, extensive investigation of subject matter, collaborative work and communication, distance learning, and other practices. A recent study, led by the Northwest Educational Technology Consortium (NETC, 2005), surveyed a sample of school principals to determine the extent of successful technology integration into school curricula. Results of the research produced a successful definition for technology integration that is based on three main dependencies: (a) teachers are

proficient in utilizing technology in classrooms, (b) teachers and students routinely employ technology to support learning activities, and (c) educational administration supports teachers and students both when they implement technology in the educational settings and when technology breaks down. Effective technology integration is also described by how, why, and for what teachers use technology, not by the amount or type of technology they use (Dockstader, 1999).

Integrating technology into the school curriculum is important for several reasons. When technology is properly implemented in classrooms, it contributes to the belief of building "lifelong skills such as problem solving, creative thinking, and self directed learning" (Kirkwood, 2000, para. 38). When technology is used effectively, it can promote critical thinking by allowing students to be occupied with real-world problems that cannot be answered immediately. It can also develop students' ability to look for information and use it in meaningful ways. Technology can be used as an incentive to excite students' interest in a specific topic by providing a concrete example of its use, thus increasing academic involvement time.

Technology integration is currently taking a critical place in the nationwide public education system in Saudi Arabia. It is a fundamental component in three kinds of educational projects called Tatweer, Alraeda, and Computer Integration into Elementary and Intermediate Education. Tatweer is the ongoing educational project aimed at developing general education in terms of developing teachers' skills, developing curricula, enhancing school activities, and improving the school environment in a high-tech style. The project was proposed by the Monarch of Saudi Arabia, King Abdullah, in 2006. The Saudi government allocated 9 billion Saudi Real (around $2.5 billion) for the

Tatweer project will be implemented over a period of six years to create high schools in a high-tech style and guarantee the availability of a highly skilled and motivated work force in the future. Currently, there are 50 high schools under the Tatweer project, divided equally by gender and distributed equally over 25 different school districts across Saudi Arabia. The aim of the Tatweer Project is to improve the general education by accomplishing four main goals:

1. Improving the quality of school curricula on the basis of the nature of the learner, social conditions and ideals, and the selection and organization of subject matter;
2. Enhancing classrooms with the forefront technology resources;
3. Qualifying teachers to use technology and integrate it into their curricula; and
4. Focusing on extra- and co-curricular activities to enhance practical experience, extreme creativity, higher-order cognitive skills, inquiry skills, and self-confidence of students, as well as to boost their educational, social, and attitudinal development.

Alraeda is also an ongoing educational project intended to create elementary, intermediate, and secondary schools in a high-tech style. The schools will be based on a charter between the schools' principals and teachers in order to achieve certain positive goals, which are set up ahead of time in the school's charter. Alraeda schools receive public money, but are not subject to same rules and regulations that apply to other, regular public schools. Instead, Alraeda schools are accountable for producing positive academic results and adhering to the school's contract. Alraeda schools, open to all residents who choose to attend one, are not allowed to charge tuition. Alreada schools' personnel are in search of improved education through better curriculum, the right kind of pedagogy, creative teachers, and technology-enhanced classrooms.

Alraeda and Tatweer schools offer “Smart Classrooms” to supplement the traditional learning models in all kinds of subject areas. A smart classroom is, basically, an electronic classroom enhanced with cutting-edge technological resources and network linking, so teachers can manage their classrooms and infuse their instruction with suitable technological practices. There are three kinds of Smart Classrooms: (a) Cooperative Electronic Classroom, which usually offers six computers, one for each group of students, and the classroom might contain other peripherals as well; (b) Electronic Classroom, which basically offers one computer for each student and might contain other peripherals as well; and (c) Show Hall, which fundamentally offers one computer and one projector and might contain other peripherals if it is used as a classroom or belongs to a specific teacher or subject matter.

Technology Integration into Elementary and Intermediate Education is an ongoing educational project that aims to incorporate computer technology into school curricula within the elementary and intermediate levels of the educational ladder in Saudi Arabia. The major goal of the project is to eliminate computer technology illiteracy among both teachers and students by preparing them to integrate computers properly into teaching and learning. An additional goal is to develop teaching techniques infused with computer technology in order to create an effective educational environment inside of the schools. The schools under this project usually offer regular classrooms which do not contain any kind of technological supplies but the schools are furnished with a computer laboratory and Learning Resources Center (LRC). Typically, the computer laboratory is a room which consists of many networked computers for educational use. Printers, scanners, projectors, and other add-on equipment may augment the lab setup. The

Learning Resources Center was defined by the Management of Educational Technology in the Ministry of Education as a place that contains various educational tools for teachers to use in aligning classroom instruction and assessment with the objectives of each subject area. The LRC is also the place which facilitates individual and cooperative learning for students by having them engage in scientific activities among different learning situations: talking, listening, working, and watching, which provoke students' thinking and encourage them to employ all five senses to make the learning process most valuable to them. The LRC is usually supervised by a trained teacher.

The aim of many educational systems is to prepare teachers for integrating technological resources and practices effectively into the school curriculum. However, many classroom teachers are unwilling or are underprepared to employ technology in their instruction. A lot of money is spent on coaching school staff and purchasing hardware and software, but some teachers are still unprepared to utilize these technological resources productively in the educational setting. There are many factors which restrict teachers' use of technology in their daily lesson planning, such as (a) the ongoing advancements in technology resources, (b) lack of experience of both teachers and students in the educational use of technology; (c) crowded classrooms; (d) more pressure on teachers, from authority, to succeed; (e) more daily responsibilities; (f) discipline issues; (g) meeting the needs of special and talented students; (h) technology availability; (i) the lack of financial resources; (j) the lack of technical support; and (k)other demands (Al-Batainah et al., 2008). According to Gahala (2001), in spite of the availability of technology and in-service training, not all teachers feel comfortable and familiar using it in their instruction. In fact, without sufficient hands-on training, practice

with feedback, and follow-up support for how technology can appropriately be integrated into the daily routines, work, and management of classrooms, the teachers will have limited implementation of technology in the educational process. Implementation in the educational environment refers to the actual placement of the innovation in the instructional process, but it is different from adoption, since many innovations are adopted but never implemented (Bond, 1988). The term "innovation" refers to introducing something new or improving something previously established by introducing new methods, practices, ideas, or products. It is easy to adopt an innovation, but it needs much effort and skill to be implemented properly in an educational setting due to the variety of curricular programs, computer platforms, and the educational population.

The process of effectively integrating technology into the school curriculum requires a highly skilled and motivated work force handling classes in the high-tech style, which, in turn, requires allocating a lot of money. One goal of the new millennium research agenda proposed by Roblyer and Kneze (2003) was to call on educators and decision makers, in terms of funds allocated for technology foundation and low technology usage by teachers, to support effective uses of technology in teaching and learning. Strudler (2003) supported Roblyer and Kneze's idea with one significant caution, saying that effective technology implementation in classrooms depends on identifying "essential conditions," which generate consistent benefits in response to certain sorts of real educational problems. Strudler (2003) argued that researchers must identify these factors to realize the consistent advantage of technology usage in the classroom.

Statement of Problem

Schools in Saudi Arabia are currently experiencing a process of educational change resulting from technology integration into the curriculum. These schools cannot expect to obtain student achievement gains from technology if teachers do not implement it in an effective manner (Mills, 1999). Technology should be well mastered by classroom teachers in order to have a positive outcome in the teaching and learning process (Al-Batainah et al., 2008). Regardless of the increased teacher training, technology infrastructure, and access to technology resources, many classroom teachers are still uncomfortable in employing technology in their instruction. At this time, school districts are offering a variety of technology-based training programs and workshops in order to augment teachers' ability to incorporate computer technology into their teaching practices. However, the content of these programs and workshops are commonly arranged around a vast amount of conceptual and procedural knowledge about technology, with much less attention being paid to the affective needs of the classroom teachers. According to Mills (1999), the role of a teacher in the innovation is very important since "much of decision making" about its success or failure is individually undertaken by the teacher. Likewise, Liu and Huang (2005) stated that "teachers' attitudes, one of several important human factors, have a significant influence on their computer adoption or implementation behavior in the classroom" (p. 37). Therefore, the theoretical framework of the present study was mainly established on the Stages of Concern, a dimension of the Concerns Based Adoption Model (CBAM), to measure and describe the current affective needs of teachers seeking knowledge and skills with respect to effective technology usage in the classroom. The attempt was made, in the study, to

take advantage of teachers' attitudes to identify the factors that teachers believe are important in creating barriers that work against the adoption of instructional technology and to identify proposed solutions that redress many of these problems. One aim in the study was to examine factors that explain teachers' acceptance of technology and their awareness of the potential benefits that technology brings to education.

Purpose of the Study

The study had a fourfold purpose: (a) to describe the current trend of teachers' concerns with respect to their knowledge and skills in technology implementation according to the total sample, gender groups, and types of school programs; (b) to determine if there are significant differences in stages of concern among teachers with different personal and professional characteristics, such as gender and type of school program; (c) to examine factors that classroom teachers perceive as critical in producing barriers that stand against the effective use of technology in teaching; and (d) to determine whether classroom teachers are self-motivated to teach with technology and what keeps them engaged with this demanding process.

Significance of the Study

The results of this study have significance for in-service planners who design in-service, technology-based training programs for teachers with concern patterns similar to those found in this study. The results of this study provide in-service planners with significant ideas for considering both the content and teachers' needs in planning professional development programs. This study contributes to closing the gap between the level of technology implementation expected of classroom teachers and the actual level of its implementation.

Research Questions

The study sought to answer the following questions:

RQ1. At what stages of concern do Saudi teachers perceive their technology implementation to be?

RQ2. Are there significant differences in Stages of Concern among Saudi teachers with different personal and professional characteristics, such as gender and type of school program?

RQ3. Do Saudi teachers have difficulties when they use technology in their teaching? If so, what are the factors that stand opposite the use of technology?

RQ4. Are Saudi teachers self-motivated for incorporating technology into their teaching? If so, what keeps them engaged with this challenging task?

Limitations of the Study

The following limitations are applicable to this study:

1. Qualitative data, allowing participants to elaborate on the quantitative results of this study, were not collected due to several circumstances: (a) face-to-face interviews could not have been conducted because of the considerable travel distance between the researcher's residence and the research study site; (b) in spite of good financial status, the researcher was not able to be in Saudi Arabia during the data collection period because of constraining family conditions, and (c) online and telephone-based interviews were also impossible to conduct due to the considerable difference in time zones between the researcher's residence and the site of the research study.

2. Since education in Saudi Arabia is segregated by gender because of the Islamic Law that prevents the interaction between men and women, the majority of teachers who participated in this study were male.
3. A convenience sampling technique was employed for an easy selection of participants; as a result, the study was subject to the sampling bias which occurs when participants are not representative of the entire population.
4. The study also was under the influence of systematic bias coming from the sampling bias. This sort of bias might lead the study to produce results which are systematically too high or too low (positively or negatively skewed), compared with a given actual result if the sample were representative of the entire population.
5. As a consequence of the sampling and systematic sampling mentioned above, the study results cannot be generalized to other school districts that were left out during the selection process, which, in turn, causes a decrease in the external validity of the study.
6. The study took place at a particular point in time, which does not represent all points of coming time, so care must be taken into consideration when any generalization is made.
7. The study was limited to the public schools within the urban area. No teacher who taught in private schools or in the rural area was asked to participate. Therefore, no generalization to these settings may be taken into account.
8. Further investigation of this topic is required in other school districts in Saudi Arabia.

CHAPTER 2

LITERATURE REVIEW

Factors Affecting Technology Implementation in the Classroom

Even though tremendous support given to classroom teachers, the huge investment made in providing public schools with new technology resources, and the vast body of research showing how an educational setting enriched with technology provides benefits to teachers and students (Fabry & Higgs, 1997), Marcinkiewicz (1993) pointed out that there remains a disparity between the level of technology integration expected of teachers and the actual integration of technology into the existing curriculum. To state the matter differently, technology is still underutilized inside of the school environment. As Peck and Dorricott (1994) asked, why do "schools rumble along virtually unchanged by the presence of computers" (p. 11)? There are major issues accountable for producing a gap between the actual and expected use of technology in the classroom that have to be addressed. These issues are as follows: (a) teachers' concerns about the use of technology in teaching, (b) the barriers that preclude the effective use of technology, and (c) the variables of intrinsic motivation that help explain teachers' behavior about using technology in their teaching.

Teachers' Concerns

While one teacher might infuse his or her instruction with the most advanced technologies and up-to-date techniques, another might be scared to touch a computer. Therefore, the issue of technology implementation in the classroom is individual. Educational leaders have to acknowledge that teachers, like their students, are at different levels of preparedness and have different needs and interests. To meet these varied needs

and make real changes in teachers' practice, the professional development has to act in response to a diversified spectrum of teachers' needs in terms of knowledge and skills. In order for staff developers to be able to recognize such needs, grasp the meaning of them, and develop activities that meet them, they must refer to a model like the Concerns-Based Adoption Model (CBAM). The next section describes the model in some detail.

The Concerns-Based Adoption Model (CBAM)

The CBAM model can help school principals, school district administrators, and staff developers identify the teachers' concerns about an innovation and design appropriate professional development workshops on the basis of the teachers' needs. The CBAM is a conceptual framework that educational leaders employ to evaluate an innovation; it demonstrates to them how individuals affected by the change process react to the implementation of the innovation (Hall & Hord, 1987). The CBAM was developed gradually out of the work of Fuller who proposed the concept of concerns and the development of concerns theory that emerged in the late 1960s (George, Hall, & Stiegelbauer, 2006). Concerns can be described as the feelings, preoccupations, thoughts, and reactions individuals develop in regard to a new program or innovation that pertains to their daily work (Hall & Hord, 1987). Concerns refer to "a state of mental arousal resulting from the need to cope with new conditions in one's work environment" (Christou, Eliophotou-Menon, & Philippou, 2004, p. 160). Fuller's (1969) study concluded by stating that teachers' concerns shift from the preteaching phase (nonconcern) to the early teaching phase (concern with self), and finally, to the late teaching phase (concern with pupils). Fuller (1969) proposed a developmental sequence of teachers' concerns that consists of four main phases, namely, unrelated concerns, self

concerns, task concerns, and impact concerns, which, in turn, correspond to their career phases: pre-teaching, early teaching, and late teaching.

Key concerns in the CBAM are defined as follows:

1. *Unrelated Concerns*: This phase is described as a period of low involvement in teaching, during which pre-service teachers in education programs have no specific concerns regarding the innovation.
2. *Self Concerns*: This phase is described as the early teaching phase, during which both pre-service teachers' and beginning teachers' concerns are related to their teaching, but are self-centered. These concerns reflect their "feelings of potential inadequacy, self-doubts about the knowledge required, or uncertainty about the situation they are about to face" (Hall & Hord, 1987, p. 57).
3. *Task Concerns*: This is a period of more involvement in teaching, when teachers' concerns are much more relevant to their teaching. They are focused on issues such as "logistics, preparation of material, coordination, and scheduling" (Hall & Hord, 1987, p. 57).
4. *Impact Concerns*: This is a late teaching phase when veteran teachers' concerns concentrate on how their teaching affects students' learning and how their profession can improve.

During 1969-1970, researchers found concerns coming from teachers who engaged in innovations. These concerns were similar to those Fuller (1969) had proposed. The researchers identified seven Stages of Concern (SoC) about an innovation through which teachers progressed until they executed it and were capable of using it (George et

al., 2006). These seven Stages of Concern are as follows: awareness, informational, personal, management, consequence, collaboration, and refocusing concerns. Table 1 offers typical expressions of the seven Stages of Concern about an innovation.

Table 1

Typical Expressions of Concern about an Innovation

Fuller's stages	Stages of Concern	Expressions of Concern
Impact	Stage 6: Refocusing	I have some ideas about something that would work even better.
	Stage 5: Collaboration	I am concerned about relating what I am doing with what my co-workers are doing.
	Stage 4: Consequence	How is my use affecting students?
Task	Stage 3: Management	I seem to be spending all of my time getting materials ready.
Self	Stage 2: Personal	How will using an innovation affect me?
	Stage 1: Informational	I would like to know more about the innovation.
Unrelated	Stage 0: Awareness	I am not concerned about the innovation

Source: George et al., 2006, p. 4.

According to Table 1, the stage of awareness parallels the unrelated level. The two subsequent stages of informational and personal constitute self-concerns. The third stage relates to task concerns. Stages four through six represent impact concerns. In accord with the Stages of Concern, initially the awareness stage of concern indicates that individuals have little knowledge of the innovation. Later on, in the informational stage of concern, individuals demonstrate their willingness to learn more about the reform and, in the personal stage of concern, they have concerns with respect to their ability to respond to the requirements of the innovation. Self-concerns gradually diminish and individuals concentrate on organizing and scheduling the reform in the management stage

of concern. Finally, individuals overcome task concerns and concentrate on the influences, and the consequences, of the innovation on students. The individuals also look for cooperation and coordination (collaboration) with others to improve their use of the innovation, and they also make suggestions and recommendations regarding improving the reform (refocusing). Table 2 shows, in detail, the characteristics of each of the Stages of Concern about an innovation.

Factors Associated with Teachers' Concerns

On the basis of CBAM's hypotheses, teachers' concerns evolve through seven developmental stages (awareness, informational, personal, management, consequence, collaboration, and refocusing) as they accept an innovation. In addition, teachers engaged in any innovation would not move through the seven stages similarly or have similar intensity of concern among several levels or groups. CBAM founders believed in some factors that are related to promoting teachers' concerns across the seven stages. These factors are as follows: (a) teaching experience, (b) the years of involvement with the innovation, (c) perceptions of technology integration levels, (d) the pre- and in-service training, and (e) involvement with another innovation other than the recent one.

Based upon the CBAM's hypotheses mentioned above, it is not surprising that individuals who are in the beginning stages of the innovation are going to show concerns at the lower Stages of Concern (self concerns) and those who are advanced in dealing with the innovation are going to show primarily concerns at the higher Stages of Concern (task or impact). It is also expected that individuals who have longer involvement with the innovation will be seen to support it more than those who considered themselves

Table 2

The Stages of Concern about an Innovation

Fuller's Stages of Concern		CBAM's Stages of Concern	Main Characteristics of each Stage of Concern about an Innovation
	6	Refocusing	Teachers evaluate the innovation and make suggestions for continued improvements, or consider alternate ideas that would work even better.
Impact	5	Collaboration	Teachers are interested in relating what they are doing to what their colleagues are doing.
	4	Consequence	Teacher concerns now center upon effects on student learning. If positive effects are observed, teachers are likely to continue to work for the implementation.
Task	3	Management	Concerns begin to concentrate on methods for managing the innovation within the classroom. Teachers now express concern over the organization and details of implementation, and the overcoming of difficulties. Time requirements are among the prime management factors, which create skepticism on the part of teachers in relation to the adoption of innovations.
Self	2	Personal	Teachers focus on the impact the innovation will have on them. At this point, they exhibit concerns about how the use of the innovation will affect them on a personal level. They may be concerned about their own time limitations and the changes they will be expected to make.
	1	Informational	Teachers express concerns regarding the nature of the innovation and the requirements for its implementation. At this stage, teachers usually show their willingness to learn more about the specific innovation or reform.
Unrelated	0	Unconcerned	Teachers have little knowledge of the innovation and have no interest in taking any action.

Source: Christou, Eliophotou-Menon, & Philippou, 2004, pp.160-161.

newcomers to the innovation. The former are expected to express concerns toward the innovation at higher stages in comparison to the latter. Liu and Huang (2005) found that

teachers with different perceptions of their technology implementation (beginner, intermediate, and advanced) displayed different concern profiles for each group. In the first four stages of concern (awareness, informational, personal, and management) beginners had the highest intensity, intermediates had moderate intensity, and advanced had the least intensity of concern. While in the last three stages (consequence, collaboration and refocusing) beginners had the least intensity, intermediates had moderate intensity, and advanced had the highest intensity of concern. The researchers confirmed that the concern profile for each group of teachers supports George et al.'s hypothesis concerning the developmental stages of concern for the different users (inexperienced, experienced, and renewing).

In terms of experience, teachers during the pre- and early teaching phases are probably going to have concerns related to self, while those who are in the late teaching phase are likely focused on advanced issues such as management of the innovation in the classroom, the effect of the innovation on student learning, and collaboration with others for raising the value of the innovation.

In terms of the effects of training on teachers' concerns toward an innovation, CBAM developers believed that individuals who receive any form of training, either formal coursework done within teacher education programs, or in-service training received as a group from staff development programs, or attained independently from well-designed instructional materials (audio; video; multimedia; or simply a good textbook), are seemingly going to support the innovation more than those who do not obtain the required knowledge and skills related to the innovation. Thus, it is no surprise to find significant differences in the Stages of Concern between those who receive

training and those who do not. Hope (1997) found that, due to training, teachers' concerns about the use of a technology workstation (innovation) transferred from the self stage toward the task and impact stages. Therefore, training is considered an influential intervention which could be used to resolve teachers' concerns at the lower stages and elevate the change process. Gershner and Snider (2001) found a significant reduction in teachers' awareness concerns as a result of training sessions they received over one semester. This indicates an increase in teachers' awareness of the use of the Internet as an instructional tool.

Furthermore, CBAM was designed under the premise that individuals, who are preoccupied with programs or projects other than the recent innovation, are going to disregard it and tend to express concerns toward it with high intensity in the lower Stages of Concern. Thus, any interference that keeps individuals away from handling the innovation on a daily basis had to be taken into consideration when examining individuals' concerns toward the innovation.

For this study, it was expected that the development of Stages of Concern would be different among Saudi teachers in terms of the three types of school programs (Tatweer, Alraeda, and Regular) in which they were engaged. It was also expected that the development of Stages of Concern would be different among Saudi teachers in terms of gender. In the Middle East educational environment, the expressed Stages of Concern scores for male and female teachers were found to be significantly different (Alshammari, 2000). The study reported, for example, that females' concerns were more intense on the task stage but less intense on the impact stages in comparison to males' concerns. Building on the recent literature review, the gender factor was found to have an

influence on the use of technology in the classroom (Hermans, Tondeur, van Braak, & Valcke, 2008; van Braak, Tondeur, & Valcke, 2004). Shapka and Ferrari (2003) found no gender differences among pre-service teachers for any of the computer attitudes or for outcomes coming from performing a specific computer task. However, the researchers expected that gender differences may be present if pre-service teachers experience computer applications that are less familiar.

Barriers to Technology Integration

A barrier refers to "any condition that makes it difficult to make progress or to achieve an objective" (WordNet, 1997). Teachers who are involved in technology integration in the classroom might find the process challenging to them because of the barriers that exist. Research on educational technology categorizes barriers to technology use in the classroom into first- and second-order barriers (Brickner, 1995). The term first-order barriers refers to those obstacles that are external to teachers. Typically, these obstacles are portrayed in the sense of types of resources including time, access, cost, support, training, and plans that are either absent or insufficient in the educational environment (Ertmer, 1999). Second-order barriers refer to those obstacles that are internal to teachers. Typically, these barriers are described in terms of teachers' perceptions of technology as being opposed to the student-directed classroom practices including: teaching methods, learning styles, management strategies, and assessment procedures (Ertmer, Addison, Lane, Ross, & Woods, 1999). Add to this other teachers' concerns of personal resistance such as irrational fear of technology, uncertainty about the value of technology in education, a sense of laggard, illogical belief that technology is

improper for students' learning, and contradictory needs between educational system and teachers with respect to technology (Lee, 2001).

Snoeyink and Ertmer (2001) addressed the relationship between first- and second-order barriers and explored the idea that the overall trend of first-order barriers is inclined to hide second-order barriers, meaning that problems associated with the internal barriers are attributed to the problems dealing with the external barriers. For instance, inappropriate training could limit teachers' knowledge of technology, and limited access to appropriate technology could also account for limited skills, which lead to unsuccessful experiences, which, in turn, bring about a lack of comfort, which, finally, keeps teachers from using technology in the classroom more often. Ertmer et al., (1999) found that even though first-order barriers are removed, second-order barriers might still exist. The researchers observed that the second order barriers are diminished as teachers move forward through levels of technology use ranging from low to the higher as follows: supplemental, supporting, and stretchable use. For example, for those who use technology as a supplement (low level of use), second order barriers are mostly observed, while those who envision a higher level of use (stretchable use), second order barriers go out of sight. Therefore, it is important for educational leaders initially to look at first order barriers and then recognize the effective interventions needed to address that category of barriers. Afterwards, second order barriers are precisely addressed so that educational leaders can thoroughly understand the reasons that make the teachers struggle to use technology effectively in the classroom.

Marcinkiewicz (1993) cited a clear disparity between the expected and actual use of technology in the classroom by K-12 teachers. Guhlin (1996) stated that this disparity

occurs due to the fact that technology is underutilized. Research on technology found that this underutilization is associated with intrinsic and extrinsic factors which mainly hinder the effective use of technology in the learning environment that places technology equipment and software in the hands of teachers. Keengwe et al. (2008) asserted that the actual challenges of technology use in teaching are contingent upon the "behavior, investments, and commitment of individual teachers" (p. 562). In a condensed form, the researchers presented the most common barriers, which were identified by classroom teachers as follows: (a) lack of functioning equipment and useful software, (b) outdated equipment and software, (c) insufficient released time, (d) insufficient funding, (e) lack of technical and administrative support, (f) negative attitudes of teachers toward technology, (g) lack of teacher confidence, (h) lack of openness to change, (i) lack of pre- and in-service training, and (j) lack of clear vision showing the effective integration of technology into the school curriculum.

The Influence of Intrinsic Factors on Technology Integration

These kinds of factors are less perceptible than extrinsic factors, have the highest extent of personality, and are more deep-rooted in the individual's attitudes. Teachers might possess attitudes which conflict with the educational change process without being conscious of the conflicts; as a result, teachers might oppose the change process. When it comes to technology integration, "an innate dislike for change (especially change mandated from above) is the most basic and significant barrier" for classroom teachers (Fabry & Higgs, 1997, p. 388). As stated by Dias (1999) one often overlooked barrier to integration of instructional technologies in the classroom is resistance to change. The researcher pointed out that, as teachers are asked to integrate technology into the existing

curriculum, they are not being asked to just adopt new technology such as computers and the Internet. Rather, they are actually being asked to for change "the way they teach their students, which may include changing the role they play in the classroom and the way their classrooms are physically arranged" (p. 12). In brief, the teachers who experience technology integration in their teaching are increasingly asked to approach to a learner-centered classroom and stay away from a teacher-centered classroom (Corcoran, 1995). This radical change is not an easy or short task that can be fulfilled in a few days, but needs a lot of time and energy from teachers to reach the intended outcomes. It requires teachers to make a 180-degree shift in thinking regarding their classroom practices. Traditional teachers believe that students need to complete a classroom activity independently, prefer to be in control of students' learning, are comfortable with their traditional approach to classroom management, believe that lectured-based instruction works better for students to learn, and believe that students' learning will not improve without testing. These teachers should make the transition by attracting students to technology-based activities and projects requiring higher-order thinking skills such as creative problem solving, critical thinking, decision making, discovery learning, self-regulated learning, and cooperative learning. The tremendous educational potential the technology holds will not be fully realized if educational leaders cannot establish a new vision of (a) how technology will change the way they define teaching and determine (b) how meaningful learning using technology can take place (Harris & Sullivan, 2000), (c) how technology resources and classroom activities can be effectively managed (U.S. Congress, 1995), and (d) how the curricular objectives accomplished by technology use can be assessed (Carey, 1993).

In addition to a resistance to change, teachers avoid using technology in the classroom because they are uncertain about technology for achieving certain curricular objectives (Schoepp, 2004). This uncertainty results from their unawareness of the important contribution which technology can make towards the educational process. Thus, teachers who experience this sort of concern might still be unaware of the fact that technology can be used inside and outside of school for students who need more time to master a particular topic and that technology can also be exploited to expand and apply what has been taught inside the classroom. If these teachers are not persuaded about the value of technology in education during the earlier stages of its implementation in schools, then they may never embrace it in their instruction.

Since the introduction of technology into educational settings, there has been a feeling of fear of computers which has been expressed by classroom teachers in several forms. Fear of losing status (Marcinkiewicz, 1993) occurs when teachers are concerned about how using technology in the classroom will negatively influence their profession. For example, teachers in the Saudi school context are under pressure to cover all the prescribed subject matter. Accordingly, most teachers are reluctant to engage their students collaboratively in solving authentic and complex problems with technology beyond a particular topic. These activities need more time to be conducted during the class time, and sometimes require teachers to skip a few parts of the subject matter. If teachers skip some subject matter and students fail to answer relevant questions on an examination, their parents are going to call a school principal to complain about teachers. Other teachers reject technology use in their instruction because they are afraid that these new machines might take their positions and roles in the schools. Still others are

concerned about losing control of classroom discipline (Hodas, 1993; Scheffler & Logan, 1999).

Teachers are also worried about how using technology in the classroom will negatively affect students' learning and achievement (Chen, 2008). They fear that their students may fail to retain possession of hard-earned skills. For instance, with the availability of the automatic checker in the word processor, which fixes spelling and grammar mistakes in a document more quickly while typing, students will not learn the construction of the spoken language. In the case of using electronic calculators, students will never learn how to multiply quantities together to find a product or how many times a number contains another. Some teachers are strongly in agreement with the objection that technology is improper for students' learning. That is evident when teachers refuse to install technology equipment in their classroom to avoid the risk that some students cannot stand against the temptation of playing games, chatting with others, watching video clips and photographs, reading electronic newspapers, and composing electronic messages via email during a teaching session. Student can easily reach these materials through Internet access, which is able to penetrate the borders of any restricted technology system. In reality, it is too hard to monitor irrelevant materials which students browse on the Internet during the class time. Such materials divert students' attention from a targeted lesson, thereby interrupting their learning, which, in turn, negatively affects their performance in taking high-stakes exams.

Fear of embarrassment appears when teachers are apparently less informed about technology than their students (Hodas, 1993; Scheffler & Logan, 1999). This sort of fear is the most intrinsic barrier which hinders teachers from acquiring skills and knowledge

required for effective use of technology. Technology can embarrass teachers when they are faced with an unknown or unfamiliar situation, such as when something goes wrong with computers during the class and as something new is introduced to schools because of the rapid advancement of technology.

Some teachers, especially those who have been in the teaching profession for a long period of time and have a poor background in the area of technology, express persevering feelings of being far behind in using technology (Lee, 2001). This group usually moves very slowly through the change process and still has self-centered concerns, trying to discover the value of technology in education, to look for more information about the effective use of technology, and to know how the use of technology in teaching will affect their professional career.

Administrators should take into consideration the "psychological risks and pressure" (Bennett, 1995, p. 22) that might disturb teachers when they attend an unfamiliar technology training session because many teachers, especially those who teach natural and formal subject areas, are seen by others as the ones who should have all the required knowledge and skills in that area of technology. The teachers might feel uncomfortable or apprehensive about engaging in a new learning environment because of their feeling of incompetence and others' derision which, in turn, have unfavorable effects on the cognitive and affective development of students. Consequently, encouragement and extra personal support have to be provided by each person, for example, school principal, technology coordinator, staff developer, who have influential roles in the professional development of teachers.

The Influence of External Factors on Technology Integration

The following sections describe a number of the most common extrinsic barriers to the use of technology in the classroom, identified by K-12 teachers.

Teacher Time. Various studies (Beggs, 2000; Cavucci, 2009; Chen, 2008; Corbin, 2003; Schechter, 2000) reported lack of teacher time as a barrier to technology use in the classroom. The amount of time required to learn new knowledge and skills in using educational technologies is often underestimated (Kearsley & Lynch, 1992). In reality, most teachers require hands-on practice in order to learn how to use new technologies in their curricular areas properly; this kind of practice usually takes time for the teachers to learn and master, and, in turn, to transfer that knowledge to the classroom in an effective manner (Brand, 1997). Successful integration of technology into the curriculum almost always takes more time than initially anticipated. However, teachers in K-12 settings have little time left over due to the fact that they spend most of their working day teaching students in the classrooms, meeting with parents, supervising students during lunch, recess, and dismissal times and attending staff and committee meetings (Fabry & Higgs, 1997). It is unreasonable to expect teachers to spend their own time and employ their own resources to learn new educational technologies which change constantly (Lei and Morrow, 2009). Teachers need released time to:

1. Attend technology training sessions to learn how to plan new lessons employing new instructional materials or methods that effectively integrate technologies (U.S. Congress, 1995),
2. Join in a collaborative community situated in the school environment, where teachers can learn to design technology-rich lessons from technology-experienced

peers through modeling, collaboration, and coaching (Browne & Ritchie, 1991;Glazer et al., 2005; Inan & Lowther, 2010; Mierzejewski, 2010),

3. Observe peers, mentors, and models in a specific subject area or grade level implementing technology virtually in the classroom (Ertmer, et al., 1999),
4. Reach a level of independence and confidence in using the technology materials with students, which could be facilitated by the four processes of fading, articulation, reflection, and exploration (Browne & Ritchie, 1991).

In-service Training. Insufficiency of knowledge and skills about how to use technology in the classroom is a very common problem at all levels of education (Kearsley & Lynch, 1992). Within the technology-rich environment in a Middle Eastern university, Schoepp (2004) found that faculty were unsure about how to use technology in the classroom properly, and this uncertainty is attributed to insufficient in-service training. Within a seminary setting, Lee (2001) found that faculty members are not inclined to adopt an information technology innovation during the preliminary phases of implementation for several reasons, including fear of the unknown and lack of knowledge and skills required to implement it. Within the public school context, Kazu (2011) and Alhazmi, Najat-Aldeen, Almowaraay, and Jonaid (2010) cited inadequacy of in-service training in technology as one of the key factors in weak implementation. Failure to support teachers with intensive in-service training is the usual reason that produces concerns about the unknown and lack of knowledge and skills in technology. Therefore, it is important to provide classroom teachers with on-going, long-term in-service training, not just a one-shot workshop, the former of which has to take place after or before the school day and during the summer vacation or on weekends (Guhlin, 1996).

Many in-service training efforts are being made to augment teachers' ability to integrate technology into their teaching process; however, many of today's technology training programs pay attention to the mechanical goal or, for example, how to operate equipment and software, with little or no focus on the instructional and organizational goals (U.S. Congress, 1995). School district administrators, superintendents, principals, and other change facilitators expect that teachers who have easy access to technology and complete initial in-service training will be able to make an effective connection between technology and the existing curriculum. In reality however, teachers oftentimes do not know how to properly design and implement classroom activities that make meaningful use of technology. They often employ technology for isolated classroom activities which are unrelated to a targeted concept or topic (Moersch, 1995).

So, how can teachers incorporate technology effectively into their already packed curriculum? The answer to this question depends on the quality of technology training programs teachers attend (Corcoran, 1995). Based on recent research, classroom teachers indicated that training presented to them in the area of technology integration is weak (Alhazmi et al., 2010), meaning that training efforts ignore pedagogical and organizational issues. Ertmer et al. (1999) recommended "incorporating a dual focus on technological and pedagogical issues within the training efforts" (p. 70). That means that training needs to identify specific topics in the curriculum where technology can work and where proper software can be selected to teach it. It is also better to recognize topics that previously could be taught effectively with technology, such as problem-solving skills, decision-making strategies, discovery learning approach, and cooperative learning approaches (Guhlin, 1996).

To achieve successful technology integration, staff developers have to provide teachers with the right kind of training which meets their current and varying needs (Boe, 1989; Browne & Ritchie, 1991; Shelton & Jones, 1996; Wedman & Heller, 1984,). The literature review shows the importance of involving teachers, who are the ones responsible for the actual integration, in some aspects of curricular and instructional planning in order to make the technology integration process meaningful to them (Lei & Morrow, 2009; Wedman & Heller, 1984). Educational research on professional development recommended staff planners take in-service teachers' concerns into account when designing the training programs. That is because those teachers are "adult learners" who will be accountable for bringing a great deal of knowledge and skills needed for in-service training sessions (Orlich, 1983). These concerns include teachers' affective needs to the meaningful uses of technology in classroom practices, including teaching methods, organizational and management strategies, and assessment procedures.

Pre-service Training. The Office of Technology Assessment (U.S. Congress, 1995) reported that most teacher education programs do not focus on technology instruction in preparation of new teachers. Even if pre-service teachers receive instruction in technology, it would be given as a "separate subject," ignoring educational objectives of a theme, concept, or topic. If teacher education programs tend to produce future teachers who have the ability to use technology in the classroom, these programs have to prepare them to achieve that task effectively (Fisher, 1997). Thus, a prospective teacher should be acquainted with the use of technology in a learner-centered environment, which focuses on the following dimensions of practice: personal, organizational, and pedagogical.

The literature on technology indicates the importance of pre-service training within teacher education programs. The U.S. Office of Technology Assessment (U.S. Congress, 1995) considers pre-service training as one of the key requirements for effective use of technology in the classroom. Miccolis (2007) found that technology training provided to prospective teachers during their credentialing education program portends the future use of technology in the classroom. Knowing teachers' concerns about microcomputer technology was a key to Hope (1997) in revealing the fact that pre-service training allows teachers who are recent graduates some opportunities to experience the innovation in the early phase of its introduction. Corbin (2003) examined factors associated with technology integration into middle and high school science curricula and found that the small amount of training given to teachers within their pre-service education does not sufficiently prepare them properly to use technology in the curriculum.

The previous findings affirm the effect of pre-service technology training on the future use of technology in the classroom. Accordingly, teacher education programs have to prepare prospective teachers to work effectively within the learner-centered environment or, in other words, work as a "facilitator" in the classroom and not as a container and dispenser of all knowledge, as in the teacher-centered classroom (Henriquez & Riconscente, 1998). Carey (1993) declared that this goal implies the following modifications in order to support the "Teacher As Facilitator" model within the teacher education program: (a) a change in existing coursework, (b) a revised program of observation and student teaching experience, (c) the use of a variety of instructional strategies by teacher educators, and (d) appointment of cooperating teachers, or perfect

users of technology, who are skilled as a "Teacher As Facilitator" in order to facilitate teacher educators' attempts to integrate technology into the classroom.

Assessment System. Scheffler and Logan (1999) stated that classroom teachers are concerned about the difficulty of assessing student learning outcomes stemming from technology-based activities through current assessment instruments. Most teachers have not been instructed to use the kind of assessment strategies that are often required in the learner-centered environment utilizing technology resources. There are several strategies for measuring students' learning and products made by technology, including the use of rubrics, the use of electronic portfolios, and performance assessment which needs students working in a group and solving an authentic problem by using technology. Teachers should be required to use strategies that can be used to assess results coming from technology use and regular classroom activities. In-service training must also provide teachers with the required skills and knowledge to use properly the electronic assessment tools that help them track student progress, identify their weaknesses, and assess the educational objectives achieved by technology that involve high-order thinking skills, including problem solving, decision making, discovery learning, and cooperative learning (Carey, 1993).

Classroom Management. Managing technology resources and classroom activities in the student-centered environment is not an easy task for teachers who have never been prepared to deal with it. Such a task includes rotating students through classroom activities with a small number of computers and helping students on computers with technical and logistical problems. Management and organization problems can

produce both intrinsic and extrinsic barriers for classroom teachers (Ertmer, 1999). First-order barriers might need to be overcome when management problems emerge from issues such as lack of equipment, large number of students, and teachers' lack of knowledge and skills of effective management strategies (Alhazmi et al., 2010). Second-order barriers relating to management issues emerge in cases where teachers prefer to control the classroom, are comfortable with the teacher-centered approach, or support independent learning (Scheffler & Logan, 1999). Currently, there are several kinds of technology-based settings where teachers can meaningfully integrate technology into school curriculum, including: (a) regular computer labs, (b) learning resources center, (c) a single-computer-based classroom for teacher demonstration and students' presentations, (d) a cooperative computer-based classroom which contains a few computers (one computer on the teacher's desktop and the others for students to work in small groups, (e) to one-to-one-computer-based classroom with one computer per student and one on the teacher's desktop (U.S. Congress, 1995). It is not surprising that teachers become confused and frustrated about utilizing the available resources among different kinds of classrooms. However, it falls on staff planners to help teachers become fully acquainted with effective management strategies and other class rules to manage the resources within each type of technology-based environment effectively.

Support. The literature review captured: (a) how teachers' behaviors change within gradual levels of use, from nonuser to experienced user, as they become increasingly skilled in technology integration (Panyan, Mcpherson, Steeves, & Hummel, 1994); (b) how teachers' behaviors characterize different computing styles, including avoidance, integration, and technical specialization (Evans-Andris, 1995); (c) how

teachers' categorize the roles of technology to different kinds of classroom use: supplemental, supporting, and stretchable (Ertmer et al., 1999); and (d) how teachers' concerns toward technology integration change through developmental stages ranging from early concerns about "self" to "task" and end with "impact" (Hope, 1997; Wedman, 1986). As teachers venture through these levels of use, kinds of use, or stages of concern, they are faced with a variety of extrinsic and intrinsic barriers, each of which, to be overcome, needs a particular kind and level of support (Dias, 1999). Since teachers arrive at a training session with a massive range of abilities in technology and those advancements and breakthroughs in the area of technology change constantly, access to various kinds of support might be required. The literature review revealed that teachers might require access to "any or all" of the following kinds of support, including emotional, administrative, professional, instructional, and technical (Ertmer & Hruskocy, 1999). A great deal of emphasis was placed on using effective kinds of support that met teachers' needs toward the implementation process. In their study, Wedman and Heller (1984) stressed that if support is to be effective, it must correspond to both cognitive and affective needs of teachers, which, in turn, augment potential implementation (Bradshaw, 1997).

Technical Support. On-site support is critical. Unfortunately, the Office of Technology Assessment (U.S. Congress, 1995) reported that regular on-site support for technology implementation into the classroom is very limited. Educational research on technology integration cited lack of support of different kinds, for example, technical, administrative, and financial, as key barriers to teachers who integrate technology into school curricula (Corbin, 2003; Dias, 1999; Schechter, 2000). Alhazmi et al. (2010)

found that there is a lot of broken-down technology equipment that needs to be fixed inside of the school context in Medina, Saudi Arabia. This finding has an important implication for school district administrators, which suggests the importance of providing each school with permanent, full time, school-level technical support responsible for training, helping teachers use technology, handling technical problems, maintaining and repairing software and equipment, and upgrading systems. Research showed a very small number of American schools which have full-time school-level technology coordinators. Even those teachers who are experienced in technology and are appointed as part-time coordinators, allocate little of their time directly to coordinating technology activities because they are very preoccupied with classroom and other school responsibilities (U.S. Congress, 1995). For part-time technology coordinators, education leaders who are in authority must make good choices regarding allotting appropriate portions of workload between technology duties and classroom efforts.

Administrative Support. The word support means any assistance, encouragement, or approval to improve a new practice within the school domain given to teachers by a person in authority. Research on the adoption of innovations in schools found that school or district administration has a key role in successful integration of technology into the classroom (Inan & Lowther, 2010). While superintendents contribute to the educational change process at the district-level, school principals have responsibilities to it within the school context. The Office of Technology Assessment (U.S. Congress, 1995) found "that when administrators are informed about and comfortable with technology, they become key players in leading and supporting technology integration activities in their schools" (p. 153). As school administrators are acquainted with the knowledge and skills needed

for successful technology integration, they become aware of difficulties associated with technology implementation, as well as the importance of support for teachers (Bennett, 1995; Meltzer & Sherman, 1997).

A school principal is an authoritative person who plays a critical role in making a decision about promoting or preventing an innovation or an education change process within the school environment (Orlich, 1983). The school principal is also a supportive person who can make a significant investment in the professional development of teachers by encouraging them to think of, and try, new ways to use the innovation and practice it and to pursue unique training sessions, workshops, and conferences that contribute to the successful change process (Kazu, 2011; Meltzer & Sherman, 1997). The school principal also works as a change facilitator who can resolve teachers' concerns towards the innovation by encouraging them to practice it and providing them with particular types of effective interventions, also called incentives or reinforcers, targeted to their needs, including: (a) a well-designed technology plan with clear objectives; (b) easy access to equipment and software; (c) adequate funding for hardware and software acquisition; (d) maintenance and repair; (e) systems upgrades and replacement; (f) released time for self-exploration; (g) collaborative work and modeling; (h) extensive ongoing, long-term, hands-on training focused on learner-centered classroom practices; and (i) in-order and on-time technical support (Hope, 1997).

Technology Plan. The literature review on technology showed that schools have made considerable investments in purchasing hardware and software (Fabry & Higgs, 1997). However, technology is still underused by classroom teachers (Guhlin, 1996). These two indicators point to a noticeable gap between obtaining technology and utilizing

it effectively in schools (U.S. Congress, 1995). To close this gap, Chopra (1994) stressed the need for a technology use plan so that its introduction into schools could achieve more. Conlon (2000) stated that

> the introduction of new technology will change our schools. But technology without philosophy is blind. Unless it is harnessed to a clear vision of change, then, chip by chip, the technology could take us into future that we would never willingly have chosen for ourselves. (p. 116)

For technology to be a "lever" for educational reform, Venezky (2004), said that individuals must primarily have a vision for that reform and then begin to work to promote it. A technology planner has to be engaged in deep thought to determine the effective integration of technology with classroom practices, in the sense of teaching, learning, assessment, and management, in ways that deepen students' understanding of instructional content and expand their learning of the world around them (Barnett, 2001). Research revealed that developing a thoughtful plan for technology use is the most important step in achieving successful implementation in the classroom (Ertmer, 1999). It is also "a major determinant of what is taught, how it is taught, and which technology will be used" (Gulbahar, 2007, p. 945) and, moreover, the most important strategy that overcomes barriers at each level of use (Ertmer et al., 1999). Classroom teachers will not be inclined to address barriers, even though they could, if they do not have a clear understanding of curricular uses of technology. As indicated by Means et al. (1993), "Most teachers will find little incentive to tackle the technical and scheduling problems associated with technology, unless they have a clear vision of how the technology can improve teaching and learning" (para. 4).

Due to the rapid change of technology advancement (Gulbahar, 2007) and changing thoughts towards the best use of technology in terms of pedagogical and

organizational issues (U.S. Congress, 1995), developing a long-term "work-in-progress" technology planning document is crucial (Czubaj, 2002, p. 20). However, before writing a technology plan, it is important to begin with creating a "shared vision of the future" by having an opportunity for all the stakeholders to take part in the process (Dwyer, 1995). Among these stakeholders are classroom teachers, students, school principals, school district administrators, library media specialists, computer lab teachers, parents, community leaders, business partners, and decision makers. In spite of the importance of involving all these people in the technology plan, teachers, school principals, and students are still considered the key because they are the ones who are very central to the implementation process (Alhazmi et al., 2010; Gulbahar, 2007). A shared vision provides the stakeholders with a starting point to make the first move and goals to reach for as a guide along the way. It presents a picture of how, in the long run, technology is going to have an impact on teaching and learning processes, classroom management, and school administration.

To address a successful change, a technology plan must begin with a needs assessment of all stakeholders dealing with technology integration to determine where they are at the time and what kinds of support they need to reach their vision in the future (Fabry & Higgs, 1997). The next step, before writing a technology plan, is to check what technology is available in schools and districts at the time in order to determine what technology will be needed to provide for effective implementation (Barnett, 2001). A list of current technology resources including network status, Internet access, the age and condition of computers, the software applications, and the auxiliary equipment has to be assessed. One important thing to be taken into account is that all hardware and software

have to be the same within all schools and be compatible with the hardware and software in the training centers in order to ensure no interruption through the process of technology implementation (Chopra, 1994). Reviewing the literature on the use of educational technology is also one of the most important steps for developing a smart technology plan which directs current and future efforts (Barnett, 2001). Technology planners must be acquainted with factors that both hinder and contribute to the use of technology in the school environment among students, teachers, and administrators.

Once stakeholders' needs for technology implementation have been recognized, the inventory of the current status of technology in the schools has been taken, and the literature on technology use in education has been reviewed; the next step is to write a mission statement (technology plan) which seeks to fill the empty space between having technology and using it effectively. This mission statement must be a collaborative, promising, long-term, and "work-in-progress" technology plan (Czubaj, 2002, p. 20). It must be in accordance with the district or school's budget and distributed wisely to multiple portions, each of which achieves a particular goal, including professional development, technical support, hardware, software applications, upgrades, and additional needs as teachers' experiences move forward in the future.

Access and Cost. Access is not merely about the availability of hardware, software, Internet connections, and so forth in a school context. Effective access requires the placement of the proper quantity, condition, and kinds of technology where both teachers and students can use them effectively at any time and in any place (Fabry & Higgs, 1997). However, there are some issues that impact the effective access to computing technology in and out the school context. Most school technologies are

usually located either in centralized computer laboratories or in learning resources centers. If technologies are only assembled in these two locations, some teachers and students are hobbled by the rules that control their access to computers within the school surroundings (Venezky, 2004). For instance, computer science and business teachers often take highest precedence in setting up appointments for a computer lab over other teachers. So, those who are language, religion, and social studies oriented are going to be unwilling to assign tasks that require students to spend ample time on computers during the school day.

Norris et al. (2003) found a significant correlation between technology use and access as a strong predictor of teachers' use of technology based on multiple predictors of access ranging from the most to the least in significance, as follows: (a) the number of classroom computers, (b) the availability of Internet at school, and (c) the availability of curricular-based software applications. This mutual relationship between technology use and access indicates that if technology is not virtually integrated in the classroom, teachers never take advantage of it in their teaching (Guhlin, 1996). Norris, Sullivan, Poirot, and Soloway (2003) indicated that having one computer in the classroom is not considered appropriate access and has a limited influence on student learning. Therefore, they suggested a classroom have six computers for both teachers and students to use when they need to, not when the computer laboratory is scheduled for them. Inan and Lowther (2010) found that the availability of classroom computers has a direct and indirect positive influence on the number of occasions teachers use technology in their classroom instruction. The authors explored the indirect influence of computer availability on teachers' use of technology as mediated by their perceptions of

technology's impact on teaching and learning and perceptions of their knowledge and skills required to integrate technology into their classroom instruction effectively.

In spite of the fact that computing technologies have found their way into educational settings, teachers are still concerned about the digital divide phenomenon (Marri, 2005; Venezky, 2004) which makes them reluctant to make homework assignments that require students to use a computer outside of the school context. If students have no computing technology available in their homes or no access to the Internet, these homework assignments are never going to be made. The term "digital divide" also directs attention to the gap between teachers who have access to technology and those who do not (Marshall, 2001). This often occurs among groups who are from different areas (urban, rural), racial groups (majority, minority), socioeconomic status (rich, poor), or gender. For example, teachers who live in rural areas or poor neighborhoods suffer more from the inequity and often have difficulties and obstacles getting access to information technology or using advanced technology in their teaching. This phenomenon also causes tremendous variability in computer-to-student ratios from school to school, both within and among school districts (Fabry & Higgs, 1997). Computer-to-student ratios conventionally shift from no computers for students in the classroom; to one computer per classroom; to a few computers for students, to one computer per student.

Another issue affecting access involves old-fashioned technology resources within school contexts (Czubaj, 2002). Classroom teachers are also concerned about the old computers, which are usually in bad condition and do not work properly due to their inability to run contemporary software applications or be networked. The reason why

these outdated machines are still in existence is because schools or districts fail to allocate adequate funds to keep up with the costs of rapid advancement in technology. Therefore, technology planners must ensure that appropriate financial resources are in place for upgrading and for ongoing updates in terms of both hardware and software resources.

Any educational institution should be equipped with up-to-date hardware and software resources, which are key features to diffusion of technology (Gulbahar, 2007); but just having them does not lead to effective integration if they are frequently out of order (Feng & Whittier, 2005). This problem points to the unavailability of on-site technical support personnel within the school environment. When classroom or laboratory computers are broken-down and teachers have no idea how to get them fixed, if technical support is not readily available this causes extended and major disruptions in teachers' ability to take advantage of technology in their teaching. Those whose personal teaching styles rely more on the teacher-centered approach will easily stop using technology in their teaching if technology equipment gets broken frequently and is not handled immediately. On-site technical support must be available at the school setting so that teachers have confidence that the time they spend in learning about software and preparing technology-enriched lesson plans is not going to be lost when hardware and networks fail to work (Barnett, 2001). It is very important to provide each school with at least one troubleshooter, technical supporter, or technology coordinator who is responsible for maintenance and repair, technical staffing, and replacement and system upgrades. Providing classroom teachers with high-tech support personnel who are readily available, highly skilled, and very highly supportive is one of the critical factors which

contribute to successful technology implementation in the classroom (Inan & Lowther, 2010). However, research on educational technology provides more insight about the amount of technical support classroom teachers need during the educational change process (Venezky, 2003). Technology planners and administrators should balance between teacher competence and technical support, meaning that the availability of a critical level of technical support is important for teachers who are still in the initial phases of technology use. However, as teachers move forward to advanced phases of use, their pedagogical skills for technology use are enhanced and their technical skills become better and reach the saturation level.

The Potential Benefits of Technology in Education

Teachers generally agree that technology has become integral to the teaching and learning process, and many of them wish to use technology better to provide high-quality schooling for students (Marshall, 2001). Teachers who use technology in their teaching are usually considered to be self-motivated because they invest their own time and effort in learning to use technology in the classroom in multiple ways (Hadley & Sheingold, 1993). Also, they are in agreement with the point that technology is proper for learning subject matter and are persuaded about the potential benefits of technology in education (Snoeyink & Ertmer, 2001). Thus, it was necessary to identify factors that help confirm teachers' enthusiasm or interest in using technology in their teaching as well as ensuring the absence of some deep-rooted attitudes that express teachers' refusal to accept technology in their teaching.

In reality, most teachers require a specific kind of practice that involves their active participation in order to learn how to use new technologies properly in their

teaching. This kind of practice usually takes time to be delivered to the teachers and more time to be mastered by them and, in turn, be transferred to the classroom in an effective manner (Brand, 1997). Effective integration of technology into the curriculum almost always takes much more time than initially expected. However, teachers in K-12 settings have little time left over due to the fact that they spend most of their working day teaching students in the classrooms, meeting with parents, supervising students during lunch, recess, and dismissal times and attending staff and committee meetings (Fabry & Higgs, 1997). In spite of their long and busy working day, what makes these teachers invest their limited time in the effort to in learn technology? The use of technology in the teaching and learning process is considered a challenging task by the classroom teachers, particularly the inexperienced newcomers. Regardless of being a demanding role, what keeps the teachers engaged in teaching with technology and why do they overburden themselves with an excessive load?

Of the potential intrinsic incentives for incorporating technology into their teaching, the most important for classroom teachers is that technology improves the learning process for students (Alhazmi et al., 2010). Advanced technologies, such as computers and the Internet, become indispensable components in the schooling environment since they profit students across multiple aspects of learning, such as: (a) reading and writing skills (Ash, 2011; Bao, 2006; Dubert & Laster, 2011; Lamb & Johnson, 2011); (b) critical thinking associated with data analysis or problem solving (Marri, 2005); (c) collaborative learning (Huang, 2006); (d) concepts of power and culture (Sernak & Wolfe, 1998); (e) learning through simulation associated with authentic tasks (Means, 1993); and (f) individualized learning for students (U.S.

Congress, 1995). Technology also contributes to increasing engagement of students (Brown, 2004; Carle et al., 2008) and their academic achievement (Carle et al., 2008), which are the most motivating things for the classroom teachers (Hadley & Sheingold, 1993).

Classroom teachers can teach more effectively to the extent that technology makes the subject matter more interesting to students (Alhazmi et al., 2010; U.S. Congress, 1995). In the inquiry-based setting, for example, where students work in different groups, learn at different speeds, use different materials, solve different problems, and join in different activities; teachers can take advantage of technology resources appropriately to create instructional materials and develop instruction that better meets students' needs (Davis, 2000; Means, 1993). Teachers can also develop authentic activities which are defined by Brown, Collins, and Duguid, (1989) as "the ordinary practices of the culture" (para. 21), and by Newmann and Wehlage (1993) as "real-world public problems" (para. 13) that meet five main standards: "(1) higher-order thinking, (2) depth of knowledge, (3) connectedness to the world beyond the classroom, (4) substantive conversation, (5) social support for student Achievement" (para. 6). These activities are also defined by Perreault (1999) as "real-world tasks" (p. 35) that students can expect to face in future jobs, in the home, or in other social contexts. Technology can benefit the educational process since it has the power to make classroom activities clearly connected to students' personal experiences and contemporary public issues. Such authentic classroom activities provide the opportunity for students (a) to make a direct connection between the new topic and the one taught previously (Woo, Herrington, Agostinho, & Reeves, 2011), (b) to apply what has been currently taught in a concrete

manner (Hadley & Sheingold, 1993; Perreault, 1999), and (c) to acquire advanced skills and knowledge due to their involvement in actual problems (Hadley & Sheingold, 1993; Means, 1993). In addition to teachable and learnable moments made possible by technology, it also helps classroom teachers save time and effort in the teaching process (Alhazmi et al., 2010). In an email correspondence project where both pre-service teachers and middle school students participated, Schoorman (2002, pp. 360-364) discussed benefits that pre-service teachers got when technology was incorporated into a multicultural course. The researcher stated that technology allowed teachers easy access to a non-local class that contained children from diverse cultural backgrounds, without spending money, time, and energy in travel. Technology has the power to create real-world environments for experimentation and exploration and helps students to be "producers of information rather than just consumers" (Bransford et al., 1986). Therefore, students can perform experiments, carry out real-world activities, explore features of a tract of land, examine tasks from different perspectives, and use a variety of resources to gather information and solve problems when the classroom is linked to the Internet and furnished with advanced technologies.

Classroom teachers have an interest in adopting technology in their daily work because it provides a means of expanding their subject matter (Brown, 2004; Means, 1993, U.S. Congress, 1995) and applying it in ways that clearly satisfy them (Gaudelli, 2006; McShay, 2005). One of the most disappointing things for teachers who work in the traditional schools is the scarcity of interaction with other colleagues and professionals situated in distant sites for the purpose of strengthening teachers' knowledge of the subject matter they teach. Even though classroom teachers are well prepared, they still

cannot be fully acquainted with all things in their subject area. Moreover, awareness about improvements is only available in a tiny sample of people. However, with the availability of technology in the educational environment, teachers can get increasing access to knowledgeable people in order to deepen their knowledge of their subject area and to have a clearer picture of critical teaching and learning approaches.

The use of technology in education enables both teachers and students to acquire the basic computer skills they will need to be computer-literate adults (Hadley & Sheingold, 1993). Ash (2011) asserted:

> Being literate has always meant the capacity to use a culture's most powerful tools to create and communicate meanings. If you are not teaching with technology, you are not preparing the kids for the future, you are not preparing them for the present moment. (p. 24)

Summary

The literature revealed a disparity between the level of technology integration expected of teachers and their actual integration of technology into the existing curriculum. There are several major issues responsible for producing this disparity, which have to be addressed. One issue often overlooked in educational reforms resulting from technology implementation is to identify individuals' concerns toward it. Since technology implementation in the classroom is individual, educational leaders must recognize that classroom teachers are at different levels of preparedness and have different affective needs. To meet these varied needs and make a real change in teachers' practice, the current study utilized the CBAM model, which was found to be an appropriate tool to recognize such needs, grasp the meaning of them, and develop activities that meet them.

Another issue in the change process resulting from technology implementation is to identify barriers that preclude individuals from making progress or achieving an intended objective. Teachers engaged in technology implementation in the classroom may find the processes challenging them due to barriers that exist. Research on educational technology divides the barriers into two main categories: external barriers, and internal barriers. External barriers are portrayed in terms of types of resources, such as time, access, cost, support, training, and plans that are either absent or inadequate in the educational setting. Internal barriers are portrayed in two ways. The first portrayal is in terms of teachers' perceptions of technology as being opposed to the student-centered classroom practices, which include teaching methods, learning styles, classroom management strategies, and assessment procedures. The second portrayal is in terms of teachers' personal resistance, for example, irrational fear, skepticism about the value of technology in education, a sense of laggard, and illogical beliefs that technology is improper for students' learning. The literature showed that the overall trend of external barriers is inclined to hide internal ones, meaning that problems associated with the internal barriers are attributed to the problems of dealing with the external barriers. Therefore, this study sought to identify major external barriers and to identify effective interventions needed to meet these barriers.

Teachers who use technology in their teaching are usually considered to be self-motivated because they invest their own time and effort in learning to use technology in the classroom. Also, they are in accord with the point that technology is proper for learning the subject matter they teach and are convinced about the potential benefits that technology brings to education. Thus, it was necessary for this researcher to determine

whether classroom teachers accept technology in education through examining factors that would help confirm teachers' enthusiasm or interest in using technology in their teaching as well as ensure the absence of some deep-rooted attitudes that express their refusal to accept technology in their teaching.

CHAPTER 3

METHODOLOGY

The nationwide educational system in Saudi Arabia is experiencing a major transition from its traditional classroom methods to constructivist methods that require students to complete technology-based classroom activities and projects that employ high-order thinking skills such as creative problem solving, critical thinking, decision making, discovery learning, self-regulated learning, and cooperative learning. The Saudi educational system has mandated the adoption of technology in curricula in all public schools through three different school programs: (a) Tatweer, (b) Alraeda, and (c) Computer Integration into Elementary and Intermediate Education. Tatweer and Alraeda schools offer multiple kinds of Smart Classrooms furnished with the most advanced technology equipment. In comparison with other schools, which are under the Computer Integration into Elementary and Intermediate Education program, technology supplies are officially found in two different places, learning resource centers and computer laboratories. The Ministry of Education has recruited specialized technology staff to teach classroom teachers the effective use of technology. All school districts across the country offer classroom teachers various kinds of brief, intensive educational programs relating to technology integration into curricula. New textbooks, teacher guides, classroom materials, and technology supplies have been adopted for each grade level to accommodate the new style of teaching and learning.

For a better understanding of the change process resulting from technology implementation, teachers' concerns had to be taken into account and scrutinized. According to CBAM, classroom teachers experience concerns during the process of

adopting technology in their teaching, so identification of their concerns can help identify appropriate interventions to resolve problems and keep the process of implementation going smoothly. The present study basically relied on the theoretical framework of one of the CBAM dimensions, called Stages of Concern, in order to identify Saudi teachers' concerns toward the use of technology in teaching. This was done by measuring their responses to the Stages of Concern Questionnaire (SoCQ) and determining whether there are significant differences in the Stages of Concern among teachers on the basis of gender and type of school program. Beside the CBAM, the study sought to uncover factors that create difficulties for teachers through the change process to determine their acceptance of technology in the educational process and what keeps them engaged in this challenging task.

This chapter contains a detailed account of participants involved in the study, procedures followed for conducting the study, research tools employed for collecting data, procedures applied to ensure reliability and validity of measures, procedures applied for cleaning the data, and statistical methods employed for analyzing data and reporting results. The chapter is divided into the following sections: (a) Population and Sampling; (b) Instrumentation; (c) Research Design; (d) Research Procedure; (e) Data Analysis; and (f) Screening Data Prior to Analysis

Population and Sampling

The target population of this study was classroom teachers of grades 1 through 12 employed in all public schools in the Kingdom of Saudi Arabia. The Ministry of Education in Saudi Arabia supports 25 school districts distributed over the country. Each school district administers a school system that comprises specific cities and suburbs

stretched over a particular area. In all research designs, it would be perfect to include the whole population in the study, but the Saudi population is such that it was impossible to include every teacher in it. Also, not all 25 school districts had convenient accessibility and proximity to the researcher. Thus, a convenience sampling technique was employed to select a school district in Medina, which was the only district accessible and proximal to the researcher. Regardless of the disadvantages of convenience sampling, it had benefits in obtaining basic data for a pilot study and addressing particular problems that happened within the study sample. As a result of using this sort of sampling technique, the process of data collection was efficient, economical, and representative of teachers in one of the key districts in the country.

A list of school names was obtained from the School District in Medina and 15 public schools were randomly selected based on variables of interest, such as type of school program, gender, and teaching level. According to types of school programs, two participating schools were part of the "Tatweer" educational program which were the only Tatweer schools located in the Medina School District. Nine schools were involved in another program called "Alraeda," and four participating schools were regular schools with a connection to the educational program called "Computer Integration into Elementary and Intermediate Education." In terms of gender, there were 11 schools for males and four for females. In regard to the teaching level factor, there were 7 secondary education schools and four each at the intermediate and elementary levels. Table 3 illustrates the teaching level, gender, type of school program, number of teachers, and number of returned questionnaires for each participating school. Numeric symbols were used rather than schools' names for privacy and confidentiality reasons.

Table 3

The characteristics of participating schools

School	Teaching Level	Gender	Type of School Program	N	Return
1	Secondary	Male	Tatweer	30	17
2	Secondary	Male	Alraeda	25	14
3	Secondary	Male	Alraeda	30	8
4	Secondary	Male	Alraeda	40	30
5	Secondary	Male	Alraeda	45	30
6	Secondary	Female	Regular	30	27
7	Secondary	Female	Tatweer	30	23
8	Intermediate	Male	Alraeda	30	11
9	Intermediate	Male	Alraeda	34	18
10	Intermediate	Male	Regular	30	17
11	Intermediate	Female	Alraeda	30	15
12	Elementary	Male	Alraeda	30	29
13	Elementary	Male	Alraeda	33	27
14	Elementary	Male	Regular	30	16
15	Elementary	Female	Regular	30	23

Instrumentation

Instrumentation in this study consisted of two parts: an addendum questionnaire and the Stages of Concern Questionnaire (SoCQ). The following sections describe each part in detail.

Addendum Questionnaire

The addendum was included with the Stages of Concern Questionnaire to collect additional information related to the study questions. It was a two-page questionnaire of 23 items split unevenly into three parts with different purposes (see Appendix O for the English version, Appendix P for male Arabic version, and Appendix Q for female Arabic version). The first part included seven items that were designed to gather information with respect to personal and professional characteristics of participants (demographic information). The seven items addressed: (a) gender; (b) type of school program (Alraeda, Tatweer, or Regular); (c) teaching level (elementary, intermediate, or secondary); (d) academic discipline (science, humanities, social science, or elementary multiple subjects); (e) perceptions of technology integration levels (non-user, beginning user, intermediate user, or advanced user); (f) the amount of involvement with technology integration in years (six choices ranging from "never" to "5 years or more"); and (g) training (whether participants did or did not receive formal training in technology).

The second part of the addendum questionnaire was a 10-item list that gathered information regarding factors which impede teachers' implementation of technology in the classroom. The 10 items were: (a) Insufficiency of technology-based training programs, (b) Weakness of technology-based training programs, (c) Lack of coursework in technology within the teacher education program, (d) Insufficient and inappropriate time to learn how to properly use technology in teaching, (e) Lots of broken-down technology equipment, (f) Lack of technology equipment in school, (g) Oldness of technology equipment, (h) The difficulty of managing a classroom enhanced with technology equipment", (i) A large number of students included in the computer lab or

learning resources center, and (j) The difficulty of assessing student learning resulting from the use of technology in the classroom.

The third part of the addendum questionnaire was a list of six items that determined whether classroom teachers are self-motivated to teach with technology and what keeps them engaged in this demanding task. The six items were: (a) Technology enables students to acquire basic computer skills, (b) Technology improves the teaching and learning process, (c) Technology helps save time and effort in the teaching process, (d) Technology motivates students to learn in new ways, (e) Technology provides a means of expanding and applying what has been taught in the classroom, and (f) School administration encourages teachers to use technology in their teaching. In terms of the items included in each of the two lists described above, participants were asked to read each item carefully and then rate it on a 5-point Likert scale based on the intensity of their agreement or disagreement with a given item or the state of their neutrality to it. The response scale had a range of 1 through 5 with the following categories: (1) strongly disagree, (2) disagree, (3) neither disagree nor agree, (4) agree, and (5) strongly agree, each of which represented an interval level of measurement.

Stages of Concern Questionnaire

For the purpose of identifying teachers' concerns toward the use of technology in teaching within the school context in Saudi Arabia, the Stages of Concern Questionnaire (see Appendix I), a quick-scoring pencil-and-paper questionnaire, was employed. It is a two-page list of the 35 items divided equally into seven scales, each composed of 5 items (see Appendix R). All 35 items are in a mixed order and are written in one direction meaning that items with high scores indicate that participants have intensified concerns

towards an innovation being defined in the present study. Participants were asked to mark each item on an eight-point Likert scale based on how true the statement seemed to them at the current time. This scale ranged from 0 through 7, where 0 indicated that "the statement is irrelevant to me," 1 and 2 indicated that "the statement is not true of me now," 3 to 5 indicated that "the statement is somewhat true of me now," and 6 and 7 indicated that "the statement is very true of me now."

The reliability and validity of the original version of the Stages of Concern Questionnaire (SoCQ) were determined by CBAM developers. Estimates of internal consistency (alpha coefficients) for the seven stages ranged from .64 to .83 (George et al., 2006). In addition, the test-retest correlations ranged from 0.65 to 0.86 and four of them were above 0.80 (George et al., 2006). The SoCQ is a valid scale and has been used extensively and reported widely in the literature (George et al., 2006). The questionnaire developers described a series of validity studies which indicated that the SoCQ is an accurate measure of the hypothesized Stages of Concern.

Since the Stages of Concern Questionnaire was originally developed in English and intended to be administered to teachers who speak Arabic, the researcher translated the SoCQ into the Arabic language (see Appendix K). Griffee (2001) stated that any survey translated from one language to another has to be exposed to further analysis and pilot studies to establish validity and reliability arguments. In terms of validity of the Arabic-translated questionnaire, the procedure of back translation was conducted to confirm content, construct, and cultural validity arguments. The Arabic-translated questionnaire was translated back to English (see Appendix L) by a Ph.D. student from the Linguistics Department at the University of Kansas, who is knowledgeable in both

languages. Then, both English versions, the original and back -translated, were compared (see Appendix M) and reviewed by three experts in order to confirm the compatibility between them. Eventually, the content in the two versions was determined to be matched and no changes or modifications were made in the Arabic version.

In terms of the reliability of the Arabic version, a focus group of three Arabic students pursuing Ph.D. degrees in education at the University was conducted to obtain more insight from their experience in completing the Arabic version of the Stages of Concern Questionnaire. Each group member spent around 10 minutes responding to the whole 35-item questionnaire. One member indicated that phrases and words, such as "innovation," "the new system," and "this approach," which were included in many statements, needed to be replaced with the phrase, "the use of technology in teaching," so that the meaning of those statements would be improved. Another found a few statements did not make sense unless they were supported with clarifying words and phrases. All modifications suggested by focus group members were made (see Appendix N for modifications in English and Appendix S for modifications in Arabic).

The modified Arabic version was piloted with a sample of 30 Saudi teachers who were similar to the target population. A sample size of 30 is often recommended by scholars and consultants to address a variety of issues in regard to initial instrument development, including the survey translation from one language to another and internal consistency across items within a single survey measuring multi-constructs. Multiple reliability analyses were conducted to compute internal consistency estimates of reliability (Coefficient Alphas) for the seven Stages of Concern, which ranged from 0.66 to 0.92 with two estimates being above 0.70 and the other three estimates over .80. The

results of these analyses confirmed the seven Stages of Concern hypothesized, essentially, by CBAM developers.

In addition, as mentioned earlier, participants responded to the SoCQ by marking each item on an eight-point Likert scale based on how true the statement seemed to them at the current time. Having eight response options within each item is be a way to "increase opportunities for variability" (DeVellis, 2003, p.75), which would, in turn, produce reliable results.

To ensure the validity of the final Arabic version (see Appendix O for the English version, Appendix P for the male Arabic version, and Appendix Q for the female Arabic version), the focus group was conducted for the second time. The group members indicated, in the aggregate, that the final Arabic version items were written in an understandable and succinct way. They all agreed that the instrument was suitable for use with populations who are from the Arabic culture. One group member pointed out that the questionnaire items are accurate to the extent that they can reflect teachers' varying affective needs toward an innovation they experience within the school environment. This observation supports the hypothesized Stages of Concern as stated in the CBAM.

Research Design

This research study was descriptive in nature and employed quantitative methods for data collection and analysis. It was first designed to identify concerns that teachers in Saudi Arabia might display in response to new demands and challenges emerging from the adoption of technology in teaching. It also investigated the potential presence of significant differences in teachers' concerns across gender and the type of school program in which they are engaged. Moreover, an aim of study was to identify factors

that impede the effective implementation of technology in the classroom. Finally, in the present study, the attempt was made to determine whether classroom teachers have positive acceptance of technology in the teaching and learning process and what keeps them engaged in this challenging task.

The Stages of Concern, one of the dimensions of the CBAM, was adopted to identify concerns that teachers experience during the change process related to implementing technology in the classroom. Hall and Hord's (1987) research on concerns identified seven developmental stages of concern through which individuals move when something new is introduced to them. The seven stages are: (stage 0) awareness, (stage 1) informational, (stage 2) personal, (stage 3) management, (stage 4) consequence, (stage 5) collaboration, and (stage 6) refocusing.

In this study, two independent variables (gender and type of school program) and seven dependent variables (the seven stages mentioned above) were examined to determine the relationships among them. A list of 10 factors was also investigated to identify the factors that have a negative influence on the recent implementation of technology in the classroom. In addition, another six-item list was used to determine whether or not classroom teachers accept the change process emerging essentially from adopting technology in their teaching.

For this study, it was expected that the development of Stages of Concern would be different among Saudi teachers in terms of gender. In other words, the expressed Stages of Concern scores for male and female teachers were foreseen to be different. It was also expected that the development of Stages of Concern would be different among Saudi teachers in terms of the type of school program (Tatweer, Alraeda, or Regular) in

which they taught. It was also expected that there would be factors impeding teachers in Saudi Arabia from effective use of technology in their teaching. Furthermore, it was expected that teachers in Saudi Arabia would be internally motivated to use technology in their teaching. Thus, the following research questions guided the study:

RQ1. At what stage of concern do Saudi teachers perceive their technology implementation to be?

RQ2. Are there significant differences in stages of concern among Saudi teachers with different personal and professional characteristics such as gender and type of school program?

RQ3. Do Saudi teachers have difficulties when they use technology in their teaching? If so, what are factors that stand opposite the use of technology?

RQ4. Are Saudi teachers self-motivated for incorporating technology into their teaching? If so, what keeps them engaged with this challenging task?

Research Procedure

Since the Stages of Concern Questionnaire, developed by the Texas Research and Development Center at the University of Texas in Austin, was the main research instrument, a written permission was first obtained (see Appendix V). Next, a human subject's approval from the Institutional Review Board at the University of Kansas was obtained before contacting or discussing the study with any of the research participants (see Appendix A). After that, a letter of introduction that explained the study (see Appendix B for the English version and Appendix C for the Arabic version) was sent to the Saudi Arabian Cultural Attaché in Washington, D.C., and he was asked for a written statement to the School District Administrator in Medina, indicating that the researcher

was pursuing a Ph.D. degree in Curriculum and Instruction and was intending to conduct his dissertation study at schools across the School District in Medina. The conventional statement from the Saudi Cultural Attaché Assistant for academic affairs (see Appendix F) was obtained via email by the researcher's adviser at the Saudi Cultural Mission. After that, the conventional statement was electronically forwarded to School District Administrator in Medina, accompanied by two formal documents. These documents were: (a) a letter of introduction (see Appendix D for the English version and Appendix E for the Arabic version) which explained the study's purpose and requested the School District Administrator's permission to collect data from public school teachers, and (b) two copies of the research instrument that were grammatically different from each other in terms of gender (see Appendix O for the English version, Appendix P for the Arabic version for males and Appendix Q for the Arabic version for females). After a short while, the researcher was granted oral permission by the Medina School District Administrator to access a list of 16 public schools, along with a facilitating letter (see Appendix G) addressed to principals of all intended schools where the researcher wished to conduct the study. The facilitating letter explained the purpose of the study and asked the principals to encourage teachers to participate in the study by completing the enclosed questionnaire and sending it back to the researcher.

Questionnaire packages were prepared for all classroom teachers, each of which consisted of three pieces of material as follows: (a) a letter of introduction to public school teachers (see Appendix H) that explained the purpose of the study, teachers' confidentiality and rights as research participants, the importance of teachers' inputs to the questionnaire, the benefits of participation in the study, and clear instructions for

answering the survey and sending it back to the researcher; (b) one hard copy of the research instrument that involved the Stages of Concern Questionnaire and addendum, which, in turn, involved personal and professional information as well as two lists of factors that affect the effective implementation of technology in the classroom; and (c) a sealable envelope that was used to keep teachers' information private and confidential. The packages were manually delivered to each participating school and were distributed by the school principal to all classroom teachers working at school. As teachers completed the questionnaire, they were asked to place it in a envelope given to them, seal the envelope, and then drop it in a secure box at school where a group of three volunteers assigned by the researcher were able to pick it up at a later time. All the completed questionnaires were scanned and sent to the researcher via email for analysis.

In the letter of introduction, the researcher notified teachers of many important points relating to their participation in the present study as follows: (a) teachers' participation is strictly voluntary; (b) teachers are free to withdraw from the study at any time; (c) teachers' nonparticipation in the study would not negatively affect their professional and personal status; (d) all data would be entered in a database without identifying information, so the teachers remained anonymous; (e) a numeric variable code was used rather than subjects' names; (f) all teachers, principals, and school data were kept strictly confidential and private, and the researcher was the only person who could access them; (g) all materials used in the process of data collection were destroyed at the end of the study; (h) all data collected during the study were used just for the purpose of the educational research; and (i) this study did not pose any threat to the teachers at any time.

Data Analysis

In this study, both descriptive and inferential statistics were used for data analysis and interpretation. In addition, the Stages of Concern manual, prepared by George et al. (2006), served the primary need of scoring the Stages of Concern Questionnaires and describing teachers' concerns about the use of technology in teaching.

Descriptive statistics were used to describe the study sample on the basis of type of school program, gender, subject matter taught, teaching level, perceptions of technology integration levels, the amount of involvement with technology integration, and whether or not participants received training in technology.

For purpose of answering the first research question, "At what stage of concern do Saudi teachers perceive their technology implementation to be?" group profile analysis was used to describe teachers' concerns as a whole and also among groups, which were categorized in terms of gender and type of school program. A Quick Scoring Device (see Appendix J) was usually used to score the Stages of Concern Questionnaire (SoCQ) manually and to form an individual profile. This kind of hand device is particularly useful when there are only a small number of questionnaires that need to be handled or when computer processing is absent. However, the employment of the hand-scoring device in the present study was problematic because the sample size was large. Therefore, an electronic quick scoring program was designed to meet the immediate need of processing a large number of the Stages of Concern Questionnaires in a rapid manner. It was very efficacious to the extent that it was capable of saving time and effort for the researcher. The electronic scoring program performed precisely the same scoring instructions given by the hand scoring device (see Appendix J, p.1) as follows: (a) the SoCQ responses were

entered into a dataset by using Microsoft Excel, (b) the dataset file was saved in a text format, so the electronic scoring program would have accessibility to the data, (c) the item responses in each stage were totaled, (d) the seven raw score totals were converted to percentile scores based on a table included in the hand-scoring device sheet (see Appendix J, p. 2 on the left), (e) the percentile scores were used to produce six horizontal bar graphs showing the Stages of Concern of public school teachers as a whole and among five different groups divided by gender (males and females) and types of school programs (Tatweer, Alraeda, and Regular).

In answer to the second research question, "Are there significant differences in Stages of Concern among Saudi teachers with different personal and professional characteristics such as gender and type of school program?" a 2×3 between-subjects factorial multivariate analysis of variance (MANOVA) was performed using the Statistical Package for Social Sciences (SPSS). MANOVA served the need of examining thoroughly the main effects of gender (a between-subjects independent variable) and type of school program (another between subjects independent variable with three levels, Tatweer, Alraeda, and Regular) on the seven Stages of Concern (awareness, informational, personal, management, consequence, collaboration, and refocusing) used as dependent variables. The raw score totals for the seven Stages of Concern were used for data analysis because George et al. (2006) strongly recommended the use of raw scores of Stages of Concern in the statistical analyses instead of using the percentile scores.

The rationale behind conducting MANOVA instead of separate ANOVAs is that MANOVA tests the mean differences among groups on a combination of dependent

variables while ANOVA considers only a single dependent variable. According to Tabachnick and Fidell (2007), MANOVA, which considers multiple dependent variables, might sometimes be more powerful than a series of ANOVAs due to the fact that (a) MANOVA offers protection against an exaggerated rejection of a true null hypothesis resulting from conducting separate tests of potential correlated dependent variables and (b) MANOVA, on some occasions, might detect differences not shown in separate ANOVAs; for example, one level of an independent variable may have an effect over other levels only on one of the dependent variables being tested. If this dependent variable is not considered in the study, the effect is missing.

SPSS generally reports a number of statistics, labeled Wilks' lambda, Pillai's trace, Hotelling's trace, and Roy's largest root, that evaluate the two-way between-subjects MANOVA hypothesis relating to the second research question. This hypothesis stated that the raw score means on the seven Stages of Concern are equal across groups in terms of gender and types of school programs. The Wilks' lambda statistic (Λ), the most frequently reported statistic in the social science literature, was used to detect the significant main effects of gender and type of school program and their interaction on the Stages of Concern. These main effects were evaluated at the .05 Level of Significance ($p = .05$). The multivariate eta square (η^2), the multivariate effect size associated with Wilks' lambda statistic (Λ), was used to determine the amount of the relationship between the factor and the dependent variable. This statistic ranged in value from 0 to 1, where a 0 indicates that the dependent variable is not associated with the independent variable (factor), while a 1 indicates the strongest potential association. Green and

Salkind (2005) stated that “it is unclear what should be considered a small, medium, and large effect size for this statistic” (p. 220).

To answer the third research question, “Do Saudi teachers have difficulties when they use technology in their teaching? If so, what are the factors that stand opposite the use of technology?” a ten-factor list was utilized (see Appendix O) along with a response scale ranging from 1 to 5 with the following indications: (a) strong disagreement, (b) disagreement, (c) neutrality, (d) agreement, and (e) strong agreement, each of which represents an interval level of measurement. The responses of the 10 factors were entered into a data set using SPSS. Once the data entry was completed, the responses of each factor were totaled and averaged. Then, the ten factor averages were displayed in a bar chart for further examination and discussion.

To answer the fourth research question, “Are Saudi teachers self-motivated for incorporating technology into their teaching? If so, what keeps them engaged with this challenging task?” a six-factor list was utilized (see Appendix O). By following the same procedures above, the sex factor averages were displayed in a bar chart for further investigation.

Data Screening Prior to Analysis

Prior to the data analysis, variables of interest were examined through several SPSS programs for accuracy of data entry, unequal sample sizes in each cell of the study design, the power of the analysis, missing data, univariate and multivariate outliers, and fit between their distributions and the assumptions of multivariate analysis including: multivariate normality, homogeneity of the variance-covariance matrices, linearity, and multicollinearity. The study data were first sorted by gender and type of school program

into five different groups. Accuracy of input was judged by means, standard deviations, and the maximum and minimum values, reaching for plausibility. According to Tabachnick and Fidell (2007), MANOVA requires having more cases than dependent variables in each cell of the design, which, in turn, contributes to the homogeneity of variances of the dependent variables across groups and ensures adequate power of the analysis. The researcher was extremely attentive in making the sample sizes in each cell of the design sufficient to the extent that the cases-to-dependent-variables ratio would be sufficient. The power of the multivariate test was also judged based on the relationships among dependent variables within a correlation matrix. The higher the negative correlation between the two dependent variables, the higher the power of the multivariate test.

Missing data is one of the most common problems in data analysis. The problem usually happens when participants unintentionally jump or deliberately refuse to answer an item or a couple of items on a research questionnaire. Several steps were carefully followed in this study for handling missing values. The first step was to observe the pattern of the missing data in order to determine whether they are described as "MCAR (missing completely at random), MAR (missing at random, called ignorable non-response), or MNAR (missing not at random or non-ignorable)" (Tabachnick & Fidell, 2007, p. 62). The decision about deleting cases was dismissed since the proportion of cases with missing data was high (31%). In addition, the decision about dropping a dependent variable with a lot of missing data was unacceptable since all seven dependent variables were critical to the data analysis. It appeared that there was a necessity to

include cases with missing values in the analysis, therefore, a process of estimating missing data was taken into consideration.

There are several ways to obtain estimates for the missing values, such as prior knowledge, mean substitution, regression, expectation maximum, and multiple imputation. However, the present study depended on multiple imputation since it is the most respectable and trustworthy one among the other methods. Wayman (2003) stated that multiple imputation is "an attractive choice as a solution to missing data problems because it represents a good balance between quality of results and ease of use" (p. 4). In the multiple imputation approach, missing values for any survey item are predicted using existing values from other items. The predicted values, called usually "imputed values," are replaced with the missing values, which in turn bring about a complete data set called an "imputed data set." This process is carried out multiple times to produce multiple imputed data sets. That is the rationale behind calling this procedure "multiple imputation." The analysis of choice is then conducted separately for each imputed data set, which produces a set of estimates (e.g., means, standard deviations, etc.). These estimates are then combined to produce one overall estimate for each survey item.

Since gender and school program (Alraeda, Tatweer, Regular) were categorical variables of interest in the present research study, the original data set was initially split into six groups. Then, SPSS Multiple Imputation analysis was utilized to generate five data sets separately for each group. Most researchers in the social sciences suggest that five imputations are usually enough to obtain fair estimates for missing data (Robin, 1996). Once the five imputed data sets had been created, descriptive statistics were performed separately on the five new data sets to produce means for the survey items in

each group. Once the means had been produced, all that remained was to combine the means by the item and group and take their average for the missing values. Since the proportion of missing values was high, the researcher considered repeating the analysis with and without missing values in order to have confidence in them.

Screening data for outliers is a critical early step in almost every statistical analysis because the presence of outliers in the data analysis can frequently lead to Type I and Type II errors, with little evidence as to the influence they have on the analysis. In this study outliers were sought separately within each group in both univariate and multivariate analyses, among both discrete and continuous variables, and among both independent and dependent variables. Both statistical and graphical procedures were used to detect univariate outliers. Among the discrete variables, cases with unusual inputs were easily found through the frequency distributions used during the preliminary process of data screening. Among the continuous variables, cases with standardized scores in excess of 3.29 at $p < .001$ for a two-tailed test were considered potential outliers. In addition to inspection of standardized scores, histograms and box plots were created to screen for other potential outliers. Univariate outliers appear in the histogram as a few cases seem to vary from the rest of the distribution. While in the box plot, outliers appear as a point or few points that lie a considerable distance from others. In the multivariate situation, the statistical measure used for detecting outliers was Mahalanobis distance. The Mahalanobis distance value was evaluated as a chi-square χ^2 value at $p < .001$ with degrees of freedom equal to the number of dependent variables, in this case seven: awareness, informational, personal, management, consequence, collaboration, and

refocusing. So, any case with a Mahalanobis distance greater than χ^2 (7) = 24.322 was considered a multivariate outlier.

The first assumption of multivariate analysis is that variance-covariance matrices of the dependent variables are equal across cells of the design. This assumption is known as homogeneity of the variance-covariance matrices and is also the same as the assumption of homoscedasticity in the case of ungrouped data. Homoscedasticity refers to the variability in scores for one continuous variable is the same at all levels of another continuous variable. It is related to the assumption of normality, meaning that if the two dependent variables are normally distributed, the relationship between them is homoscedastic. The Box's M, a statistical test for evaluating the null hypothesis stating that the observed variance-covariance matrices of the dependent variables are equal across different groups, was not employed due to the discrepant sample sizes across the six groups, gender (male and female) × school program (Alraeda, Tatweer, Regular), with a ratio of almost 11:1 for males to females within the Alraeda program. Instead, sample variances were compared across the six groups according to the criterion that for each dependent variable the ratio of largest to smallest variance approaches a ratio of 10:1. Having met that criterion, it can be said that the discrepancy in the sample sizes across the six groups did not violate the assumptions underlying the use of MANOVA.

Normality is another critical assumption of multivariate analyses that has to be taken into account. Data that violate normality can lead to misinformed outcomes. Therefore, researchers should evaluate the multivariate normality before executing the analysis, because any judgment or conclusion founded on non-normal data is perhaps spurious. In other words, multivariate normality is the assumption that implies that each

dependent variable in each cell of the design is normally distributed and all possible linear combinations of the dependent variables are normally distributed (Burdenski, 2000; George, 2001; Green & Salkind, 2005; Tabachnick & Fidell, 2007). The assumption specifically implies two different examinations: (a) all dependent variables must be univariate normal and (b) all possible pairs of dependent variables must be bivariate normal. According to Burdenski (2000), although univariate and bivariate examinations are necessary prerequisites for evaluating the multivariate normality, they still provide an incomplete depiction for a multivariate normal distribution. Unfortunately, SPSS does not currently offer direct statistical and graphical procedures for evaluating multivariate normality. An SPSS macro programmed by DeCarlo (2011) (see appendix T) was utilized to evaluate multivariate normality in the study data through a scatter plot of Mahalanobis distances (D^2) against derived chi-square χ^2 values. Mahalanobis distance refers to "the distance of a case from the centroid where the centroid is the point defined by the means of all the variables taken as a whole" (Burdenski, 2000, p. 19). There are two signs to be noticed to explore multivariate normality through the scatter plot of D^2 values against chi-square χ^2 values: (a) a straight diagonal line running from the lower left corner to the upper right corner of the plot (b) any case far from the centroid is considered a potential multivariate outlier which might have a hand in non-normality, so this case should be removed from the data set to attain multivariate normality. Since the study data were separated into five different groups in terms of gender and type of school program, each group had to meet its own multivariate normality standard.

MANOVA assumes linear relationships among all pairs of dependent variables. Linearity is usually detected by inspection of bivariate scatterplots between pairs of

dependent variables. Criteria for determining linearity and non-linearity through the bivariate scatterplot were as follows: (a) if the two variables are normally distributed and linearly related, the scatterplot between them looks the elliptical shape and (b) if one of the two variables is non-normal, then the scatterplot between this variable and the other is not elliptical (Tabachnick & Fidell, 2007). Since this study had seven dependent variables and subjects were divided into five different groups, screening all possible pairs of the dependent variables for linearity within each group was burdensome. Thus, the significance tests for both kurtosis and skewness were used to exmaine the distributions of the dependent variables statistically. The obtained kurtosis and skewness values were evaluated against the null hypothesis of zero. Moreover, the graphical method was employed to create frequency histograms for the seven dependent variables within each of the five groups. Only pairs of variables that had true non-normality were examined through bivariate scatterplots.

Screening data for multicollinearity and singularity is an important step in almost every multivariate analysis. According to Haworth (1996), multicollinearity is a statistical problem where two or more dependent variables in the multivariate model are highly correlated (.90 and above), while singularity is also a problem in which dependent variables are redundant, meaning that one of the dependent variables is a combination of two or more of the other variables. In this study, a correlation matrix of the dependent variables was first examined, but as it is known that reliance on one approach is not an adequate examination (Luchters & Chakrabarty, 2006), so two approaches were used. Therefore, collinearity diagnostics in the SPSS were further used to detect the presence of multicollinearity in the multivariate analysis. These diagnostics produce a condition

index for each root (dimension) as well as variance proportions associated with each dependent variable after standardization. The condition index is a standard measure of dependency of one dependent variable on the others; the higher the condition index, the stronger this dependency and the larger the standard error of the estimator for this dependent variable. The root or dimension explains some proportion of the variance of each parameter being estimated. According to Tabachnick and Fidell (2007), collinearity is spotted by finding two or more dependent variables that have large proportions of variance (.50 and above) that correspond to a condition index greater than 30 for a given root (dimension).

CHAPTER 4

RESULTS

Data Screening

A total of 477 questionnaire packets were manually delivered to 15 schools within one selected school district located in Medina, Saudi Arabia. A return rate of 63.31% was obtained with a total response of 302 classroom teachers of grades 1 through 12. The 25 unanswered and irrelevant questionnaires, about 8.28%, were eliminated, leaving a total response of 277 participants, with a rate of 91.72%.

Prior to analysis, all the raw data collected from 277 respondents were examined through various SPSS programs for accuracy of entry and missing values, as described in Chapter 3. The input was accurate according to plausible means, standard deviations and ranges, and reasonable maximum and minimum values of each of the survey items. The sample indicated that 86 of the respondents had missing values, with a rate of 31%. SPSS MVA (Missing Values Analysis) was conducted to highlight the pattern of missing values and to determine whether data were randomly missing. Little's MCAR (missing completely at random) test statistically disclosed a non-desired significant result: p = 0.001, confirming that the pattern of missing values diverged from randomness. However, the Separate Variance t Tests revealed a systematic relationship between missingness and other survey items (other than items that form the dependent variables of the main analysis) in the data set, showing that data were missing in a random pattern or, in other words, the data behaved in accordance with the MAR (missing at random) pattern. Due to the evidence of randomness in the pattern of missing data and the high proportion of missing values, the Multiple Imputation (MI) method was found to be the

most reasonable and respectable approach of dealing with the missing data. All the survey items (n = 58), either critical (n = 53) or uncritical (n = 5) to the analysis, were retained for the analysis because each item with missing values had fewer than 5% of the cases. The missing values on each item were replaced with the average means of the five imputed data sets created for each group.

The variables of the main analysis were examined through various SPSS programs for the purpose of spotting univariate outliers using a criterion $z > |3.3|$, $\alpha = 0.001$ and multivariate outliers using a criterion critical $\chi^2 (7) = 24.322$, $\alpha = 0.001$. The variables were examined separately among female and male teachers working within three different types of school programs: Alraeda ($n_{female} = 14$, $n_{male} = 150$), Tatweer ($n_{female} = 20$, $n_{male} = 16$), and Regular ($n_{female} = 46$, $n_{male} = 31$). One case in the Regular female group was a univariate outlier because of its extremely low z score on the personal variable. This case was deleted, leaving 45 cases in that group. According to the box plots, one case in the Alraeda female group was found to be a univariate outlier on the personal and refocusing variables because it fell very far away from the box. This case was deleted, leaving 13 cases in that group. By using Mahalanobis distance with $p < 0.001$, one case was identified as a multivariate outlier in the Alraeda male group. This case was deleted, leaving 149 cases in that group. With the three outliers deleted, 274 cases remained in the whole sample for further analysis.

Sample Description

The participants' major demographics are described in Table 4 below.

Table 4

Major Demographic for Participants

Demographic	N	Percentage
Gender		
Male	196	71.5%
Female	78	28.5%
Type of School Program		
Alraeda	162	59.2%
Tatweer	36	13.1%
Regular	76	28.7%
Teaching Level		
Elementary	91	33.2%
Intermediate	55	20.1%
Secondary	128	46.7%
Subject Matter		
Humanities	83	30.3%
Social Sciences	59	21.5%
Natural Sciences	94	34.3%
Elementary Multiple Subjects	27	9.9%
Missing	11	4%
Perceptions of technology integration levels		
No skill	18	6.6%
Beginning level	43	15.7%
Intermediate level	151	55.1%
Advanced level	59	21.5%
Missing	3	1.1%

(continued)

Table 4 (continued)

Major Demographic for Participants

Demographic	N	Percentage
Technology experience in teaching (years)		
Never	13	4.7%
1	22	8%
2	20	7.3%
3	38	13.9%
4	37	13.5%
5 and more	144	52.6%
Technology- based training		
Not received	126	46%
Received	148	54%

Research Question 1

At what stages of concern do Saudi teachers perceive their technology implementation to be?

Teachers' responses on the Stages of Concern Questionnaire were analyzed to identify their concerns toward implementation of technology in the classroom. In short, item responses were grouped by gender and type of school program and summed according to each of the seven Stages of Concern (see Appendix J). The raw score totals were averaged and then the raw averages were converted to percentile scores according to the Quick Score Device (see Appendix J). The percentile scores were used to represent the seven Stages of Concern. In order to derive clear meaning of concerns that teachers experienced during the implementation of technology in the classroom, a group profile analysis was employed. According George et al. (2006), a profile analysis can provide a

rich picture of grouped data by examining and interpreting high and low scores among the seven Stages of Concern. In this section, six graphic profiles were created: total sample profile, female and male profiles, and three school program profiles.

The Stages of Concern Profile according to the Total Sample

Figure 1 displays a line chart of percentile scores for all seven Stages of Concern for the total group of teachers. The percentiles were between 87 and 43 and revealed that classroom teachers as a whole had the most intense concern in stage 0, awareness (87%). The distinct peaking at the awareness stage indicated either experienced users who were no longer particularly concerned about the innovation (the use of technology in teaching) or were more concerned about things not related to the innovation, such as pursuing a higher education degree, or were preoccupied with another change process or indicated novice users who were just becoming aware of the innovation and had little knowledge and skills about it (Hall & Hord, 1987). With the absence of peaking at stage 3 (management) and the presence of high percentile scores at stage 0 (awareness, 87%), stage 1 (informational, 80%), and stage 2 (personal, 78%) successively, there was clear indication of non-transition from self concerns (stages 0, 1, 2) to task concerns (stage 3), which confirmed that teachers' concerns toward the innovation were still self-centered. Both the peak stage 0 (awareness) and the second highest stage 1 (informational) suggested that classroom teachers were considered novice users who were just becoming aware of the innovation and wanted more information about it. The profile also showed that these teachers had minimal or no concerns regarding the impact of the innovation on learners according to the recognizable valley that occurred at stage 4 (consequence, 43%). The distinct tailing-up on stage 6 (refocusing) indicated novice users who had

ideas about how to improve the implementation of technology in the classroom, but these ideas might not have worked properly due to the lack of knowledge and skills necessary for reaching effective implementation.

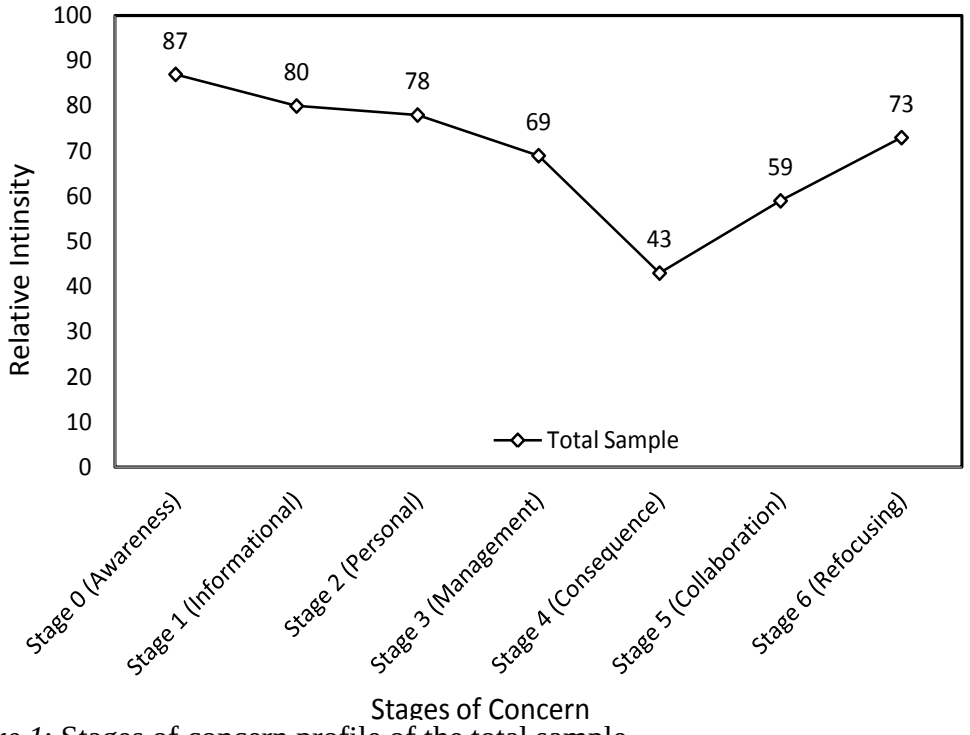

Figure 1: Stages of concern profile of the total sample

The pattern in Figure 1 generally revealed that self concerns (awareness, informational, personal) were more intense among classroom teachers than other sorts of concern, such as task concerns (management) and impact concerns (consequence, collaboration, refocusing). In short, the Stages of Concern profile for the total sample suggested average novice implementers who had little familiarity with use of technology in the teaching and learning process, who demonstrated their willingness to obtain more knowledge and skills that would enable the implementation process to go more smoothly,

and who had concerns about how the use of technology will affect them on a personal level. Additionally, the tailing-up at stage 6 (refocusing) supported the notion that the average implementer had ideas about how to improve innovation, but these ideas would not be achievable because of lack of experience.

The Stages of Concern Profiles According to the Gender Factor

Figure 2 displays different profiles of the percentile scores for male and female groups in all seven Stages of Concern compared to the overall profile of concerns for the total sample. The profile for female teachers resembled the profile of the total sample with the exception of the higher percentile scores showing on the female response pattern. A high stage 0 (awareness, 94%), indicated established users who were no longer particularly concerned about the innovation (the use of technology in teaching) or were more concerned about things not related to the innovation such as pursuing a higher education degree or preoccupied with another change process, or indicated novice users who lacked knowledge and skills required for reaching the effective use of technology in the educational setting. There appeared to be modest differences in the response pattern, specifically, between the second high percentile at Stage 1, informational (90%), and the third high percentile at Stage 2, personal (89%), (Stage 1 slightly higher than Stage 2). The minor difference between the informational and personal concerns indicated that female users who were more concerned about learning the substantive nature of the innovation and the requirements of its implementation also had concerns with respect to their ability to respond to these requirements. With the absence of peaking at Stage 3, management, there was no obvious indication of progression from self to task concerns for female teachers, so their concerns were inclined to the self orientation. The lowest

stage, Stage 4, consequence (63%), indicated that female teachers had not overcome task concerns (73%) yet; therefore, their consequence concerns related to the influences of the innovation on students' learning were low. The distinct tailing-up on Stage 6, refocusing (87%), clearly suggested that female teachers had some suggestions regarding improving the use of technology in the teaching and learning process, but not all the suggestions were on the right track due to the lack of knowledge and skills required of the female teachers themselves.

The Stages of Concern profile for the male group was like the profile of the total sample with the exception of the lower percentile scores in the male response profile and the second peaking spotted in Stage 2 (personal). Although a high Stage 0 (awareness, 81%) indicated novice users who were just becoming cognizant of the innovation, Stage 2 (personal, 76%) was equal to or more intense than Stage 1 (informational, 75%), which suggested novice users who were concerned about how they were personally affected by the innovation more than about acquiring knowledge about the essential nature of the innovation. With the disappearance of peaking at Stage 3 (management), there was no apparent sign of movement from self concerns (Stages 0, 1, 2) to task concerns (Stage 3) for male teachers, so their concerns were still within the self phase. The valley at Stage 4 (consequence, 33%) indicated that task concerns for male teachers have not diminished yet; therefore, they did not pay attention to the impact of the innovation on students' learning. The distinct tailing-up on Stage 6 (refocusing, 65%) clearly suggested novice users who had some ideas about how to improve the innovation, but these ideas might have been negative toward the innovation due to the lack of knowledge and skills required of the users themselves.

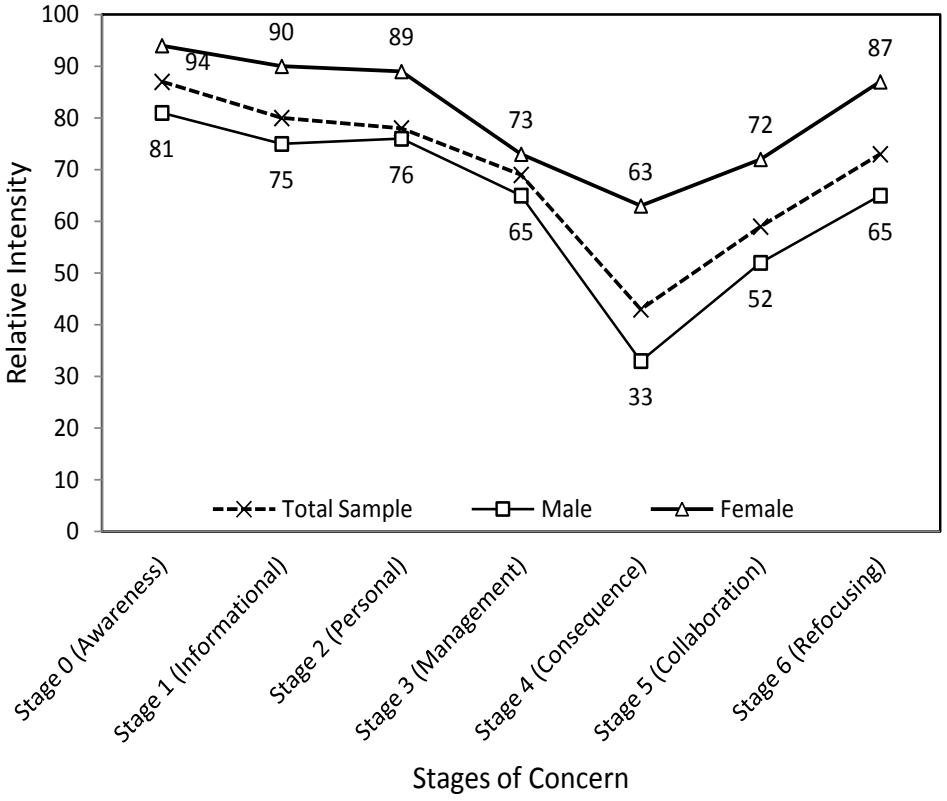

Figure 2. Stages of concern profiles for male and female groups compared to the profile of the total sample

The Stages of Concern Profiles According to the School Program Factor

When school program was considered as a main factor within the data analysis, the stages of concern profile for each program was formulated. These profiles included plotting the seven Stages of Concern along the horizontal axis and their corresponding percentile scores up the vertical axis (see Figure 3). Teachers across the three school programs (Alraeda, Tatweer, and Regular) shared concerns that had a continuous decline from the top at stage 0 (awareness) to the bottom at stage 4 (consequence) and then followed with a moderate increase from stage 5 (collaboration) to stage 6 (refocusing). The peaking at stage 0 along with stage 1 being the second highest stage suggested novice users who were just getting attentive to the innovation and expressed their

willingness to learn more about the innovation. The non-peaking at stage 3 (management) did come into view within the three school program profiles, so there was no evident pattern of evolvement from a dimension of self concerns to a dimension of task concerns. Teachers among the three school programs exhibited minimal concerns at stage 4 (consequence), which suggested novice users who were still in a struggle with the

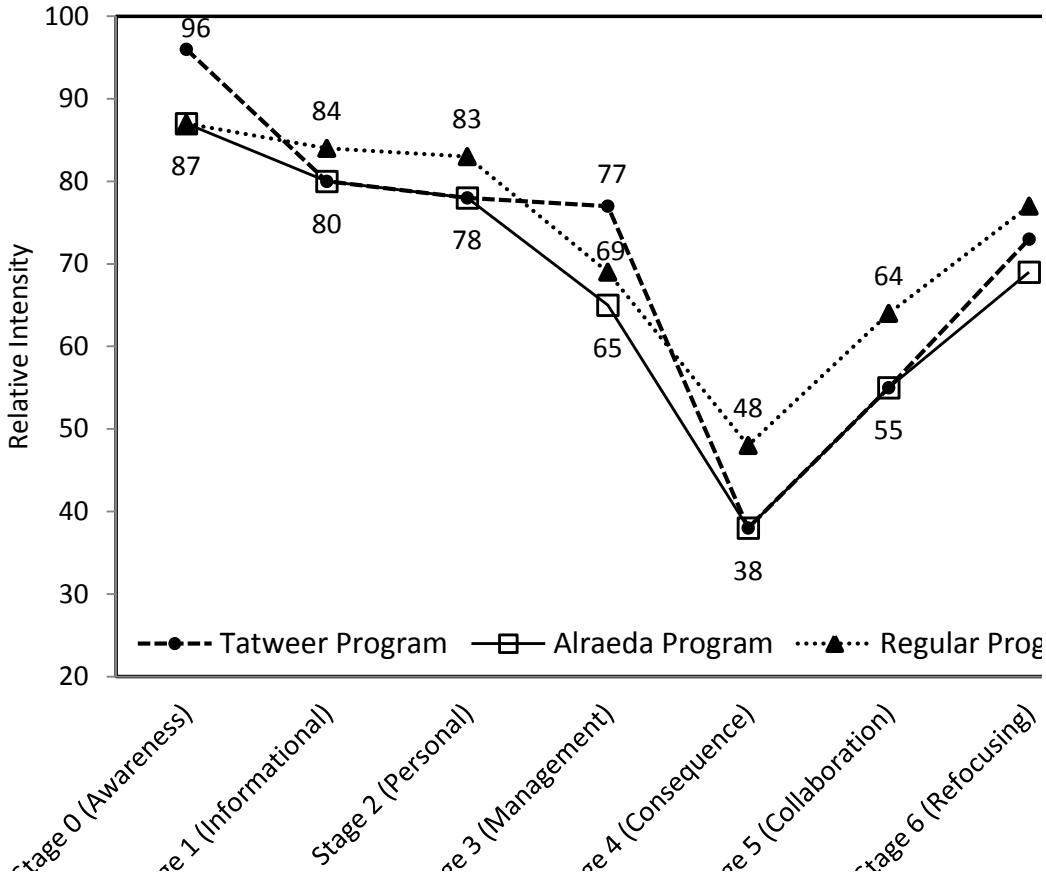

Figure 3. The stages of concern profiles according to the school program factor

innovation in terms of lack of knowledge and skills. Because of this they did show much less consideration of the academic consequences related to student learning.

Each school program profile had distinct tailing-up on stage 6 (refocusing) but with different levels of relative intensity. The tailing-up on that stage indicated novice users who had ideas to do things differently within the innovation, but these ideas were likely to be negative concerning the innovation because of their lack of experience in dealing with the innovation. Based on the previous results, teachers across the three school programs were found to be more consistent with that of the "novice user" hypothesized by Hall and Hord (1987).

Research Question 2

Are there significant differences in Stages of Concern among Saudi teachers with different personal and professional characteristics such as gender and type of school program?

A 2 (gender: male and female) × 3 (type of school program: Alraeda, Tatweer, and Regular) between-subjects multivariate analysis of variance (MANOVA) was performed on six dependent variables: awareness, informational, personal, management, consequence, collaboration, and refocusing. Total N of 277 was reduced to 274 with the deletion of two univariate outliers and one multivariate outlier at $p < 0.001$. Results of evaluation of assumptions of normality, linearity, and multicollinearity were satisfactory. For the homogeneity of variance–covariance matrices, the sample sizes for the subgroups were widely discrepant, with a ratio of almost 11:1 for the Alraeda male to Alraeda female groups. However, no dependent variable met the ratio of largest to smallest variance approach 10:1(Tabachnick & Fidell, 2007). As a matter of fact, the largest ratio was about 4.8:1 for the regular male group to Alraeda female group on the refocusing dependent variable. So, the discrepancy in sample sizes did not invalidate the use of

MANOVA. Levene's homogeneity of variance test was statistically significant for the informational (p = .015) and personal (p = .006) dependent variables.

Using Wilk's criterion (Λ) as the omnibus test statistic, the combined dependent variables were significantly affected by both gender, Wilk's Λ = 0.83, $F(7, 262) = 7.80$, $p < .001$, and school program, Wilk's Λ = 0.90, $F(14, 524) = 2.12$, $p = .01$, but not by their interaction, Wilk's Λ = 0.92, $F(14, 524) = 1.67$, $p > 0.05$. The results reflected a small multivariate association between the combined dependent variables and the gender factor, partial η2 = .17. The multivariate association was even less substantial between the school program and the dependent variables, partial η2 = .05. Table 5 contains the means and the standard deviations on the dependent variables for gender groups (male and female) and school program groups (Alraeda, Tatweer, and Regular).

To probe for the statistically significant multivariate effects, a group of analyses of variances (ANOVAs) were conducted on each individual dependent variable. For the awareness dependent variable, there was a significant main effect for gender, $F(1, 268) = 5.22$, $p = .02$, partial η2 = .019. Awareness concerns were significantly higher for female teachers relative to male teachers (See Table 5). There was a significant main effect for the school program, $F(2, 268) = 5.46$, $p = .005$, partial η2 = .039. A post-hoc analysis of this main effect using Tukey HSD revealed that awareness concerns were significantly lower ($p = .001$ and $p = .015$) for both regular school teachers and Alraeda school teachers relative to Tatweer school teachers. No significant differences were found between Alraeda and Regular school teachers ($p = .616$). Table 5 contains the means and the standard deviations on the awareness dependent variable for three school programs.

Table 5

Means and Standard Deviations on the Dependent Variables according to the Gender and School Program Factors

	Gender				School Program					
	Male		Female		Alraeda		Tatweer		Regular	
Dependent Variables	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Awareness	14.46	5.63	17.23	5.22	14.56	5.35	18.33	6.33	15.26	5.51
Informational	21.15	6.27	25	5.18	21.73	6.13	22.06	7.57	23.45	5.59
Personal	20.64	7.36	26.67	5.73	21.54	7.26	22.03	7.66	24.26	7.41
Management	16.77	7.22	19.38	7.87	16.58	7.14	20.44	8.23	18.11	7.55
Consequence	21.17	7.52	26.64	6.37	22.28	7.51	21.81	7.81	24.13	7.64
Collaboration	21.36	7.84	26.10	6.90	2.24	7.81	21.89	8.22	24.09	7.75
Refocusing	19.74	6.55	26.03	5.43	20.89	6.44	21.83	6.94	22.76	7.57

For the informational dependent variable, there was a significant main effect for gender, $F(1, 268) = 18.35$, $p < .001$, partial $\eta 2 = .064$. Informational concerns were significantly higher for female teachers in comparison with male teachers (See Table 5). There was not a statistically significant main effect for the school program, $F(2, 268) = .662$, $p = .517$, partial $\eta 2 = .005$. This indicated that Alraeda, Tatweer, and Regular school teachers were not significantly different from each other in terms of the informational concerns. For the personal dependent variable, there was a significant main effect for gender, $F(1, 268) = 31.53$, $p < .001$, partial $\eta 2 = .11$. Personal concerns were significantly higher for female teachers ($M = 26.67$) in relation to male teachers ($M = 20.64$). There was not a statistically significant main effect for the school program factor, $F(2, 268) = 1.27$, $p = .28$, partial $\eta 2 = .009$. This result indicated no significant

differences were found in the personal level of concern among teachers who were working within the three school programs.

For the task dependent variable, the ANOVA results indicated a significant main effect for the school program on management, $F(2, 268) = 3.45$, $p = .033$, partial $\eta 2 = .025$, and a non-significant main effect for gender, $F(1, 268) = 2.68$, $p = .103$, partial $\eta 2 = .01$. The main effect for the school program pointed to the presence of significant differences among the three school program groups in terms of management issues; therefore, follow-up analyses were conducted to determine these differences. The Tukey HSD procedure was used to control for Type I error across the pairwise comparisons. The results of this analysis indicated that teachers who were working in the Tatweer program were more concerned about the management concerns than those who were in the Alraeda program due to significant differences between Tatweer teachers ($M = 20.44$) and Alraeda teachers ($M = 16.58$). Two of the three comparisons were not significant, the comparisons associated with the Regular and Alraeda groups and with the Regular and Tatweer groups.

For the impact dependent variables, there were significant main effects for gender on the consequence, $F(1, 268) = 29.32$, $p < .001$, partial $\eta 2 = .099$, the collaboration, $F(1, 268) = 22.04$, $p < .001$, partial $\eta 2 = .076$, and the refocusing, $F(1, 268) = 49.37$, $p < .001$, partial $\eta 2 = .156$. These results indicated that consequence, collaboration, and refocusing concerns were significantly higher for female teachers in comparison with male teachers. The means and standard deviations for the impact concerns as a function of the gender factor are presented in Table 5. There were not statistically significant main effects for the school program on the consequence, $F(2, 268) = 2.02$, $p = .13$, partial $\eta 2 = .015$, the

collaboration, $F(2, 268) = 1.17$, $p = .31$, partial $\eta 2 = .009$, and the refocusing, $F(2, 268) = 1.86$, $p = .16$, partial $\eta 2 = .014$. These results indicated no significant differences were found in the impact stages of concern among teachers who were working within the three school programs. The means and standard deviations for the impact concerns as a function of the school program factor are presented in Table 5.

Research Question 3

Do Saudi teachers have difficulties when they use technology in their teaching? If so, what are the factors that stand opposite the use of technology?

Teachers who might be committed to integrating technology in the classroom might find the process demanding due to the barriers that exist. To address whether the present use of technology is problematic within the school context in Saudi Arabia, classroom teachers were asked about 10 factors influencing the use of instructional technology in an unfavorable manner. They were asked to rate their level of accord on a five-point Likert scale as follows: (1) strongly disagree; (2) disagree; (3) undecided; (4) agree; and (5) strongly agree. Coefficient Alpha showed a reliability of .74 for this scale, which points to an acceptable level of internal consistency. Table 6 lists the 10 items in a descending order according to the mean of teachers' responses to each item. The number and percentage of participants who were in accord with each item have also been included. This number was calculated using the dichotomous scores by assigning a value of 1 for either a 'Strongly Agree' response or an 'Agree' response and a value of 0 for the other responses. Thus, the maximum score that could be attained on this scale was 274 (the total number of teachers who participated in this study). These two pieces of information were useful in identifying the number and percentage of times an item was

actually identified by participants as being a barrier. The following section demonstrates the significant barriers to the integration of technology into teaching, which teachers experienced within the Saudi Arabian schools

Table 6:

Rank of Barriers to Technology Integration

Item	Mean	Frequency *	Percent
Insufficient training	4.26	232	84.7
Crowded computer lab	4.15	217	79.2
Weak training	4.09	216	78.8
Inadequate coursework	4.08	213	77.7
Plenty of broken equipment	3.93	202	73.7
Lack of equipment	3.76	188	68.6
Lack of time	3.71	189	69.0
Aged equipment	3.36	153	55.8
Difficult assessment	2.95	108	39.4
Difficult management	2.58	81	29.6

Note: *The number of participants who are in accord or strongly accord with an item**.**

As would be expected, the number of teachers who were in agreement and strongly agreed with the item was related to the mean of teachers' responses to the item per se (See Table 6). The Pearson correlation coefficient between the frequency and mean was significant, $r(8) = 1$, $p < .001$, which pointed to a very strong relationship. Eight factors were identified as barriers by more than half of the teachers. Figure 4 shows these barriers in descending order according to percentages of teachers who were in accord and strongly accord with the barriers themselves. As would be expected from users who have

not been concerned yet about the management of the innovation in the classroom and the consequences for learners, difficulty of management (39.4%) and difficulty of assessment (29.6%) were the least recognized barriers.

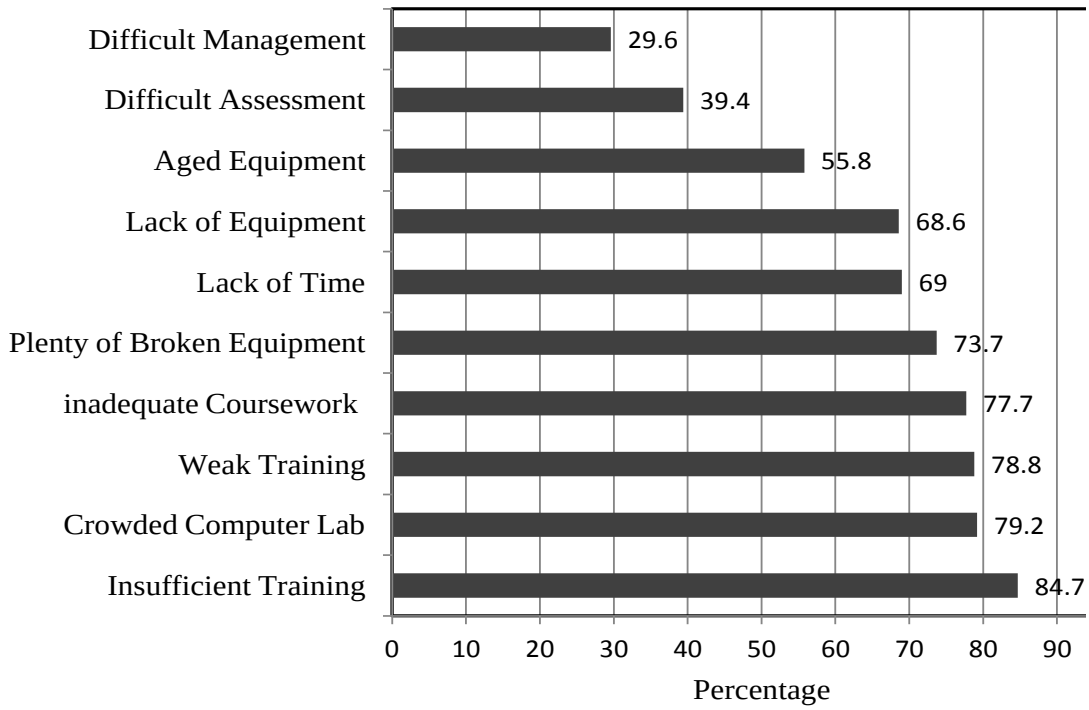

Figure 4. Rank of barriers to technology integration according to percentage

From classroom teachers' perspectives, insufficiency of training was found to be the biggest problem with using technology for teaching (*M* = 4.26). The vast majority of classroom teachers (n = 232), with a rate approaching to 85%, agreed that technology-based training programs were inadequate. Failure to provide enough in-service training was the usual reason associated with the second-order or intrinsic barrier related to teachers' lack of knowledge and skills about the effective use of technology in the classroom.

Crowded computer laboratories were rated the second highest barrier (M = 4.15) in the adoption of technology in the educational setting. A large cluster of classroom teachers (n = 217), with a rate of 79.2%, agreed that the excessive number of students involved in the educational computer laboratory posed a formidable challenge for them to teach in an efficient way. The crowded tech environment might have arisen as a barrier due to the teachers' lack of knowledge of effective organizational strategies necessary for managing technology resources within the student-centered classrooms.

The third biggest barrier reported by classroom teachers was the weakness of technology-based training programs (M = 4.09). Many teachers (n = 216), with a rate of 78.8%, reported that the available in-service training on technology was not appropriate or, in other words, the training activities tended to focus on the mechanical facet of technology (e.g. how to operate a machine) with little attention to integrating technology into specific subjects, how to select software, how to organize the classroom, and so on.

Another barrier to adoption of technology in the Saudi school context was the perception of inadequate coursework within teacher education programs (M = 4.08). A large number of the classroom teachers (n = 213), with a rate of 77.7%, agreed that the amount of training on technology given to them within the pre-service education was trivial to the extent that it did not sufficiently prepare them to properly use technology in the school curriculum.

In general, classroom teachers had considerable broken-down equipment at their schools (M = 3.93). This is usually attributed to lack of technical support and inexperience caused by school administration. The extent of nonfunctional hardware and

software needing to be fixed, ranked higher or very important by 73.7% of the classroom teachers (n = 202).

Probably the greatest barrier to the use of technology in the classroom, however, was simply lack of teacher time (*M* = 3.71); as time to attend in- or out-service training or workshops, to test new machines and explore unfamiliar software, to collaborate with other colleagues to determine what works and what does not, and to develop lessons using new materials or strategies. The time needed to learn how to use instructional technology was also ranked important by 69% of the classroom teachers (n = 189).

One basic prerequisite for the effective teacher use of technology is the availability of functional equipment. Although the Saudi government has made substantial investments in hardware and software over the past several years; many schools, as perceived by 68% of classroom teachers (n = 188), lacked the basic technology infrastructure necessary for reaching the most promising implementation of technology in the educational setting. The study data showed general agreement from classroom teachers, with a mean of 3.76, confirming that majority of schools in Saudi Arabia were still ill equipped to take advantage of the potential presented by networks.

The aged equipment barrier was reported by 55.8% of the classroom teachers (n = 153). Relatively above the average of teachers' agreement (*M* = 3.36) stated that hardware in school was old to the extent that it might not handle many newer computer applications and networking issues.

Research Question 4

Are Saudi teachers self-motivated for incorporating technology into their teaching? If so, what keeps them engaged with this challenging task?

This question sought to identify some possible incentives that would help confirm teachers' enthusiasm or interest in using technology in their teaching as well as identify attitudes that influence teachers' refusal or opposition to using technology in their teaching. To address this question, classroom teachers were asked to rate their level of agreement on six potential incentives according to a five-point Likert scale as follows: (1) strongly disagree; (2) disagree; (3) neutral; (4) agree; and (5) strongly agree. Coefficient Alpha revealed a reliability of .82 for this scale, which points to a very acceptable level of internal consistency. Table 7 lists six items in a descending order according to the mean of teachers' responses to each item. The number and percentage of classroom teachers who were in accord with each item have also been included. This number was computed using the dichotomous scoring procedure by assigning a value of 1 for either a "Strongly Agree" response or an "Agree" response and a value of 0 for the other responses. Thus, the maximum score that could be attained on this scale was 274 (the total number of teachers who participated in this study). These two pieces of information were helpful in identifying the number and percentage of times an item was actually identified by teachers as being an incentive. The next section illustrates the significant incentives that keep Saudi teachers engaged in the integration of technology in the school curriculum.

As shown in Table 7, the averages of teachers' responses to all the six incentives ranged from 4.25 to 4.55. All the incentives received critical importance by 85.4% of the respondents as a minimum and 92% as a maximum. The most important incentive for 92% of the classroom teachers (n = 252) was that "technology helps save time and effort in teaching" (M = 4.55). Thus, the rest of the classroom activities might be teacher-centered, in which students use technology to master facts and content (e.g. drill and

practice) or be student-centered, in which students act as producers of knowledge through conducting their own scientific inquiries or projects or becoming involved in collaborative activities, and the teacher acts as the facilitator or coach.

Table 7

Rank of Incentives to Technology Integration According to the Mean

Item	Mean	Frequency *	Percent
3. Technology helps save time and effort in teaching.	4.55	252	92.0
2. Technology improves the teaching and learning process.	4.44	249	90.9
6. School administration encourages teachers to use technology in their teaching.	4.40	245	89.4
4. Technology motivates students to learn in multiple ways.	4.38	247	90.1
1. Technology enables students to acquire basic computer skills.	4.34	248	90.5
5. Technology provides a mean of expanding and applying what has been taught.	4.25	234	85.4

Note: *The number of participants who are in accord and strongly accord with an item.

In addition to being motivated by the potential of technology for saving time and energy during instruction, around 91% of the classroom teachers (n = 249) were motivated by the capability of technology to improve the instruction (*M* = 4.44). This incentive is important for classroom teachers because it is usually accompanied by two benefits: (a) a growth in student achievement resulting usually from students' use of technology in their learning, such as writing, data analysis, and problem solving; and (b) an increase in student engagement where students can employ technology for their own purposes.

A message of support and encouragement from a school principal was also rated higher (M = 4.40) by 89.4% of the classroom teachers (n = 245). This result was significant for teachers because the principal, as a chief administrative officer in the school building, has a critical role in upholding teachers' desires to improve the school, allocating valuable time to staff to attend in- and out-service programs and workshops, allocating necessary resources to the staff, and encouraging them to take part in any educational reform.

How exciting and motivating technology was for students to learn the subject matter in multiple ways was rated, on average, higher (M = 4.38) or very important by 90.1% of classroom teachers (n = 247). This result (extrinsic incentive) worked as an intrinsic incentive for classroom teachers to employ technology in the classroom because they noticed that their students were more attracted to the lessons infused with technology along with their increased interaction or interplay with technology during the learning process.

Having students acquire basic computer skills to be computer-literate adults was also ranked higher (M = 4.34) and received importance by 90.5% of the teachers (n = 248). This result indicates that classroom teachers were highly influenced by goals for their students. They wanted their students to have sufficient knowledge and skills in technology so they can use it for their own learning and be ready to face the current global technology revolution. The result also indicated that teachers value their student's involvement in technology-based work.

A large majority (85.4%) of the classroom teachers (n = 234) were highly motivated by the potential of technology for expanding students' learning and applying

what has been taught in a tangible manner (M = 4.25). A majority of teachers reported that they were aware of the value or worth of technology in expanding students' learning, experience, capacity, and productivity. In addition, they were convinced that technology is indispensable for their academic settings due to its possibility to create a real-world environment for discovery and examination.

Additional Results

A group of seven multiple regression analyses were conducted to address whether the 10 barriers to technology integration (insufficient training, crowded tech lab, weak training, insufficient coursework, broken equipment, inadequate equipment, insufficient time, old equipment, difficult assessment, difficult management) as independent variables (predictors) were related to each of the seven Stages of Concern (awareness, informational, personal, management, consequence, collaboration, refocusing), each of which served separately as the dependent variable (criterion) within each regression analysis. The analyses were performed using SPSS LINEAR REGRESSION and SPSS EXPLORE for evaluation of assumptions.

With the use of a $z > |3.3|$, $p < .001$criterion 4 univariate outliers among the cases were found. These four cases were deleted, leaving 270 in a whole sample for further analysis. With the use of a critical χ^2 (7) = 24.322, $p < .001$criterion for Mahalanobis distance, no multivariate outliers among the cases were found. With 270 respondents and 10 independent variables, the number of cases was well above the minimum requirement of 114 (104+10) for testing individual predictors in the multiple regression. No cases had missing values and no suppressor variables were found, N = 270. No multicollinearity and singularity were evident within each of the seven analyses because none of the

tolerances (1–the squared multiple correlation of each predictor) was low or approached zero. With the examination of the scatterplot of the standardized residuals against the predicted dependent variable values for each criterion variable, the assumptions of normality, linearity, and homoscedasticity were met.

The linear combination of the 10 barriers was significantly related to the *awareness* stage of concern, $F(10, 259) = 2.54$, $p < .01$. The sample multiple correlation coefficient was .30, indicating that approximately 9% of the variance of the *awareness* concerns in the sample can be accounted for by the linear combination of the 10 barriers to technology integration. For the regression coefficient (*difficult assessment*) that differed significantly from zero, 95% confidence limits were calculated. The confidence limits for the *difficult assessment* were 0.050 to 1.183. Based on the significant regression coefficient, it is tempting to say that the only useful predictor is the *difficult assessment* barrier. It alone accounted for approximately 2% of the variance of the *awareness* concerns, while the other predictors contributed only the additional variance of 7% (9% - 2% = 7%). The size and the direction of the relationship suggest that teachers who have more difficulty in assessing student learning resulting from technology experience higher concerns at the awareness stage.

The linear combination of the 10 barriers was not significantly related to the *Informational* stage of concern, $F(10, 259) = 1.84$, $p = 0.055$.

The linear combination of the 10 barriers was significantly related to the *Personal* stage of concern, $F(10, 259) = 1.97$, $p < 0.05$. The sample multiple correlation coefficient was .27, indicating that approximately 7% of the variance of the *Personal* concerns in the sample can be accounted for by the linear combination of the 10 barriers to technology

integration. For the two regression coefficients (*plenty of broken equipment* and *difficult assessment*) that differed significantly from zero, 95% confidence limits were calculated. The confidence limits for the *difficult assessment* were -1.520 to -0.014, and those for the *plenty of broken equipment* were 0.282 to 2.019. These two significant independent variables accounted for approximately 4% of the variance of the *personal* concerns, while the other predictors contributed only the additional variance of 3% (7% - 4% = 3%). The size and the direction of the relationships suggest that teachers who have more trouble from broken-down equipment and have less difficulty in assessing student learning coming from technology experience higher concerns at the personal stage.

The linear combination of the 10 barriers was significantly related to the *management* stage of concern, $F(10, 259) = 6.99$, $p < 0.001$. The sample multiple correlation coefficient was .46, indicating that approximately 21% of the variance of the *management* concerns in the sample can be accounted for by the linear combination of the 10 barriers to technology integration. For the independent variable (*lack of time*) that differed significantly from zero, 95% confidence limits were calculated. The confidence limits for the *lack of time* were 0.844 to 2.455. This significant independent variable alone accounted for approximately 5% of the variance of the *management* concerns, while the other independent variables contributed only the additional variance of 16% (21% - 5% = 16%). Based on the significant regression coefficient, it is tempting to say that teachers who are more concerned about their own time limitations to use technology in their teaching and also the limited scheduling to attend technology-based training programs and workshops experience higher concerns at the management stage.

The linear combination of the 10 barriers was significantly related to the *consequence* stage of concern, $F(10, 259) = 3.55$, $p < 0.001$. The sample multiple correlation coefficient was .35, indicating that approximately 12% of the variance of the *consequence* concerns in the sample can be accounted for by the linear combination of the 10 barriers to technology integration. For the three regression coefficients (*lack of time, difficult management,* and *difficult assessment*) that differed significantly from zero, 95% confidence limits were calculated. The confidence limits for the *lack of time* were -1.774 to -0.040, and those for the *difficult management* were -1.611 to -0.081, and those for *difficult assessment* were -1.779 to -0.286. These three significant independent variables accounted for approximately 5.6% of the variance of the *consequence* concerns, while the other independent variables contributed only the extra variance of 6.4% (12% - 5.6% = 6.4%). The size and the direction of the relationships suggest that classroom teachers who have less time constraints, have less difficulty in managing the innovation and have less difficulty in assessing student learning coming from the innovation usage experience higher concerns at the consequence stage.

The linear combination of the 10 barriers was significantly related to the *collaboration* stage of concern, $F(10, 259) = 2.63$, $p < 0.001$. The sample multiple correlation coefficient was .31, indicating that 9.2% of the variance of the *collaboration* concerns in the sample can be accounted for by the linear combination of the 10 barriers to technology integration. For the two regression coefficients (*plenty of broken equipment* and *difficult assessment*) that differed significantly from zero, 95% confidence limits were computed. The confidence limits for the *plenty of broken equipment* were 0.161 to 1.974, and those for the *difficult assessment* were -1.921 to -0.349. These two significant

independent variables accounted for approximately 4.7% of the variance of the *collaboration* concerns, which was nearly equal to the additional variance of 4.5% (9.2% - 4.7% = 4.5%) shared jointly by the other predictors or independent variables. The size and the direction of the relationships suggest that teachers who have more trouble from broken-down equipment and have less difficulty in assessing student learning coming from technology express higher concerns at the collaboration stage.

The linear combination of the 10 barriers was significantly related to the *refocusing* stage of concern, $F(10, 259) = 3.29$, $p < 0.01$. The sample multiple correlation coefficient was .34, indicating that 11.3% of the variance of the *refocusing* concerns in the sample can be accounted for by the linear combination of the 10 barriers to technology integration. For the three independent variables (*plenty of broken-down equipment, aged equipment, and difficult management*) that differed significantly from zero, 95% confidence limits were computed. The confidence limits for the *plenty of broken-down equipment* were 0.389 to 1.950, and those for the *aged equipment* were 0.402 to 1.966, and those for the *difficult management* were -1.565 to -0.178. These three significant independent variables accounted for 8.1% of the variance of the *refocusing* concerns, while the other independent variables contributed only the supplemental variance of 3.2% (11.3% - 8.1% = 3.2%). The size and the direction of the relationships suggest that classroom teachers who suffer more from the broken-down and aged equipment and have less difficulty in managing the innovation within the classroom often experience higher concerns at the *refocusing* stage where teachers make suggestions for improvement and the overcoming of difficulties.

CHAPTER 5

DISCUSSION, CONCLUSIONS AND IMPLICATIONS

Researchers share the view that educational technology could have a positive influence on the educational system. Saudi Arabia is a country that has mandated the adoption of technology into the curriculum in all public schools, including male and female schools, and across three different kinds of school programs, including Tatweer, Alraeda, and Regular. This mandate raised the necessity among classroom teachers to learn technology and understand its potential for changing the educational process, which, in turn, led them to in-service training so they can integrate technology resources effectively in the classroom.

Many in-service training efforts are currently seeking to augment teachers' ability to accommodate technology into their instructional techniques. However, the majority of Saudi teachers perceived these in-service efforts as ineffective (Alhazmi et al., 2010). This is usually because little attention is being paid to certain concerns these teachers bring to technology being implemented in schools. If an in-service training event is to be organized effectively, teachers' concerns must be taken into consideration. Therefore, the aim in the first part of this study was to identify the concerns of a group of teachers implementing technology in the public school settings in Saudi Arabia. In the second part, the aim was to examine the relationships between teachers' concerns and other demographic factors such as gender and type of school program.

In spite of the availability of technology in schools, not all teachers adopted it for use in their teaching because of barriers that exist (Alhazmi et al., 2010). The third part of this study dealt with an examination of the status of technology use among teachers in

Saudi Arabia in order to identify critical barriers that oppose their technology implementation in the classroom.

Even though technology resources have found their way into schools, research revealed that technology is still underutilized. The consequence of underutilization of technology is that the availability of technology in schools is high, but teachers' desire for use is low (Marcinkiewicz, 1993). Thus, the fourth part of this study sought to determine whether or not classroom teachers in Saudi Arabia are self motivated to incorporate technology into their teaching and what keeps them involved in this demanding task.

All four objectives of the study mentioned above come together to formulate the following research questions:

1. At what Stages of Concern do Saudi teachers perceive their technology implementation to be?
2. Are there significant differences in Stages of Concern among Saudi teachers with different personal and professional characteristics, such as gender and type of school program?
3. Do Saudi teachers have difficulties when they use technology in their teaching? If so, what are the factors that stand opposite the use of technology?
4. Are Saudi teachers self-motivated for incorporating technology into their teaching? If so, what keeps them engaged with this challenging task?

Teachers' Concerns about Technology Use in the Classroom

RQ 1. At what Stages of Concern do Saudi teachers perceive their technology implementation to be?

The Stages of Concern profile for the whole sample (see Figure 1) directly addressed Research Question 1. This profile displays several pieces of information about the current concerns of teachers who use technology in their teaching. The presence of successive high intense concerns at stage 0 (awareness), stage 1 (informational), and stage 2 (personal) indicates that teachers' concerns about the innovation (the use of technology in teaching) are self-centered. These self-concerns belong to a group of inexperienced users who have "feelings of potential inadequacy, self-doubts about the knowledge required, or uncertainty about the situation they are about to face" (Hall & Hord, 1987, p. 57). A first high stage 0 (awareness) indicates classroom teachers are just becoming aware of the innovation and have little familiarity with it. A second high stage 1 (informational) indicates that classroom teachers demonstrate their willingness to get knowledge and skills that enable the technology implementation process go smoothly in the classroom. A third high stage 2 (personal) indicates that the classroom teachers have concerns about how the use of technology in teaching would affect them on a personal level. With the absence of peaking at stage 3 (management), there is no obvious indication of progression from self to task concerns for classroom teachers, so their concerns about the innovation are still inclined to the self orientation. A remarkable valley located at stage 4 (consequence) suggests that classroom teachers have no concerns regarding the impact of the innovation on student learning at this moment. The rise in stage 5 (collaboration) indicates that classroom teachers have a tendency to work with other technology specialists or other experienced colleagues for the purpose of obtaining a clear understanding of the curricular uses of technology in a specific subject area. The tailing up on stage 6 (refocusing) indicates that classroom teachers have some

ideas about how to improve the innovation, but these ideas are more likely to be inefficient towards the innovation because of a lack of basic understanding or knowledge about the innovation.

In summary, classroom teachers in this study should be classified as inexperienced users whose concerns about the innovation (the use of technology in teaching) are centered on three stages of self concerns including *awareness* where teachers have little familiarity with the innovation, *informational* where teachers display willingness to learn new uses of the innovation, and *personal* where teachers want to know how these uses impact one's professional role. In addition to the self-concerns, teachers show a tendency to link with others to learn tangible uses of the innovation. Additionally, these teachers pay minor attention to logistics, time, and management issues relative to the innovation and no attention at all to the impact of the innovation on learners.

Teachers' Concerns in Relation to Gender and School Program Factors

RQ 2. Are there significant differences in Stages of Concern among Saudi teachers with different personal and professional characteristics such as gender and type of school program?

Figures 2 and 3, Table 5, and the results of multivariate analysis of variance directly address Research Question 2. The Stages of Concern profile for the gender factor shown in Figure 2 indicates that male and female teachers have concerns about the innovation similar to those expressed by the whole group. This finding means that both groups of teachers have extreme self-concerns in the areas of awareness, informational, and personal concerns, as well as a relative inclination for collaboration with others to

obtain knowledge. However, the multivariate analysis of variance results indicate that the female concerns are significantly more intense than the male ones except at the management stage where both males' and females' concerns are not significantly different. This finding indicates that females' self-concerns are more intense than male ones. Also, females show more inclination to collaborate with others to obtain tangible uses of the innovation than do males. No matter how different or similar male and female teachers are in the case of management concerns, both groups' concerns are still self-oriented at this time. No matter how different male and female teachers are in the case of consequence concerns, both groups give no attention at all to the impact of the innovation on students' learning. No matter how different male and female teachers are in the case of refocusing concerns, both groups lack basic knowledge about the innovation.

The Stages of Concern profile for the school program factor shown in Figure 3 indicates that classroom teachers across the three school programs (Alraeda, Tatweer, and Regular) have concerns about the innovation similar to those expressed by the whole group. This finding means that all the three groups have high self-concerns in the areas of awareness, informational, and personal concerns as well as a relative inclination for collaboration with others to obtain knowledge. However, results of the multivariate analysis of variance indicate that awareness and management concerns are significantly higher for Tatweer program teachers relative to colleagues employed in the other two programs. Since concerns of teachers across the three programs are self-centered, it does not matter how different their management concerns are from each other.

Barriers to Technology Integration

RQ 3. Do Saudi teachers have difficulties when they use technology in their teaching? If so, what are the factors that stand opposite the use of technology?

According to Table 6 and Figure 4, which directly address Research Question 3, the research study identified eight significant barriers to technology integration into the curriculum, experienced by more than half of the classroom teachers within the Saudi Arabian school environments located in one selected Medina City school district. These barriers, ranked in descending order according to percentage of teachers who were in accord or strongly in accord with the barriers, were: (a) insufficient in-service training, (b) large number of students in the computer lab and learning resources center, (c) poor in-service training, (d) insufficient pre-service training, (e) lots of broken-down technology equipment, (f) lack of teacher time, (g) lack of technology equipment in schools, and (h) old technology equipment.

Insufficiency of In-service Training

Insufficiency of in-service training was found to be the biggest problem with using technology for teaching. The vast majority of classroom teachers in this study agreed that technology-based in-service training programs are inadequate. In fact, failure to provide enough in-service training is the usual reason for why teachers lack the knowledge and skills (informational concerns) necessary for reaching the effective use of technology in the classroom. The Office of Technology Assessment (U.S. Congress, 1995) revealed that participants would engage in technology-based in-service training if the opportunity were presented. Any form of in-service training, whether formal coursework done within teacher education programs, training received as a group from

professional development programs, or training attained independently from well-designed instructional materials (whether audio; video; multimedia; or simply a good textbook), are seemingly going to support the innovation.

Crowded Computer Lab and Learning Resources Center

Large numbers of students in the computer labs and learning resources center ranked second as a barrier to the adoption of technology particularly in the regular school settings. The majority of classroom teachers reported that the excessive number of students poses a challenge for them to teach with technology in an efficient way. This barrier might arise because teachers (a) believe that the number of computers is few in comparison with the number of students, (b) prefer to be in control of students' learning, or (c) believe that students need to complete an activity independently. The usual reason underlying these problems is that teachers lack knowledge of effective organizational strategies necessary for managing classroom activities within a technology-based environment.

Weakness of In-service Training

Poor in-service training ranked number 3 as an extreme barrier in integrating technology into teaching. The majority of classroom teachers in this study reported that the available in-service training on technology is not appropriate or not the right kind, meaning that the in-service activities tend to concentrate on the mechanical side of technology (e.g., how to operate equipment or software) with trivial consideration of the instructional and organizational sides. Guhlin (1996) stated that in-service training is not of great worth unless it accommodates activities that explain to participants how to integrate technology into specific subjects that involve discovery learning, developing

higher-order thinking skills, and the comprehension and communications of ideas and information. Moreover, research revealed that if in-service efforts are to be effective, they must present activities that explain how teachers can organize classes effectively, for example, using six computer workstations, a single computer with a modem and overhead projector, or one computer per student and one on the teacher's desktop.

Insufficiency of Pre-service Training

The perception of insufficient technology-based coursework within teacher education programs was considered an extreme barrier to adoption of technology in the Saudi school context. This means that the need to prepare prospective teachers to use technology effectively in their future job receives trivial attention in the schools of education in Saudi Arabia, specifically in Medina where the present study was conducted. The literature review of educational technology revealed that pre-service training has a positive influence on the future use of technology in the classroom. Therefore, teacher education programs must focus on technology instruction in the preparation of new teachers.

Lots of Broken Technology Equipment

Classroom teachers in Saudi Arabia had a considerable amount of non-functional hardware and software at their schools. This problem is usually attributed to the lack of on-site and on-call technology specialists who are usually responsible for training, helping teachers with technology skills, handling technical problems, maintaining and repairing software and hardware, and upgrading systems. Lei and Morrow (2009) showed that the availability of in-house high-tech support personnel, who are readily available,

highly skilled, and extremely supportive, is one of the critical factors which contributes to successful technology implementation in the classroom.

Lack of Teacher Time

Related to in-service training issues is the lack of adequate time to implement technology; this is usually attributed to inexperience or poor technology leadership from school principals and school district administrators. The majority of teachers in this study reported lack of time as an extreme barrier to technology use in the classroom. Kearsley and Lynch (1992) revealed that the amount of time required to learn new knowledge and skills in technology use is most often underestimated. Successful integration of technology into curriculum takes more time than initially expected. Teachers need release time to experiment with new technologies, share experiences with other teachers, plan and debug lessons using new methods that integrate new technologies, and attend workshops or training sessions.

Lack of Technology Equipment in Schools

Although the Saudi government has made substantial investments in hardware and software over the past several years, the majority of teachers in the present study reported that they still have limited access to technology to reach the most promising implementation. The limited access might arise due to the inappropriate placement and inflexibility of technology equipment within the school context, as is the case in the regular schools where all technologies are located in labs and learning resources centers (LRCs) rather in classrooms. This makes it difficult for teachers to use the technology hardware during the school day. Given the immovability of equipment in one location, the problem of uneven access can easily appear, especially when a lab is set up just for a

group of teachers who have high priority (e.g., computer science teachers or for use by at-risk, gifted, or talented students), thus blocking the lab to other classroom teachers and students.

Aged Technology Equipment

Another issue resulting in limited access is the old-fashioned technology resources within the school contexts. This study found that more than half of classroom teachers are still concerned about aging technology equipment which might be in bad condition and not working properly because of its inability to run contemporary software applications or be networked. The reason why such outdated machines are still in existence is because school district administrators fail to allocate enough funds to keep up with the costs of rapid advancements in technology.

Motivations to Technology Integration

RQ 4. Are Saudi teachers self-motivated for incorporating technology into their teaching? If so, what keeps them engaged with this challenging task?

Table 6 directly addressed Research Question 4. Findings from Table 6 indicate that technology's potential to save time and effort for teachers, in terms of lecturing, is a critical incentive for them to incorporate technology into their teaching. The teachers reported that they spend little time and effort in delivering a lesson to their students. Thus, the rest of classroom activities might be teacher-centered, in which students use technology to master facts and content (e.g. drill and practice) or to supplement teacher-controlled activities (e.g. tutorials). The classroom activities might be student-centered, in which the teacher acts as the facilitator or coach and students act as producers of

knowledge by conducting their own scientific inquiries or projects or becoming involved in collaborative activities.

One key incentive for incorporating technology into their teaching is that technology becomes a powerful resource which can help these teachers improve multiple facets of their teaching. Classroom teachers might use technology to help bring a broader range of new materials into the classroom, develop new forms of instruction, or individualize instruction for at-risk, special education, gifted and talented students. If technology is perceived as a resource to help students learn better, teachers are more likely to expend their own time and effort in learning to use it in an effective way.

In addition to being motivated by teaching improvement, Saudi teachers reported that technology-based classroom activities can be motivating to students. These teachers suggested that technology can be a key resource for stimulating learning. Teachers undoubtedly want to ensure that their students are learning. If technology can be a resource to enhance student motivation to learn in multiple ways, such as group work, data analysis, and problem solving; technology starts to make more sense to these teachers. This result might be significant for teachers for several possible reasons: First, growth in student achievement, which is so motivating for these teachers and, second, an increase in student engagement where students can use technology for their own purposes are key incentives.

Furthermore, the findings of this study indicate that classroom teachers are highly motivated by goals for their students. They want their students to acquire basic knowledge and skills in technology so they can use it effectively for their own learning.

This result indicates that these teachers value their students' involvement in technology-based work.

Moreover, the potential of technology for expanding learning and real-world application is a key incentive for classroom teachers to integrate it into their teaching. Technology can expose students to a wider world of information and experts and stimulate techniques that apply concepts or themes being learned in a tangible manner (e.g. the use of graphing software, where students seem to develop a clear understanding of abstract mathematical concepts rather than just formulae).

In conclusion, in keeping with their highly motivated view, classroom teachers are unlikely to feel conflict about using technology in their teaching. These teachers are also more likely to believe that technology is the future for improving the quality of education. They are highly motivated by the potential of technology in terms of improving their own teaching and student learning, motivating their students to learn in multiple ways, and expanding their students' learning.

Implications of the Findings for Practice

Implications of Teachers' Concerns

For those who are accountable for designing in-service training programs in educational technology and those who are in charge of making decisions regarding the innovation, the findings of teachers' concerns have several immediate and long term implications. Individuals with intense concerns at stage 0 (awareness) and stage 1 (informational) are not likely to take advantage of in-service training efforts directed towards high levels of concern. The effect of this disadvantage might be seen in the observed gap between the expected and actual utilization of technology in the educational

process by public school teachers in Saudi Arabia. For instance, it is unreasonable for a staff developer to begin an in-service training program with theories and in-depth demonstrations about using technology in teaching while classroom teachers have little experience with the innovation or, in other words, have intense awareness and informational concerns toward it. Rather, in-service efforts must focus initially on the general attributes of the innovation. Later, in-service training attempts may shift to personal concerns where classroom teachers experience conflicts between their current roles and the changes they will be expected to make as a result of the use of technology in the classroom.

Findings from this study indicate that there is no obvious indication of progression from self to task concerns for classroom teachers in Saudi Arabia, so their concerns are still inclined to self-orientation. This result suggests that in-service training activities should not focus on the management of the innovation at this time because the Saudi teachers are not ready yet to handle logistics, time, and management issues. To support this implication further, findings about barriers indicate that the majority of classroom teachers do not agree that classroom management is a critical barrier to technology integration. That is because those teachers are completely overwhelmed with their self-concerns toward the innovation and are not willing to give consideration to the management and organizational issues of technology in the classroom.

The lowest relative intensity of concern spotted at the consequences stage indicated that task concerns for classroom teachers have not diminished yet; therefore, they do not have any opportunity at this time to pay attention to the impact of the innovation on student learning. This result has an immediate implication for in-service

training providers, and suggests that the current in-service training on technology should not include activities that expose classroom teachers to the impact of technology on learners.

According to the CBAM hypothesis, teachers' concerns evolve through seven developmental stages (awareness, informational, personal, management, consequence, collaboration, and refocusing) as they experience an innovation. A long-term implication is the possibility that classroom teachers who participated in this study might show an improved concern profile in the near future if technology in-service training meets their emerging affective needs (concerns). If the in-service training is to be effective, it must be compatible with the concerns of the classroom teachers, along with particular content considerations. Based on this matter, in-service training programs or workshops in the *second level* should be different in two facets: teachers' concerns and content.

Since classroom teachers engaged in the innovation move through the Stages of Concern differently, the Stages of Concern Questionnaire (SoCQ) should be employed from time to time to identify teachers with different concern profiles. Then, the SoCQ data could be used to design in-service training activities targeted at groups or individuals with the same concerns and content needs.

The following sections discuss some suggested interventions that can address teachers' concerns in the stages of awareness (informational, personal, collaboration concerns).

Awareness Concerns. For classroom teachers who have intense awareness concerns about the innovation (the use of technology in teaching), staff developers or change agents should pursue the following intervention to address this area of concern.

Change agents should hold an initial, well-timed social event for each group of classroom teachers. This sort of event helps classroom teachers engage in discussion and the decision-making process to make the innovation meaningful to them. During this event, staff developers should share enough information about the innovation with the teachers, but not so much that it puts a strain on the teachers. Staff developers should act as counselors whose job is to convince classroom teachers that their unawareness of the innovation is expected and reasonable and no questions or inquiries about it are considered illogical. During this event, staff developers should also recognize other undetected problems teachers might experience during the implementation process. These could be teachers' full involvement with another program or project or their preoccupation with more school duties. The problems could also be other priorities, such as more pressure from educational authority to finish content on time and that student success depends on achievement tests. These undetected problems might not reflect what has been learned with technology, but each of the problems might prevent teachers from focusing their attention on the innovation. Staff developers should then record these problems during that event and share them later with the site administrator.

Informational Concerns. The classroom teachers in this study expressed intense informational concerns about the innovation (the use of technology in teaching). These teachers wanted to know more about the nature of the innovation. Their expressions of concern revealed limited knowledge about the innovation, lack of models showing the value of technology for their own professional use, absence of a clear understanding of how technology can improve teaching and learning, lack of information about the available resources in schools, and lack of information about the innovation's demands in

the immediate future. The most effective intervention for addressing the informational concerns mentioned above is to provide schools with a clear written plan for technology use through which teachers can obtain a clear understanding of the curricular uses of technology in their own subject matter. This plan provides schools and teachers with a starting point to make the first move and goals to reach for, and it works as a guide along the way. Research indicated that the technology plan must be a work-in-progress vision so schools can keep pace with technology's rapid change in terms of hardware and software and the changing messages regarding the best use. In addition, it must be a shared vision, which involves all stakeholders dealing with technology integration including classroom teachers, students, school principals, school district administrators, library media specialists, computer lab teachers, parents, and business partners. The plan for technology use must be long term because successful implementation almost always takes more time than initially anticipated. Teachers require demonstrations, hands-on practice, and follow-up support activities to learn how to implement technology properly in their own subject area.

The second effective intervention for addressing the informational concerns is learning by providing classroom teachers with enough, and appropriate, in-service training on technology in a timely manner. Any form of in-service training, whether formal coursework done within teacher education programs, training received as a group from professional development programs, or training attained independently from well-designed instructional materials such as audio; video; multimedia; or simply a good textbook, are seemingly going to address this area of concern. However, since teachers have extreme awareness and informational concerns, it is not suitable that in-service

training efforts start with a series of comprehensive and intensive demonstrations about using technology in the classroom. Rather, in-service training efforts must include a presentation of single theory along with a demonstration, and additional time for classroom teachers to practice a skill and receive feedback.

Personal Concerns. The classroom teachers in this study expressed extreme personal concerns about the innovation (the use of technology in teaching). These teachers wanted to know the effect of the innovation on their professional status, how their teaching and administration are supposed to change, more information about time and energy commitments required by the innovation, and how their role will change when they are using the innovation. Their expressions of concern were typical of inexperienced users who have concerns at the personal level. For these users, in-service training activities must focus on addressing the relationship between the teaching role and the use of technology. The activities might include topics dealing with the promise that technology holds for classroom teachers including: (a) The potential of technology to enhance teachers' professional growth; (b) The potential of technology to simplify teacher and administrative tasks -; and (c) The potential of technology to change teaching and learning (U.S. Congress, 1995).

Collaboration Concerns. In-service training developers in educational technology must also recognize that, while classroom teachers have little familiarity with the innovation and a willingness to learn more about it, they also have concerns about the effects its use will have on their own professional roles. In spite of this, they also want to connect with other colleagues who have a good experience with the innovation in order to see how technology can be applied in a specific subject area. Therefore, classroom

teachers must be provided with on-going follow-up support through peer coaching, collegial study groups, and peer review (See Appendix U for more details) to implement the concepts and skills presented in the in-service training programs or workshops. In addition, it is highly recommended that policymakers, school district administrators, and school principals create a policy that allows in-service training participants released time to observe and help each other with implementation efforts. In-service training providers must recognize that their efforts do not stop when the workshop ends. To enhance the return on the investment in the in-service training efforts, there must be follow-up support activities. Failure to provide such activities, which build on follow-up support, might result in users who are uninterested in the innovation.

Implications of Teachers' Concerns According to Gender and School Program Factors

The Stages of Concern profile for gender generally indicated homogeneity of concerns between males and females, suggesting that in-service training providers must be cognizant of the homogeneity of male and female teachers' views about educational technology in-service training programs. However, they must also know that the amount of in-service training females need to resolve their self and collaboration concerns is more than males need.

The Stages of Concern profile for the school program factor generally indicated the homogeneity of teachers' concerns among the three school programs (Tatweer, Alraeda, and Regular), suggesting that in-service training providers, in designing educational technology in-service training programs, must be cognizant of the homogeneity of teachers across the three programs. However, the training providers must

know that teachers working in Tatweer schools need more interventions for resolving awareness concerns than do their colleagues working in the other programs.

Implications of Barriers to Technology Integration

In-service Training. It might be postulated that the nature of the innovation, the use of technology in teaching, is dynamic and complex as a result of the rapid rate of technology development and changing thoughts on the use of technology in terms of pedagogical and organizational issues. Therefore, it is important for in-service training developers to provide classroom teachers with on-going, long-term in-service training, not just a one-shot workshop, which has to take place after and during the school day, during the summer vacation (e.g. intensive course), or on weekends.

To achieve high-quality training, staff developers must incorporate a triple focus on the mechanical, pedagogical, and organization issues. Besides the mechanics of operating new machinery, in-service training activities need to identify specific topics in the curriculum where technology can work and the software used to teach it. The in-service efforts must include activities that explain how teachers can use technology in topics in the curriculum, which involve discovery learning, high-order thinking skills, and the comprehension and communication of ideas and information. Otherwise, technology would be used as a drill-and-practice tutor. Beside the pedagogical issues, the in-service attempts must involve activities that explain how to organize classes using six computer workstations, a single computer with a modem and overhead projector, or one computer per student and one on the teacher's desktop.

It is highly recommended that in-service training developers take teachers' current and varying affective needs (concerns) into account so high-quality training can be attained.

Management of Tech Environment. It is recommended that in-service training developers provide teachers with effective organizational strategies to address all barriers that may emerge from management issues. To utilize technology resources effectively, in-service training developers must consider ways to help teachers rotate their students smoothly through a self-contained lab and learning resources center.

Furthermore, classroom teachers need to be acquainted with some strategies that can be used to help their students with computer skills and technical problems while they are working on computers in the computer lab or LRC. These strategies include: "initial teacher demonstrations, peer modeling and assistance, technology posters and job aids, and student handouts" (Ertmer, 1999, p. 57). When students are faced with technical problems, they should be asked to listen carefully, while they are solving the problems, to their teacher modeling the troubleshooting process for them. Students should be encouraged to ask a neighbor, to follow specific steps for handling most common problems, or to try a few things prior to disrupting their teachers. Students should be encouraged to keep a written record of all the troubleshooting tips they experience and keep it in case the technical problems happen again with other students.

In addition to general classroom rules, another list of rules should also be created with respect to how to maintain technology resources available in the computer lab (e.g., keep your hands off the computer monitors). Classroom teachers and students should be aware of other skills (e.g., helping each other with the troubleshooting issues and sharing

the unknown computer concepts and skills) in order to create a social digital learning atmosphere that supports high-order thinking skills including problem solving, decision making, discovery learning, and cooperative learning.

Pre-service Training. The literature review on educational technology revealed that pre-service training has a positive influence on the future use of technology in the classroom. However, the majority of classroom teachers in this study reported that the amount of pre-service training given to them within teacher education programs was trivial and did not sufficiently prepare them to use technology in the school curriculum properly. This finding has an important implication for teacher education programs, which must focus on technology instruction in the preparation of new teachers. The technology instruction must not be given as a separate subject, ignoring the educational objectives of a topic being learned. Technology must be central to the teacher preparation experience in teacher education programs. Otherwise, the new teachers will graduate with limited knowledge of the ways technology can be employed in their own profession.

Successful implementation of technology requires teachers to make a radical change in their classroom practices, including a change in the way they teach their students, a change in the role they play in the classroom, and a change in the way their classrooms are physically organized. In other words, the implementation process requires teachers increasingly to move toward a learner-centered approach and away from a teacher-centered approach. Therefore, teacher education programs must prepare prospective teachers to work effectively as a facilitator or coach within the technology-enriched and learner-centered environment and not as a dispenser or container of all knowledge as is the case in the traditional education environment.

Technical Support. The broken equipment as an environmental barrier has an important implication for school district administrators, which suggests the importance of providing each school with a permanent, full time, school-level technology coordinator who is responsible for training, helping teachers with technology skills, handling the technical problems, maintaining and repairing software and hardware, and upgrading systems . If the availability of full-time coordinators is impossible due to lack of funds, the alternative option is to do business with school faculty who are skilled in technology and appoint them as part-time coordinators. Unfortunately, very little of their time will go to technology duties due to classroom efforts and other school-day responsibilities. In addressing this, school principals, as chief administrative officers in the school building, must decide how to balance the workload of part-time coordinators between technology and classroom efforts.

Teacher Time. In fact, learning the use of educational technologies requires demonstrations, hands-on practice, and follow-up support activities through peer review, peer coaching, and collegial study groups, which all take much more time than initially expected. However, classroom teachers in the Saudi school settings have little time left over because they are overburdened with their classroom duties and other school-day responsibilities. To address these time concerns, Shelton and Jones (1996) suggested that training should be outside or away from the normal school day and be offered in a short-term module, either on weekends or after the school day. One efficient way is to use technologies such as the Internet or video-conferencing. Some suggested that the ideal time for classroom teachers to acquire training is during the summer. These ways have been proven to be useful for follow-up training as well. When allocating time outside the

school day is impossible for some reason, school district administrators must develop a training schedule which offers flexibility and not on the basis of a "one size fits all" philosophy (Brand, 1997). For that matter, a training session must be offered on different working days and at different school hours, so that classroom teachers can best take advantage of the offerings. When training time during the school day is available for some and not for others, school district administrators should designate one early-release day so all teachers have a chance to participate in professional development activities.

Access . The majority of teachers in the present study reported that they still have access to technology that is too limited to reach the most promising implementation. To address this problem, each school must be equipped with the proper quantity and condition of portable computers (laptops), along with carts that can move these machines anywhere and anytime in the school building. Research suggested that a classroom with six computers is a comfortable environment for both teachers and students to use technology when they need to, not when the computer lab is scheduled for them. A cart of six laptops might be used more often than a lab or LRC, both of which are usually located far from the classroom or are constantly used by a specific group of school staff or are set up for other priorities.

Another issue causing limited access is the out-of-date technology resources (either hardware or software) within the school contexts. These outdated machines and software are still present because school districts fail to allocate enough financial resources to keep pace with the costs of the rapid rate of technology development. Therefore, administrators must ensure that appropriate financial resources are in place for upgrading and ongoing updates in terms of both hardware and software resources.

Implications of Motivations to Technology Integration

It should be emphasized that, for teachers to realize the potential improvement that technology brings to education, certain basic conditions must be present. These include sufficient hardware and software, enough and the right kind of training, technical support, released time, flexible scheduling, clear vision for technology use, administrative support, and a school climate that encourages teachers to employ these resources in effective ways. However, the existence of these conditions in one place is far from commonplace, as discovered by this study.

Additional Findings

Additional findings of this study indicated a significant relationship between management concerns and lack of time as a barrier to technology integration. This relationship has a long-term implication for school principals and school district administrators. This implication is based on the possibility that, if in-service training does not address time constraints, participants might express higher concerns (undesired outcomes) later, at the management stage. Hence, school principals must provide classroom teachers with released time for learning, experimenting, sharing, and planning. School district administrators must offer flexible scheduling so teachers can attend workshops and training sessions.

Further additional findings revealed significant relationships between the consequence concerns and three barriers to technology integration: lack of time, the difficulty of management, and the difficulty of assessment. These relationships have a long-term implication for in-service training providers. This implication is based on the possibility that in-service training participants might later, at the consequence stage,

express higher concerns (desired outcomes) if they have (a) fewer time constraints for learning, sharing, and planning; (b) less difficulty in managing a technology-enriched classroom; and (c) less difficulty in assessing student learning coming from the technology usage.

Additionally, the findings indicated significant relationships between collaboration concerns and two barriers to technology integration, namely broken equipment and difficult assessment. These relationships have a long-term implication for in-service training providers and imply that classroom teachers might express higher concerns (desired outcomes) in the near future, at the collaboration stage, if they have a full-time, school-level technology coordinator for technical support and have less difficulty in assessing student learning coming from the technology usage.

Furthermore, findings from this study showed that refocusing concerns is significantly related to three barriers to technology integration. These barriers include: (a) old equipment, (b) plenty of broken-down equipment, and (c) difficulty in managing the technology-enriched classroom. For those in charge of the innovation implementation, these findings propose a long-term implication based on the possibility that intense refocusing concerns (desired outcomes) may show up in the near future if the following conditions are present. First, schools must offer a full-time, school-level technology coordinator for technical support who is readily available, highly knowledgeable, and extremely supportive. Second, school district administrators must allocate enough funds for upgrading issues and ongoing updating in terms of both hardware and software. Third, second level, or follow-up, in-service training programs must focus on the

organization, time, and management of the innovation so classroom teachers can handle technology resources and classroom activities in an effective way.

Conclusions

Conclusions drawn from the examination of concerns about the innovation (the use of technology in teaching) showed that classroom teachers were classified as inexperienced users whose concerns about the innovation are centered on three stages of self concern including *awareness*, where teachers have little familiarity with the innovation; *informational*, where teachers display willingness to learn new uses of the innovation; and *personal*, where teachers want to know how these uses impact one's professional role. In addition to the self concerns, teachers showed a tendency to link with others to learn such tangible curricular uses of technology. The self- and collaboration-concerns are significantly higher for female teachers in comparison to male teachers. The awareness concerns are significantly higher for Tatweer school teachers in comparison to both Alraeda and Regular school teachers. Implications derived from these findings have significance for in-service training developers who design technology-based, in-service training programs for teachers with concern patterns similar to those found in this study. The significance of considering both content and concerns of teachers in designing in-services training activities was emphasized. The importance of considering more in-service training for female teachers in the areas of self- and collaboration-concerns and for Tatweer schoolteachers in the area of awareness concerns was stressed.

Conclusions drawn from the examination of barriers to technology integration revealed that long-term technology-based, in-service training focused on mechanical,

pedagogical, and organizational issues that would support the integration of technology into school curriculum must be available to teachers during their regular schedule. Teachers need released time, for learning new technologies, sharing experiences with others, and planning lessons using technology and flexible scheduling, to attend workshops and training sessions. In addition, technology equipment must be available in each classroom, must function properly, and must be updated throughout the school year, allowing teachers to integrate technology into their teaching. A full-time, school-level technology coordinator, who is responsible for training, helping teachers with technology skills, handling technical problems, maintaining and repairing software and hardware, and upgrading systems, must be available in the school building. Finally, teacher education programs must focus on technology instruction in preparing prospective teachers. The conclusion drawn from the examination of motivations for technology integration revealed that classroom teachers have a high desire for technology use in their teaching.

Future Research

Future research should include school principals and students because they are considered key components of the technology plan and also the ones who are very akin to the implementation process. Further research should collect qualitative data, using interview and open-ended response techniques, to help the researcher elaborate on the quantitative results and discover other hidden factors affecting technology implementation in schools. Further research is needed to include participants (school principals, teachers, students) from private and public schools, from urban and rural areas, and from other school districts across Saudi Arabia, so the sample will be

representative of the entire population. Further research is needed to examine other intrinsic factors (e.g., technophobes and technophiles) who might oppose the change process.

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APPENDICES

Appendix A

Human Subjects Research Committee Permission

KU RESEARCH & GRADUATE STUDIES
The University of Kansas

9/30/2010
HSCL #18842

Moatasim Barri
3416 Aldrich St.
Lawrence, KS 66047

The Human Subjects Committee Lawrence reviewed your research update application for project

18842 Barri/Marc Mahlios (C & T) Integrating Technology into School Curriculum in Saudi Arabia: An Examination of Factors that Influence Technology Implementation in Classrooms

and approved this project under the expedited procedure provided in 45 CFR 46.110 (f) (7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies. As described, the project complies with all the requirements and policies established by the University for protection of human subjects in research. Unless renewed, approval lapses one year after approval date.

HSCL has waived the requirement for a signed parental permission form (45 CFR 46.117 (c) (2)). However, the cooperating institution may require signed parental permission. The Office for Human Research Protections requires that your teacher information statement must include the note of HSCL approval and expiration date, which has been entered on the form sent back to you with this approval.

1. At designated intervals until the project is completed, a Project Status Report must be returned to the HSCL office.
2. Any significant change in the experimental procedure as described should be reviewed by this Committee prior to altering the project.
3. Notify HSCL about any new investigators not named in original application. Note that new investigators must take the online tutorial at http://www.rcr.ku.edu/hscl/hsp_tutorial/000.shtml.
4. Any injury to a subject because of the research procedure must be reported to the Committee immediately.
5. When signed consent documents are required, the primary investigator must retain the signed consent documents for at least three years past completion of the research activity. If you use a signed consent form, provide a copy of the consent form to subjects at the time of consent.
6. If this is a funded project, keep a copy of this approval letter with your proposal/grant file.

Please inform HSCL when this project is terminated. You must also provide HSCL with an annual status report to maintain HSCL approval. Unless renewed, approval lapses one year after approval date. If your project receives funding which requests an annual update approval, you must request this from HSCL one month prior to the annual update. Thanks for your cooperation. If you have any questions, please contact me.

Sincerely,

Mary Denning

Mary Denning
HSCL Coordinator
University of Kansas

cc: Marc Mahlios

Appendix B

An English Letter of Introduction to Saudi Arabian Cultural Attaché in Washington D.C., the United States

04/02/2011

Dr. Mohammed Aleissa
Saudi Arabian Cultural Mission
8500 Hilltop Rd, Fairfax, VA 22031

Dear Saudi Arabian Cultural attaché in Washington D.C.,

With my ultimate respect and appreciation to you, this is Moatasim Barri, a mathematics teacher in the College of Technology in Medina for four years, a teaching assistant in the Department of Curriculum and Instruction at University of Taibah for three years, and a holder of Master's-degree from the University of Kansas in the area of Curriculum and Teaching. Currently, I am pursuing a Ph.D. degree in education in the area of Curriculum and Instruction and I hope to complete my Ph.D. program at the University of Kansas in Lawrence within the next semesters. I appreciate your favor to help me in this effort.

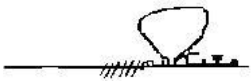
At this time, I am interested in studying the process of change in education, particularly, with regard to integrating technology into school curriculum. It is widely argued that technology offers a great job in the process of teaching and learning. Consequently, I am making it the focus of my research study.

I am requesting your help with writing a letter to the school district administrator in Medina and requesting him permission to conduct my research study at public schools that are equipped with educational technology and distribute a 58-item questionnaire to teachers who experience the change process resulting from the recent implementation of technology in their teaching. The questionnaire has already been approved by the Institutional Review Board at the University of Kansas. Teachers will be asked to complete the questionnaire that measures current pedagogical attitudes of school teachers toward technology implementation in the classrooms. Participation in this study is strictly

voluntary. All data relating to teachers, principals, and schools will be strictly kept confidential and private and will be used just for the purpose of the study.

Thank you a lot for your assistance and I will report the results to you as this study has been completed.

Sincerely,



Moatasim Barri
The Study Investigator
SACM ID no.: 50478
Cell Phone no.: 785-393-7117
Email: m_barri@hotmail.com
Mail Address: 3416 Aldrich St. Lawrence, KS 66047

Attachments:

1. A copy of the Ph.D. dissertation proposal approval
2. A copy of the study questionnaire
3. A copy of Human Subjects Research Committee Permission

Appendix C

An Arabic Letter of Introduction to Saudi Arabian Cultural Attaché in Washington D.C., the United States

بسم الله الرحمن الرحيم

سعادة الملحق الثقافي بالولايات المتحدة الأمريكية الدكتور/ محمد العيسى يحفظه الله

السلام عليكم ورحمة الله وبركاته، وبعد،

مع فائق الاحترام والتقدير، أفيد سعادتكم بأنني أحد المبتعثين في الولايات المتحدة الأمريكية، من قبل جامعة طيبة في المدينة المنورة، للحصول على درجة الدكتوراه في تخصص المناهج وطرق التدريس. وحيث أنني بصدد تطبيق دراستي خلال الشهور المقبلة للعام الميلادي 2011، والمتمثلة في استخدام التقنية الحديثة في تدريس المناهج الدراسية للمراحل التعليمية الثلاث، الابتدائية والمتوسطة والثانوية، ضمن مشروع المدارس الرائدة، ومشروع دمج الحاسب الآلي في المرحلتين الابتدائية والمتوسطة، ومشروع الملك عبدالله بن عبدالعزيز لتطوير التعليم العام "تطوير"، فاني أتوجه إلى سعادتكم ملتمسا مساعدتي في مخاطبة مدير إدارة التربية والتعليم في منطقة المدينة المنورة بخصوص تطبيق دراستي على مدارس التعليم العام التي تقع ضمن تلك البرامج، والمتمثلة في تعبئة استبيان خاص بهذه الدراسة والذي يمكن أن يوزع على بعض المعلمين والمعلمات في المراحل التعليمية الثلاث، علماً أن هذا الاستبيان لا يستغرق أكثر من ثلث ساعة تقريبا لملئ النقاط الواردة فيه. وأرجوا من سعادتكم تزويدي بأصل الخطاب أو صورة منه حتى يتسنى لي إرساله عن طريق البريد الالكتروني إلى الجهة المعنية في أسرع وقت ممكن ومن ثم يكون لدي متسع من الوقت لتطبيق دراستي قبل حلول إجازة فصل الصيف المقبلة.

وتهدف الدراسة إلى جمع معلومات تتعلق باهتمامات المعلمين والمعلمات نحو استخدام التقنية في التعليم، وكذلك على الفروق في اهتمامات أفراد الدراسة نحو توظيفهم للتقنية باختلاف خصائصهم الشخصية والوظيفية، والتعرف أيضاً على المعوقات المسببة في عدم استخدام التقنية على الوجه الأمثل، وكذلك التوصل إلى معرفة المحفزات التي تشجع على استخدام التقنية في التعليم، وأخيراً تهدف إلى التعرف على الطرق والحلول المحتملة التي ستساعد الطاقم التعليمي على تحسين استخدامهم للتقنية في مجال التدريس. هذه المعلومات يمكن أن يستفاد منها من قبل وزارة التربية والتعليم وإداراتها ومدارسها في مختلف المراحل التعليمية في بلادنا، لاسيما أن هناك توجه كبير لدي مسئولي التربية والتعليم في بلادنا نحو تعميم استخدام التقنية الحديثة في مجال التدريس، وتزويد المدارس

والفصول الدراسية بالأجهزة التقنية والبرامج التعليمية الحديثة والمفيدة بالإضافة إلى الشبكات العنكبوتية، التي تخدم العملية التربوية والتعليمية. إضافة إلى ذلك، فإن الدراسة يمكن أن تضيف معلومات مفيدة في تطوير مهارات القائمين على العملية التربوية والتعليمية فيما يتعلق باستخدام الأجهزة الرقمية ومصادرها المختلفة، وهي كلها أهداف تسعى الجهات التربوية والتعليمية في بلادنا إلى تحقيقها في سبيل إعداد بيئة تربوية وتعليمية قادرة على التعامل مع كل ما يستجد من تطور وتقدم في مجال الحاسب الآلي والعلوم الرقمية.

شاكرا ومقدرا لسعادتكم جهودكم الجبارة وخدماتكم الجليلة في ميدان التربية والتعليم، ومتمنيا لكم ولكل العاملين في هذا المجال دوام التوفيق والنجاح، في ظل النهضة الشاملة، التي تشهدها بلادنا الحبيبة بقيادة خادم الحرمين الشريفين يحفظه الله وسمو نائبه الأمين، والله يحفظكم ويرعاكم.

مقدمه

معتصم أسعد بري

04/02/2011

m_barri@hotmail.com

785-393-7117

3416 Aldrich St. Lawrence,
KS, 66047

المرفقات:

1/ صورة من الموافقة على أطروحة الدكتوراة

2/ صورة من الاستبيان

3/ صورة من الموافقة على تطبيق الدراسة من مركز الدراسات العليا والبحث العلمي في جامعة كانساس

Appendix D

An English Letter of Introduction to Medina School District Administrator

04/02/2011

Dr. Saud Hussain Alzahrani
P. O. Box 64000, Medina, Saudi Arabia

Dear Medina School District Administrator,

With my ultimate respect and appreciation to you, this is Moatasim Barri, a mathematics teacher in the College of Technology in Medina for four years, a teaching assistant in the Department of Curriculum and Instruction at University of Taibah for three years, and a holder of Master's-degree from the University of Kansas in the area of Curriculum and Teaching. Currently, I am pursuing a Ph.D. degree in education in the area of Curriculum and Instruction and I hope to complete my Ph.D. program at the University of Kansas in Lawrence within the next semesters. I appreciate your favor to help me in this effort.

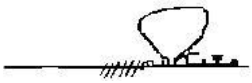
At this time, I am interested in studying the process of change in education, particularly, with regard to integrating technology into school curriculum. It is widely argued that technology offers a great job in the process of teaching and learning. Consequently, I am making it the focus of my research study.

I am requesting your help in allowing me to conduct my study at your schools and distribute a 58-item questionnaire to teachers who use high-tech classrooms in addition to conducting follow-up interviews for teachers. The questionnaire has already been approved by the Institutional Review Board at the University of Kansas. Teachers will be asked to complete the questionnaire that measures current pedagogical attitudes of school teachers toward technology implementation in the classrooms and follow-up interviews to elaborate on the quantitative results. Participation in this study is strictly voluntary. All

data relating to teachers, principals, and schools will be strictly kept confidential and private and will be used just for the purpose of the study.

Thank you a lot for your assistance and I will report the results to you as this study has been completed.

Sincerely,



Moatasim Barri
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Cell Phone no.: 785-393-7117
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Appendix E

An Arabic Letter of Introduction to Medina School District Administrator

بسم الله الرحمن الرحيم

سعادة مدير إدارة التربية والتعليم في منطقة المدينة المنورة يحفظه الله

السلام عليكم ورحمة الله وبركاته، وبعد،

مع فائق الاحترام والتقدير، أفيد سعادتكم بأنني أحد المبتعثين في الولايات المتحدة الأمريكية، من قبل جامعة طيبة في المدينة المنورة، للحصول على درجة الدكتوراه في تخصص المناهج وطرق التدريس. وحيث أنني بصدد تطبيق دراستي خلال شهر فيبراير الحالي للعام الميلادي 2011، والمتمثلة في استخدام التقنية الحديثة في تدريس المناهج الدراسية للمراحل التعليمية الثلاث، الابتدائية والمتوسطة والثانوية، ضمن مشروع المدارس الرائدة، ومشروع دمج الحاسب الآلي في المرحلتين الابتدائية والمتوسطة، ومشروع الملك عبدالله بن عبدالعزيز لتطوير التعليم العام "تطوير"، فاني أتوجه إلى سعادتكم ملتمسا مساعدتي في مخاطبة المدارس، التي تقع ضمن تلك البرامج، لتسهيل ملئ الاستبيان الخاص بهذه الدراسة، والذين يمكن أن يوزع على بعض المعلمين والمعلمات في المراحل التعليمية الثلاث، علما أن هذا الاستبيان لا يستغرق أكثر من ثلث ساعة تقريبا لملئ النقاط الواردة فيه.

وتهدف الدراسة إلى جمع معلومات تتعلق باهتمامات المعلمين والمعلمات نحو استخدام التقنية في التعليم، وكذلك على الفروق في اهتمامات أفراد الدراسة نحو توظيفهم للتقنية باختلاف خصائصهم الشخصية والوظيفية، والتعرف أيضاً على المعوقات المسببة في عدم استخدام التقنية على الوجه الأمثل، وكذلك التوصل إلى معرفة المحفزات التي تشجع على استخدام التقنية في التعليم، وأخيراً تهدف إلى التعرف على الطرق والحلول المحتملة التي ستساعد الطاقم التعليمي على تحسين استخدامهم للتقنية في مجال التدريس. هذه المعلومات يمكن أن يستفاد منها من قبل وزارة التربية والتعليم وإداراتها ومدارسها في مختلف المراحل التعليمية في بلادنا، لاسيما أن هناك توجه كبير لدي مسئولي التربية والتعليم في بلادنا نحو تعميم استخدام التقنية الحديثة في مجال التدريس، وتزويد المدارس والفصول الدراسية بالأجهزة التقنية والبرامج التعليمية الحديثة والمفيدة بالإضافة إلى الشبكات العنكبوتية، التي تخدم العملية التربوية والتعليمية. إضافة إلى ذلك، فإن الدراسة يمكن أن تضيف معلومات مفيدة في تطوير مهارات القائمين على العملية التربوية والتعليمية فيما يتعلق باستخدام الأجهزة الرقمية ومصادرها المختلفة، وهي كلها أهداف تسعى

الجهات التربوية والتعليمية في بلادنا إلى تحقيقها في سبيل إعداد بيئة تربوية وتعليمية قادرة على التعامل مع كل ما يستجد من تطور وتقدم في مجال الحاسب الآلي والعلوم الرقمية.

شاكرا ومقدرا لسعادتكم جهودكم الجبارة، وخدماتكم الجليلة في ميدان التربية والتعليم في منطقتنا العزيزة، ومتمنيا لكم ولكل العاملين في مجال التربية والتعليم دوام التوفيق والنجاح، في ظل النهضة الشاملة، التي تشهدها بلادنا الحبيبة بقيادة خادم الحرمين الشريفين يحفظه الله وسمو نائبه الأمين، والله يحفظكم ويرعاكم.

مقدمه

معتصم أسعد بري

04/02/2011

m_barri@hotmail.com

785-393-7117

3416 Aldrich St. Lawrence,
KS, 66047

Appendix F

An Arabic Statement to Medina School District from Saudi Cultural Attaché

Assistant for Academic Affairs regarding Conducting Research Study

بسم الله الرحمن الرحيم

المملكة العربية السعودية
وزارة التعليم العالي
الملحقية الثقافية بالولايات المتحدة الأمريكية

Kingdom of Saudi Arabia
Ministry of Higher Education
Cultural Mission To The U.S.A.

وزارة التعليم العالي
Ministry of Higher Education

الرقم: ٣/ ١٦١٩٧ التاريخ: ١٤٣٢/٤/٢٤ المرفقات: ــــــ

الشؤون الدراسية

إفـــــادة

تفيـــــــد الملحقيـــــة الثقافية السعودية في الولايات المتحدة الامريكيـة بـــــأن / معتصم اسعد بري (١٥٤-٥٠٤٧٨) رقم سجله المدني (١٠٠١٣٣٠٨٠٠) مبتعث للدراسة في امريكا على حساب جامعة طيبة للحصول على درجة الدكتوراة تخصص (CURRICULUM AND INSTRUCTION) منذ ٢٠٠٥/٥/٢٦م ولا يزال يواصل دراسته حتى تاريخه ، علماً بـأن مدة بعثته المقررة تنتهي في ٢٠١١/٥/٢٥م .

لقـــد أعطيت له هذه الافادة . بناء على طلبه وبدون ادنى مسئولية . لتقديمها الى إدارة التربية والتعليم بمنطقة المدينة المنورة وإستعمالها حسب الانظمة المتبعة في المملكـــة .

والله الموفـــــق ،،

مساعد الملحق الثقافي بامريكا للشـؤون الدراسيـة

د. محمد بن عبدالرحمن العمر

الملحقية الثقافية السعودية بأمريكا
الشؤون الدراسية
SAUDI ARABIAN CULTURAL MISSION
ACADEMIC AFFAIRS

س ت / د. مقادمي

2600 Virginia Ave. , N.W. Suite 800 • Washington, D.C. 20037 • (202) 337-9450 • Fax: (202) 337-2978
Web Site: www.sacm.org • E-Mail: sacmusa@sacm.org

Appendix G

An Arabic Permission Letter from Medina School District Administrator to Distribute Surveys and Conduct Research Study

المملكة العربية السعودية
وزارة التربية والتعليم
(٢٨٠)
الإدارة العامة للتربية والتعليم
بمنطقة المدينة المنورة
إدارة التخطيط والتطوير

وزارة التربية والتعليم
Ministry of Education

الرقم : ٣٢٧٠٠٠٩٤
التاريخ : ١٤٣٢/٤/٢٩هـ
المرفقات : ٠

الموضوع : تسهيل مهمة الباحث/ معتصم أسعد بري

تعميم إلى المدارس الحكومية وفق البيان المرفق

سعادة مدير / وفقه الله

سعادة مديرة/ وفقها الله

السلام عليكم ورحمة الله وبركاته .

إشارة إلى خطاب مساعد الملحق الثقافي في بأمريكا للشؤون الدراسية رقم ٣/١٦١٩٧ بتاريخ ١٤٣٢/٤/٢٤هـ المتضمن رغبة الباحث / معتصم أسعد بري في تطبيق أداة دراسته التي بعنوان " استخدام التقنية في التعليم " لمتطلبات مرحلة الدكتوراه.

عليه نأمل منكم تسهيل مهمة الباحث أو من ينوب عنه لتطبيق أدارة دراسته، ونحن على ثقة باهتمامكم بالبحث التربوي الذي يسهم في تطوير العملية التربوية والتعليمية.

وتقبلوا وافر التحية والتقدير.

المدير العام التربية والتعليم بمنطقة المدينة المنورة

د. سعود بن حسين الزهراني

صورة لمكتبنا
صورة لمساعد المدير العام للشؤون التعليمية
صورة لمساعد المدير العام للشؤون المدرسية
صورة لإدارة التخطيط والتطوير
صورة للباحث على بريد moatasim@ku.edu
صور للاتصالات

العنوان البريدي : المدينة المنورة ص.ب ٦٤٠٠٠ - هاتف مباشر : ٨٣٥٥٩٦١ - سنترال : ٨٣٥٥٩٦٢ - ٨٣٥٥٩٦٣ - فاكس : ٨٣٥٥٨٢٤
البريد الالكتروني : pd@madinaedu.gov.sa

المملكة العربية السعودية
وزارة التربية والتعليم
(٢٨٠)
الإدارة العامة للتربية والتعليم
بمنطقة المدينة المنورة
إدارة التخطيط والتطوير

وزارة التربية والتعليم
Ministry of Education

الـــرقـــم : .....
التـــاريـــخ : .....
المـرفقـات : .....

الموضوع : .....

بيان بأسماء المدارس

م	المدرسة
١	مدرسة دار الأبرار الثانوية
٢	مدرسة الأنصار الثانوية
٣	مدرسة العقيق الثانوية
٤	مدرسة الأمير عبدالمحسن الثانوية
٥	مدرسة عبدالعزيز الربيع الثانوية
٦	مدرسة عثمان بن عفان المتوسطة
٧	مدرسة أبو بكر الصديق المتوسطة
٨	مدرسة الإمام علي المتوسطة
٩	مدرسة دار التقوى الابتدائية
١٠	مدرسة النجاح الابتدائية
١١	مدرسة عبدالله بن رواحه الابتدائية
١٢	المدرسة الثانية الثانوية
١٣	المدرسة العاشرة المتوسطة
١٤	المدرسة الواحدة والثلاثون المتوسطة
١٥	المدرسة الثانية والستون الابتدائية
١٦	المدرسة الرابعة والعشرون الابتدائية

العنوان البريدي : المدينة المنورة ص.ب ٦٤٠٠٠ - هاتف مباشر : ٨٣٥٥٩٦١ - سنترال : ٨٣٥٥٩٦٢ - ٨٣٥٥٩٦٣ - فاكس : ٨٣٥٥٨٢٤
البريد الالكتروني : pd@madinaedu.gov.sa

م.مرغلاني

Appendix H

A letter of Introduction to Classroom Teachers

Dear Sir or Madam,

The Department of Curriculum and Teaching at the University of Kansas supports the practice of protection for human subjects participating in research. The following information is being provided for you to decide whether you wish to participate in the present study. You should be aware that even if you agree to participate, you are free to withdraw at any time.

We are conducting this study to better understand the current teaching concerns of Saudi teachers toward technology implementation in the classrooms. This will entail your completion of a 58-item questionnaire that will take approximately 20-25 minutes from your precious time to complete. The questionnaires will not require your name.

The content of the questionnaire should cause no more discomfort than you would experience in your everyday life. Although participation may not benefit you directly, we believe that the information obtained from this study will help us gain a better understanding of your attitudes toward technology usage in the classrooms. Your participation is solicited, although strictly voluntary. If you would like additional information concerning this study before or after it is completed, please feel free to contact us by phone, mail, or email provided to you below.

Completion of the surveys indicates your willingness to participate in this study. If you have any additional questions about your rights as a research participant, you may call +1(785) 864-7429 or +1 (785) 864-7385, or mail an inquiry to the Human Subjects Committee Lawrence (HSCL) at the University of Kansas to the following address: 2385 Irving Hill Road, Lawrence, Kansas 66045-7563, or send an inquiry electronically to the following email: mdenning@ku.edu.

Note: you are provided with a sealed envelope to enclose the responded questionnaire directly after you complete it and are asked to drop the sealed envelope in a sealed box situated in a secure place at school that is available to the researcher to pick it up at a later time; thereby your information will be kept private and confidential.

Sincerely,

Moatasim Barri, M.S.Ed.
Principal Investigator
3416 Aldrich St. Lawrence, KS, 66047
Cell-phone no.: +1 (785) 393-7117
M_barri@hotmail.com

Marc Mahlios, Ph.D.
Professor, The researcher's Advisor
Department of Curriculum and Teaching
1122 W. Campus Rd.,
Joseph R. Pearson Hall, Room 437,
University of Kansas, Lawrence, KS, 66045
Tel. no.: +1 (785) 864-9666
Mahlios@ku.edu

Appendix I

The Stages of Concern Questionnaire

SoCQ 075

Stages of Concern Questionnaire

Name (optional): _____

The purpose of this questionnaire is to determine what people who are using or thinking about using various programs are concerned about at various times during the adoption process.

The items were developed from typical responses of school and college teachers who ranged from no knowledge at all about various programs to many years' experience using them. Therefore, **many of the items on this questionnaire may appear to be of little relevance or irrelevant to you at this time.** For the completely irrelevant items, please circle "0" on the scale. Other items will represent those concerns you do have, in varying degrees of intensity, and should be marked higher on the scale.

For example:

This statement is very true of me at this time.	0	1	2	3	4	5	6	(7)
This statement is somewhat true of me now.	0	1	2	3	(4)	5	6	7
This statement is not at all true of me at this time.	0	(1)	2	3	4	5	6	7
This statement seems irrelevant to me.	(0)	1	2	3	4	5	6	7

Please respond to the items in terms of **your present concerns,** or how you feel about your involvement with **this** innovation. We do not hold to any one definition of the innovation so please think of it in terms of your own perception of what it involves. Phrases such as "this approach" and "the new system" all refer to the same innovation. Remember to respond to each item in terms of your present concerns about your involvement or potential involvement with the innovation.

Thank you for taking time to complete this task.

0	1 2	3 4 5	6 7
Irrelevant	Not true of me now	Somewhat true of me now	Very true of me now

Circle One Number For Each Item

1. I am concerned about students' attitudes toward the innovation.	0 1 2 3 4 5 6 7
2. I now know of some other approaches that might work better.	0 1 2 3 4 5 6 7
3. I am more concerned about another innovation.	0 1 2 3 4 5 6 7
4. I am concerned about not having enough time to organize myself each day.	0 1 2 3 4 5 6 7
5. I would like to help other faculty in their use of the innovation.	0 1 2 3 4 5 6 7
6. I have a very limited knowledge of the innovation.	0 1 2 3 4 5 6 7
7. I would like to know the effect of reorganization on my professional status.	0 1 2 3 4 5 6 7
8. I am concerned about conflict between my interests and my responsibilities.	0 1 2 3 4 5 6 7
9. I am concerned about revising my use of the innovation.	0 1 2 3 4 5 6 7
10. I would like to develop working relationships with both our faculty and outside faculty using this innovation.	0 1 2 3 4 5 6 7
11. I am concerned about how the innovation affects students.	0 1 2 3 4 5 6 7
12. I am not concerned about the innovation at this time.	0 1 2 3 4 5 6 7
13. I would like to know who will make the decisions in the new system.	0 1 2 3 4 5 6 7
14. I would like to discuss the possibility of using the innovation.	0 1 2 3 4 5 6 7
15. I would like to know what resources are available if we decide to adopt the innovation	0 1 2 3 4 5 6 7
16. I am concerned about my inability to manage all that the innovation requires.	0 1 2 3 4 5 6 7
17. I would like to know how my teaching or administration is supposed to change.	0 1 2 3 4 5 6 7
18. I would like to familiarize other departments or persons with the progress of this new approach.	0 1 2 3 4 5 6 7

0	1 2	3 4 5	6 7
Irrelevant	Not true of me now	Somewhat true of me now	Very true of me now

Circle One Number For Each Item

19. I am concerned about evaluating my impact on students.	0 1 2 3 4 5 6 7
20. I would like to revise the innovation's approach.	0 1 2 3 4 5 6 7
21. I am preoccupied with things other than the innovation.	0 1 2 3 4 5 6 7
22. I would like to modify our use of the innovation based on the experiences of our students.	0 1 2 3 4 5 6 7
23. I spend little time thinking about the innovation.	0 1 2 3 4 5 6 7
24. I would like to excite my students about their part in this approach.	0 1 2 3 4 5 6 7
25. I am concerned about time spent working with nonacademic problems related to the innovation.	0 1 2 3 4 5 6 7
26. I would like to know what the use of the innovation will require in the immediate future.	0 1 2 3 4 5 6 7
27. I would like to coordinate my efforts with others to maximize the innovation's effects.	0 1 2 3 4 5 6 7
28. I would like to have more information on time and energy commitments required by the innovation.	0 1 2 3 4 5 6 7
29. I would like to know what other faculty are doing in this area.	0 1 2 3 4 5 6 7
30. Currently, other priorities prevent me from focusing my attention on the innovation.	0 1 2 3 4 5 6 7
31. I would like to determine how to supplement, enhance, or replace the innovation.	0 1 2 3 4 5 6 7
32. I would like to use feedback from students to change the program.	0 1 2 3 4 5 6 7
33. I would like to know how my role will change when I am using the innovation.	0 1 2 3 4 5 6 7
34. Coordination of tasks and people is taking too much of my time.	0 1 2 3 4 5 6 7
35. I would like to know how the innovation is better than what we have now.	0 1 2 3 4 5 6 7

Appendix J

The Stages of Concern Quick Scoring Device

Stages of Concern Quick Scoring Device

The Quick Scoring Device can be used to hand score the Stages of Concern Questionnaire (SoCQ) responses and to plot an individual profile. It is especially useful when only a small number of questionnaires need to be processed or when computer processing is not available. By following the step-by-step instructions, the SoCQ responses are transferred to the device, entered into seven scales, and each scale is totaled. Then the seven raw scale score totals are translated into percentile scores and plotted on a grid to produce the individual's SoCQ profile.

Instructions

1. In the box labeled A, fill in the identifying information taken from the cover sheet of the SoCQ.
2. In the table labeled B on the Scoring Device, transcribe each of the 35 SoCQ circled responses from the questionnaire (raw data). Note that the numbered blanks are not in consecutive order.
3. Row C contains the Raw Scale Score Total for each stage (0–6). Take each of the seven columns (0–6) in Table B, add the numbers within each column, and enter the sum of each column (0–6) in the appropriate blank in Row C. Each of these seven Raw Scale Score totals is a number between 0 and 35.
4. Table D contains the percentile scores for each Stage of Concern. For example, find the Raw Scale Score Total for Stage 0 from Row C ("12" from the example) in the left-hand column in Table D, then look in the Stage 0 column to the right in Table D and circle that percentile rank ("69" in the example). Take the raw score for Stage 1 ("31" in the example) to Table D and locate that numeral in the left hand Raw Score Total column. Move across in the percentile table to the Stage 1 column and circle the percentile value ("98" in the example). Do the same for Stages 2 through 6.
5. Transcribe the circled percentile scores for each stage (0-6) from Table D to Box E. Box E now contains seven numbers between 0 and 99.
6. Box F contains the SoCQ grid. From Box E, take the percentile score for Stage 0 ("69" in the example) and mark that point with a dot on the Stage 0 vertical line of the SoCQ grid. Do the same for Stages 1–6. Connect the points to form the SoCQ profile.

You can now check your own scoring by using the blank profile sheet (see Appendix C). You will want to make copies of the blank scoring device before writing on it. Reproduce the data in the example by recording the original data from the completed SoCQ.

Date: _____

Site: _____ SS#: _____

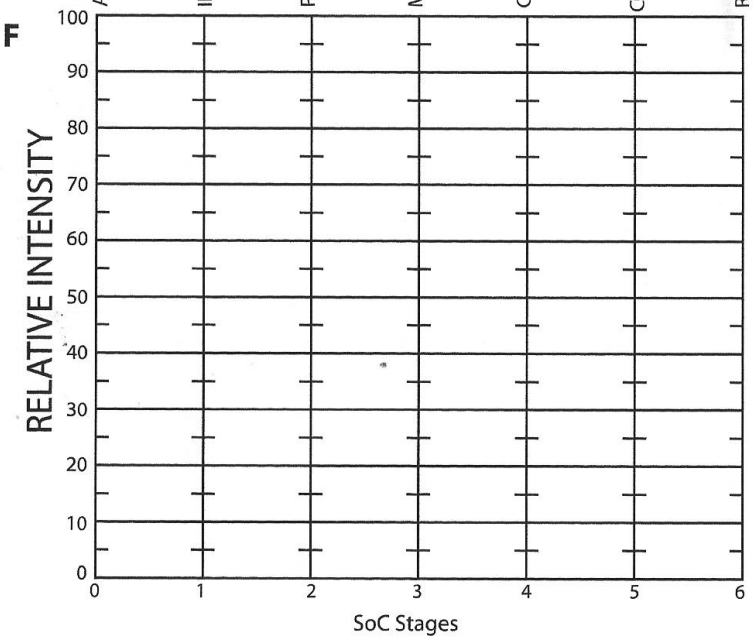
Innovation: _____

Stage	0	1	2	3	4	5	6
B	3 ___	6 ___	7 ___	4 ___	1 ___	5 ___	2 ___
	12 ___	14 ___	13 ___	8 ___	11 ___	10 ___	9 ___
	21 ___	15 ___	17 ___	16 ___	19 ___	18 ___	20 ___
	23 ___	26 ___	28 ___	25 ___	24 ___	27 ___	22 ___
	30 ___	35 ___	33 ___	34 ___	32 ___	29 ___	31 ___
Raw Score Totals **C**	___	___	___	___	___	___	___
Percentile Scores **E**	___	___	___	___	___	___	___

Five Item Raw Scale Score Total	Percentiles for:						
	Stage 0	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6
0	0	5	5	2	1	1	1
1	1	12	12	5	1	2	2
2	2	16	14	7	1	3	3
3	4	19	17	9	2	3	5
4	7	23	21	11	2	4	6
5	14	27	25	15	3	5	9
6	22	30	28	18	3	7	11
7	31	34	31	23	4	9	14
8	40	37	35	27	5	10	17
9	48	40	39	30	5	12	20
10	55	43	41	34	7	14	22
11	61	45	45	39	8	16	26
12	69	48	48	43	9	19	30
13	75	51	52	47	11	22	34
14	81	54	55	52	13	25	38
15	87	57	57	56	16	28	42
16	91	60	59	60	19	31	47
17	94	63	63	65	21	36	52
18	96	66	67	69	24	40	57
19	97	69	70	73	27	44	60
20	98	72	72	77	30	48	65
21	99	75	76	80	33	52	69
22	99	80	78	83	38	55	73
23	99	84	80	85	43	59	77
24	99	88	83	88	48	64	81
25	99	90	85	90	54	68	84
26	99	91	87	92	59	72	87
27	99	93	89	94	63	76	90
28	99	95	91	95	66	80	92
29	99	96	92	97	71	84	94
30	99	97	94	97	76	88	96
31	99	98	95	98	82	91	97
32	99	99	96	98	86	93	98
33	99	99	96	99	90	95	99
34	99	99	97	99	92	97	99
35	99	99	99	99	96	98	99

Concerns Based Systems International

F



Appendix K

The Arabic-Translated Stages of Concern Questionnaire

Original Statements	Arabic-Translated Statements
1. I am concerned about students' attitudes toward the innovation.	اهتم بمواقف الطلاب نحو الابتكار.
2. I now know of some other approaches that might work better.	أعرف حالياً أساليب أخرى قد تعمل بشكل افضل.
3. I am more concerned about another innovation.	أنا مهتم كثيراً بابتكار آخر.
4. I am concerned about not having enough time to organize myself each day.	أنا قلق بخصوص عدم وجود وقت كاف لتنظيم نفسي كل يوم.
5. I would like to help other faculty in their use of the innovation.	أرغب في مساعدة المعلمين الأخرين في استخدامهم للابتكار.
6. I have a very limited knowledge of the innovation.	لدي معلومات محدودة جداً عن الابتكار.
7. I would like to know the effect of reorganization on my professional status.	أرغب في معرفة أثر إعادة التنظيم على وضعي المهني.
8. I am concerned about conflict between my interests and my responsibilities.	أنا قلق بخصوص التعارض بين اهتماماتي ومسؤلياتي.
9. I am concerned about revising my use of the innovation.	أنا مهتم بتعديل استخدامي للابتكار.
10. I would like to develop working relationships with both our faculty and outside faculty using this innovation.	أرغب في اقامة علاقات عمل مع طاقم التعليم الخاص بنا وطاقم تعليم من الخارج يستخدم هذا الابتكار.
11. I am concerned about how the innovation affects students.	أنا مهتم بكيفية تأثير الابتكار على الطلاب.
12. I am not concerned about the innovation at this time.	أنا لا اهتم بالابتكار في الوقت الحالي.
13. I would like to know who will make the decisions in the new system.	أرغب في معرفة من سيضع القرارات في النظام الجديد.
14. I would like to discuss the possibility of using the innovation.	أرغب في المناقشة حول امكانية استخدام الابتكار.
15. I would like to know what resources are available if we decide to adopt the innovation.	أرغب في معرفة المصادر التعليمية المتوفرة في حال قررنا تبني الابتكار.
16. I am concerned about my inability to manage all that the innovation requires.	أنا قلق لعدم قدرتي على إدارة كل ما يتطلبه الابتكار.
17. I would like to know how my teaching or administration is supposed to change.	أرغب في معرفة كيف سيتغير تدريسي أو إدارتي.
18. I would like to familiarize other departments or persons with the progress of this new approach.	أرغب في المام الأقسام الأخرى أو الأشخاص الآخرين بتقدم هذا الاسلوب الجديد.
19. I am concerned about evaluating my impact on students.	أنا مهتم بتقييم أثري على الطلاب.
20. I would like to revise the innovation's approach.	أرغب في تعديل أسلوب هذا الابتكار.

Original Statements	Arabic-Translated Statements
21. I am preoccupied with things other than the innovation.	أنا مشغول بأشياء علاوة على الابتكار.
22. I would like to modify our use of the innovation based on the experiences of our students.	أرغب في تغيير استخدامنا للابتكار بناءً على خبرات طلابنا.
23. I spend little time thinking about the innovation.	أقضي وقتاً قليلاً للتفكير حول الابتكار.
24. I would like to excite my students about their part in this approach.	أرغب في استثارة طلابي حول دورهم في هذا الاسلوب.
25. I am concerned about time spent working with nonacademic problems related to the innovation.	أنا قلق بشأن الوقت المبذول في العمل مع المشكلات الغير تعليمية المتعلقة بالابتكار.
26. I would like to know what the use of the innovation will require in the immediate future.	أرغب في معرفة ما سيتطلبه استخدام الابتكار في المستقبل العاجل.
27. I would like to coordinate my efforts with others to maximize the innovation's effects.	أرغب في تنسيق جهودي مع الاخرين لزيادة آثار الابتكار.
28. I would like to have more information on time and energy commitments required by the innovation.	أرغب في الحصول على المزيد من المعلومات عن الالتزامات الخاصة بالوقت والجهد المطلوبة من قبل الابتكار.
29. I would like to know what other faculty are doing in this area.	أرغب في معرفة ما يفعله المعلمون الآخرون في هذا المجال.
30. Currently, other priorities prevent me from focusing my attention on the innovation.	حالياً أولويات أخرى تمنعني من تركيز انتباهي على الابتكار.
31. I would like to determine how to supplement, enhance, or replace the innovation.	أرغب في تحديد كيفية اتمام أو تعزيز أو استبدال الابتكار.
32. I would like to use feedback from students to change the program.	أرغب في استخدام التغذية الراجعة من الطلاب لعمل تغييرات في البرنامج.
33. I would like to know how my role will change when I am using the innovation.	أرغب في معرفة كيف سيتغير دوري عندما استخدم الابتكار.
34. Coordination of tasks and people is taking too much of my time.	تنسيق المهام والأشخاص يأخذ الكثير من وقتي.
35. I would like to know how the innovation is better than what we have now.	أرغب في معرفة كيف يكون هذا الابتكار افضل مما لدينا حالياً.

Appendix L

The Back-Translated Stages of Concern Questionnaire

Back-Translated Statements	Arabic-Translated Statements	
I am concerned about students' attitudes to the innovation.	اهتم بمواقف الطلاب نحو الابتكار	1
I currently know about other methods that may work better.	أعرف حالياً أساليب أخرى قد تعمل بشكل أفضل.	2
I am very concerned about another innovation.	أنا مهتم كثيراً بابتكار آخر.	3
I am concerned about not having enough time to organize myself every day.	أنا قلق بخصوص عدم وجود وقت كاف لتنظيم نفسي كل يوم.	4
I would like to help other faculty in their use of the innovation.	أرغب في مساعدة المعلمين الأخرين في استخدامهم للابتكار.	5
I have very limited knowledge about the innovation.	لدي معلومات محدودة جداً حول الابتكار.	6
I would like to know the effect of the reorganization on my occupational status.	أرغب في معرفة إعادة التنظيم على وضعي المهني.	7
I am concerned about the conflict between my interests and responsibilities.	أنا قلق بخصوص التعارض بين اهتماماتي ومسؤلياتي.	8
I am concerned about revising my use of innovation.	أنا مهتم بتعديل استخدامي للابتكار.	9
I would like to establish work relationships with our faculty and outside faculty that use this innovation.	أرغب في اقامة علاقات عمل مع طاقم التعليم الخاص بنا وطاقم تعليم من الخارج يستخدم هذا الابتكار.	10
I am concerned about the effect of the innovation on students.	أنا مهتم بكيفية تأثير الابتكار على الطلاب	11
I am not concerned with the innovation currently.	أنا لا اهتم بالابتكار في الوقت الحالي.	12
I would like to know who will place decisions in the new system.	أرغب في معرفة من سيضع القرارات في النظام الجديد.	13
I would like to discuss the possibility of using the innovation.	أرغب في المناقشة حول امكانية استخدام الابتكار.	14
I would like to know the available learning resources if we decide to use the innovation.	أرغب في معرفة مصادر التعلم المتوفرة في حال قررنا استخدام الابتكار.	15
I am concerned about my inability to manage all what the innovation requires.	أنا قلق لعدم قدرتي على إدارة كل ما يتطلبه الابتكار.	16
I would like to know how my teaching or managing would change.	أرغب في معرفة كيف سيتغير تدريسي أو إدارتي.	17
I would like to familiarize other departments or persons about the advance of the new approach.	أرغب في إلمام الأقسام الأخرى أو الأشخاص الآخرين بتقدم هذا الاسلوب الجديد.	18
I am concerned about evaluating my affect on students.	أنا مهتم بتقييم أثري على الطلاب.	19
I would like to revise the approach of the innovation.	أرغب في تعديل أسلوب هذا الابتكار.	20

Back-Translated Statements	Arabic-Translated Statements	
I am currently preoccupied with things other than innovation.	أنا مشغول بأشياء علاوة على الابتكار.	21
I would like to modify our use of the innovation based on students' experiences.	أرغب في تعديل استخدامنا للابتكار بناءً على خبرات طلابنا.	22
I spend little time to think about the innovation.	أقضي وقتاً قليلاً للتفكير حول الابتكار.	23
I would like to excite my students about their role in this approach.	أرغب في استثارة طلابي حول دورهم في هذا الاسلوب.	24
I am concerned about the time spent to resolve non-academic problems related to the innovation.	أنا قلق بالنسبة للوقت المبذول في العمل مع المشكلات الغير تعليمية المتعلقة بالابتكار.	25
I would like to know what the innovation requires in the near future.	أرغب في معرفة ما سيتطلبه استخدام الابتكار في المستقبل العاجل.	26
I would like to coordinate my efforts with others to increase the effects of the innovation.	أرغب في تنسيق جهودي مع الاخرين لزيادة آثار الابتكار.	27
I would like to acquire more information about time and effort commitments required by the innovation.	أرغب في الحصول على المزيد من المعلومات عن الالتزامات الخاصة بالوقت والجهد المطلوبة من قبل الابتكار.	28
I would like to know what other faculty do in this field.	أرغب في معرفة ما يفعله المعلمون الآخرون في هذا المجال.	29
Currently, other priorities are distracting me from concentrating on the innovation.	حالياً أولويات أخرى تمنعني من تركيز انتباهي على الابتكار.	30
I would like to determine how to complete, improve or replace the innovation.	أرغب في تحديد كيفية اتمام أو تعزيز أو استبدال الابتكار.	31
I would like to employ students' feedback to change the program.	أرغب في استخدام التغذية الراجعة من الطلاب لعمل تغييرات في البرنامج	32
I would like to know how my role would change when I use the innovation.	أرغب في معرفة كيف سيتغير دوري عندما استخدم الابتكار.	33
Coordination of tasks and people takes a lot of my time.	تنسيق المهام والأشخاص يأخذ الكثير من وقتي.	34
I would like to know how the innovation would be better than what we have currently.	أرغب في معرفة كيف يكون هذا الابتكار افضل مما لدينا حالياً.	35

Appendix M

Back-Translated Statements vs. Original Statements of the Stages of Concern

	Back-Translated Statements	Original Statements
1	I am concerned about students' attitudes to the innovation.	I am concerned about students' attitudes toward the innovation.
2	I currently know about other methods that may work better.	I now know of some other approaches that might work better.
3	I am very concerned about another innovation.	I am more concerned about another innovation.
4	I am concerned about not having enough time to organize myself every day.	I am concerned about not having enough time to organize myself each day.
5	I would like to help other faculty in their use of the innovation.	I would like to help other faculty in their use of the innovation.
6	I have very limited knowledge about the innovation.	I have a very limited knowledge of the innovation.
7	I would like to know the effect of reorganization on my occupational status.	I would like to know the effect of reorganization on my professional status.
8	I am concerned about the conflict between my interests and responsibilities.	I am concerned about conflict between my interests and my responsibilities.
9	I am concerned about revising my use of the innovation.	I am concerned about revising my use of the innovation.
10	I would like to establish work relationships with our faculty and outside faculty that use this innovation.	I would like to develop working relationships with both our faculty and outside faculty using this innovation.
11	I am concerned about the effect of the innovation on students.	I am concerned about how the innovation affects students.
12	I am not concerned about the innovation currently.	I am not concerned about the innovation at this time.
13	I would like to know who will place decisions in the new system.	I would like to know who will make the decisions in the new system.
14	I would like to discuss the possibility of using the innovation.	I would like to discuss the possibility of using the innovation.
15	I would like to know the available learning resources if we decide to use the innovation.	I would like to know what resources are available if we decide to adopt the innovation.
16	I am concerned about my inability to manage all what the innovation requires.	I am concerned about my inability to manage all that the innovation requires.
17	I would like to know how my teaching or management would change.	I would like to know how my teaching or administration is supposed to change.
18	I would like to familiarize other departments or persons about the advance of the new approach.	I would like to familiarize other departments or persons with the progress of this new approach.
19	I am concerned about evaluating my effect on students.	I am concerned about evaluating my impact on students.

	Back-Translated Statements	Original Statements
20	I would like to revise the approach of the innovation.	I would like to revise the innovation's approach.
21	I am preoccupied with things other than innovation.	I am preoccupied with things other than the innovation.
22	I would like to change our use of the innovation based on students' experiences.	I would like to modify our use of the innovation based on the experiences of our students.
23	I spend little time to think about the innovation.	I spend little time thinking about the innovation.
24	I would like to excite my students about their role in this approach.	I would like to excite my students about their part in this approach.
25	I am concerned about the time spent to resolve non-academic problems related to the innovation.	I am concerned about time spent working with nonacademic problems related to the innovation.
26	I would like to know what the innovation will require in the near future.	I would like to know what the use of the innovation will require in the immediate future.
27	I would like to coordinate my efforts with others to increase the effects of the innovation.	I would like to coordinate my efforts with others to maximize the innovation's effects.
28	I would like to acquire more information about time and effort commitments required by the innovation.	I would like to have more information on time and energy commitments required by the innovation.
29	I would like to know what other faculty do in this field.	I would like to know what other faculty are doing in this area.
30	Currently, other priorities are distracting me from concentrating on the innovation.	Currently, other priorities prevent me from focusing my attention on the innovation.
31	I would like to determine how to complete, improve or replace the innovation.	I would like to determine how to supplement, enhance, or replace the innovation.
32	I would like to employ students' feedback to change the program.	I would like to use feedback from students to change the program.
33	I would like to know how my role would change when I use the innovation.	I would like to know how my role will change when I am using the innovation.
34	Coordination of tasks and people takes a lot of my time.	Coordination of tasks and people is taking too much of my time.
35	I would like to know how the innovation is better than what we have currently.	I would like to know how the innovation is better than what we have now.

Appendix N

The Original vs. the Modified Statements of the Stages of Concern Questionnaire

(English Version)

	Original Statements	Statements After Modification
1.	I am concerned about students' attitudes toward **the innovation**.	I am concerned about students' attitudes toward **the use of technology in teaching.**
2.	I now know of some other approaches that might work better.	I now know of some other approaches that might work better **than the use of technology in teaching.**
3.	I am more concerned about another **innovation**.	I am more concerned about another program **rather than the program of technology use in teaching.**
4.	I am concerned about not having enough time to organize myself each day.	I am concerned about not having enough time to organize myself each day **in which I use technology.**
5.	I would like to help other faculty in their use of **the innovation**.	I would like to help other faculty in their use of **technology in teaching.**
6.	I have a very limited knowledge of **the innovation.**	I have a very limited knowledge of **the use of technology in teaching.**
7.	I would like to know the effect of **reorganization** on my professional status.	I would like to know the effect of **the use of technology in teaching** on my professional status.
8.	I am concerned about conflict between my interests and my responsibilities.	I am concerned about conflict between my interests and my responsibilities **when I am using technology in teaching**.
9.	I am concerned about revising my use of **the innovation**.	I am concerned about revising my use of **technology in teaching.**
10.	I would like to develop working relationships with both our faculty and outside faculty using **this innovation**.	I would like to develop working relationships with both our faculty and outside faculty using **technology in teaching.**
11.	I am concerned about how the **innovation** affects students.	I am concerned about how the **use of technology in teaching** affects students.
12.	I am not concerned about the **innovation** at this time.	I am not concerned about the **use of technology in teaching** at this time.
13.	I would like to know who will make the decisions in the **new system**.	I would like to know who will make the decisions in the **use of technology in teaching.**
14.	I would like to discuss the possibility of using **the innovation**.	I would like to discuss the possibility of using **technology in teaching**.
15.	I would like to know what resources are available if we decide to adopt **the innovation**.	I would like to know what resources are available if we decide to adopt **technology in teaching.**

	Original Statements	Statements After Modification
16.	I am concerned about my inability to manage all that **the innovation** requires.	I am concerned about my inability to manage all that **the use of technology in teaching** requires.
17.	I would like to know how my teaching or administration is supposed to change.	I would like to know how my teaching or administration is supposed to change **in case I decide using technology in teaching.**
18.	I would like to familiarize other **departments** or **persons** with the progress of **this new approach.**	I would like to familiarize other **schools** or **teachers** with the progress of **the use of technology in teaching.**
19.	I am concerned about evaluating my impact on students.	I am concerned about evaluating my impact on students **when I am using technology in teaching.**
20.	I would like to revise the **innovation's approach.**	I would like to revise the **approach of the use of technology in teaching.**
21.	I am preoccupied with things other than the **innovation**.	I am preoccupied with things other than the **use of technology in teaching.**
22.	I would like to modify our use of the **innovation** based on the experiences of our students.	I would like to modify our use of **technology in teaching** based on the experiences of our students.
23.	I spend little time thinking about the **innovation.**	I spend little time thinking about the **use of technology in teaching.**
24.	I would like to excite my students about their part in **this approach**.	I would like to excite my students about their part in the **use of technology in teaching.**
25.	I am concerned about time spent working with nonacademic problems related to the **innovation**.	I am concerned about time spent working with nonacademic problems related to the **use of technology in teaching.**
26.	I would like to know what the use of the **innovation** will require in the immediate future.	I would like to know what the use of **technology in teaching** will require in the immediate future.
27.	I would like to coordinate my efforts with others to maximize the **innovation's** effects.	I would like to coordinate my efforts with others to maximize the effects of the **use of technology in teaching.**
28.	I would like to have more information on time and energy commitments required by the **innovation**.	I would like to have more information on time and energy commitments required by the **use of technology in teaching.**
29.	I would like to know what other faculty are doing in **this** area.	I would like to know what other faculty are doing in the area **of the use of technology in teaching.**

	Original Statements	Statements After Modification
30.	Currently, other priorities prevent me from focusing my attention on the **innovation**.	Currently, other priorities prevent me from focusing my attention on the **use of technology in teaching.**
31.	I would like to determine how to supplement, enhance, or replace **the innovation.**	I would like to determine how to supplement **or** enhance **the use of technology in teaching** or **how to** replace **it with another thing better.**
32.	I would like to use feedback from students to change the program.	I would like to use feedback from students to change the program **of technology use in teaching.**
33.	I would like to know how my role will change when I am using the innovation.	I would like to know how my role will change when I am using **technology in teaching.**
34.	Coordination of tasks and people is taking too much of my time.	Coordination of tasks and people is taking too much of my time **when I am using technology in teaching.**
35.	I would like to know how the **innovation** is better than what we have now.	I would like to know how the **use of technology in teaching** is better than what we have now.

Appendix O

The Research Study Instrument

(English Version)

In the Name of God, Most Gracious, Most Merciful

Peace, Mercy, and blessings of God be upon you,

Dear classroom teacher, I would like to thank you in advance for your great cooperation in completing this study which aims to identify teachers' concerns towards the use of technology in teaching and also any significant differences in their concerns among different demographic characteristics such as gender and type of school program. In addition, the study is in search of factors that make difficulties for effective technology integration to take place inside of the classroom and other factors that stimulate teachers to integrate technology into their teaching. The most important thing that I would like to notify you is that your participation in this study is strictly voluntary and all data relating to you will be strictly kept confidential and private and will be used just for the purpose of the study.

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Demographic Information

1.	Gender: ☐ Male ☐ Female
2.	Type of School Program: ☐ Tatweer ☐ Alraeda ☐ Regular
3.	Grade Level: ☐ Elementary ☐ Intermediate ☐ Secondary
4.	Subject Area Taught: ☐ Science (Mathematics, Physics, Biology, Chemistry, Geology, Ecology) ☐ Humanities (Social Studies, Islamic Studies, Arabic Language, English Language, Sociology) ☐ Social Science (Health & Physical Education, Art Education, Family Education, Vocational Education, National Education, Educational Psychology, Life Skills, Library and Search, Special Education, Accounting, Principles of Economics, Principles of Administration) ☐ Elementary Multiple Subjects
5.	In your use of technology in the classroom, do you consider yourself to be a: ☐ Nonuser ☐ Beginning User ☐ Intermediate User ☐ Advanced User
6.	How long have you been involved in teaching with technology, not counting this year? ☐ Never ☐ 1 year ☐ 2 years ☐ 3 years ☐ 4 years ☐ 5 or more
7.	Have you received formal training regarding technology implementation in the classrooms? ☐ No ☐ Yes

Next are two separate lists with different purposes, the first list involves 6 most common incentives that stimulate classroom teachers to employ technology in the educational process and the second one involves 10 most common factors that make difficulties for teachers to effectively use technology in their teaching. Please, read each item carefully and circle a number based on the following scale:

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1	2	3	4	5

Incentive	Scale				
9. Technology enables students to acquire basic computer skills.	1	2	3	4	5
10. Technology improves the teaching and learning process.	1	2	3	4	5
11. Technology helps save time and effort in the teaching process.	1	2	3	4	5
12. Technology motivates students to learn in new ways.	1	2	3	4	5
13. Technology provides a mean of expanding and applying what has been taught in the classroom.	1	2	3	4	5
14. School administration encourages teachers to use technology in their teaching.	1	2	3	4	5

Barrier	Scale				
15. Insufficiency of technology-based training programs	1	2	3	4	5
16. Weakness of technology-based training programs	1	2	3	4	5
17. Lack of coursework in technology within the teacher education program	1	2	3	4	5
18. Insufficient and inappropriate time to learn how to properly use technology in teaching	1	2	3	4	5
19. Lots of broken-down technology equipment	1	2	3	4	5
20. Lack of technology equipment in school	1	2	3	4	5
21. Oldness of technology equipment	1	2	3	4	5
22. The difficulty of managing a classroom enhanced with technology equipment	1	2	3	4	5
23. A large number of students included in the computer lab or learning resources center	1	2	3	4	5
24. The difficulty of assessing students learning resulting from the use of technology in the classroom	1	2	3	4	5

The purpose of this questionnaire is to determine your present concerns toward the use of technology in teaching. Please, read each item carefully and then circle one number (a degree of intensify) that determines your present concern to that item. Remember to respond to each item in terms of your present concerns about your involvement, potential involvement, no involvement with the use of technology in teaching.

0	1 2	3 4 5	6 7
Irrelevant	Not true of me now	Somewhat true of me now	Very true of me now

Circle One Number For Each Item

1. I am concerned about students' attitudes toward the use of technology in teaching.	0	1	2	3	4	5	6	7
2. I now know of some other approaches that might work better than the use of technology in teaching.	0	1	2	3	4	5	6	7
3. I am more concerned about another program rather than the program of technology use in teaching.	0	1	2	3	4	5	6	7
4. I am concerned about not having enough time to organize myself each day in which I use technology.	0	1	2	3	4	5	6	7
5. I would like to help other faculty in their use of technology in teaching.	0	1	2	3	4	5	6	7
6. I have a very limited knowledge of the use of technology in teaching.	0	1	2	3	4	5	6	7
7. I would like to know the effect of the use of technology in teaching on my professional status.	0	1	2	3	4	5	6	7
8. I am concerned about conflict between my interests and my responsibilities when I am using technology in teaching.	0	1	2	3	4	5	6	7
9. I am concerned about revising my use of technology in teaching.	0	1	2	3	4	5	6	7
10. I would like to develop working relationships with both our faculty and outside faculty using technology in teaching.	0	1	2	3	4	5	6	7
11. I am concerned about how the use of technology in teaching affects students.	0	1	2	3	4	5	6	7
12. I am not concerned about the use of technology in teaching at this time.	0	1	2	3	4	5	6	7
13. I would like to know who will make the decisions in the use of technology in teaching.	0	1	2	3	4	5	6	7
14. I would like to discuss the possibility of using technology in teaching.	0	1	2	3	4	5	6	7
15. I would like to know what resources are available if we decide to adopt technology in teaching.	0	1	2	3	4	5	6	7
16. I am concerned about my inability to manage all that the use of technology in teaching requires.	0	1	2	3	4	5	6	7

0	1 2	3 4 5	6 7
Irrelevant	Not true of me now	Somewhat true of me now	Very true of me now

Circle One Number For Each Item

17. I would like to know how my teaching or administration is supposed to change in case I decide using technology in teaching.	0	1	2	3	4	5	6	7
18. I would like to familiarize other schools or teachers with the progress of the use of technology in teaching.	0	1	2	3	4	5	6	7
19. I am concerned about evaluating my impact on students when I am using technology in teaching.	0	1	2	3	4	5	6	7
20. I would like to revise the approach of the use of technology in teaching.	0	1	2	3	4	5	6	7
21. I am preoccupied with things other than the use of technology in teaching.	0	1	2	3	4	5	6	7
22. I would like to modify our use of technology in teaching based on the experiences of our students.	0	1	2	3	4	5	6	7
23. I spend little time thinking about the use of technology in teaching.	0	1	2	3	4	5	6	7
24. I would like to excite my students about their part in the use of technology in teaching.	0	1	2	3	4	5	6	7
25. I am concerned about time spent working with nonacademic problems related to the use of technology in teaching.	0	1	2	3	4	5	6	7
26. I would like to know what the use of technology in teaching will require in the immediate future.	0	1	2	3	4	5	6	7
27. I would like to coordinate my efforts with others to maximize the effects of the use of technology in teaching.	0	1	2	3	4	5	6	7
28. I would like to have more information on time and energy commitments required by the use of technology in teaching.	0	1	2	3	4	5	6	7
29. I would like to know what other faculty are doing in the area of the use of technology in teaching.	0	1	2	3	4	5	6	7
30. Currently, other priorities prevent me from focusing my attention on the use of technology in teaching.	0	1	2	3	4	5	6	7
31. I would like to determine how to supplement or enhance the use of technology in teaching or how to replace it with another thing better.	0	1	2	3	4	5	6	7
32. I would like to use feedback from students to change the program of technology use in teaching.	0	1	2	3	4	5	6	7
33. I would like to know how my role will change when I am using technology in teaching.	0	1	2	3	4	5	6	7
34. Coordination of tasks and people is taking too much of my time when I am using technology in teaching.	0	1	2	3	4	5	6	7
35. I would like to know how the use of technology in teaching is better than what we have now.	0	1	2	3	4	5	6	7

Appendix P

Research Study Instrument

(Arabic Version for Male Teachers)

بسم الله الرحمن الرحيم

السلام عليكم ورحمة الله وبركاته **وبعد**

أخي المعلم أحب أن أشكر لك مقدماً حسن تعاونك في إتمام هذه الدراسة، والتي تهدف إلى التعرف على اهتمامات معلمي ومعلمات المدارس بمنطقة المدينة المنورة نحو استخدامهم للتقنية في التعليم، وكذلك على الفروق في اهتمامات أفراد الدراسة نحو توظيفهم للتقنية باختلاف خصائصهم الشخصية والوظيفية، وأيضاً المعوقات التي تواجه المعلمين والمعلمات أثناء استخدامهم التقنية في العملية التعليمية وأخيراً تهدف إلى التعرف على المحفزات التي تدفعهم نحو استخدامها. كما أحب أن أنوه بأن المعلومات المقدمة لهذه الدراسة سوف تعامل بسرية تامة ولن تستخدم إلا لأغراض البحث العلمي فقط.

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المعلومات الشخصية والوظيفية

1. الجنس: ☐ ذكر ☐ أنثى
2. نوع البرنامج المدرسي: ☐ الرائدة ☐ تطوير ☐ عادي
3. المرحلة الدراسية التي تقوم بتدريسها: ☐ إبتدائي ☐ متوسط ☐ ثانوي
4. المنهج الدراسي الذي تقوم بتدريسه: ----------
5. بناءً على إستخدامك التقنية في التعليم، هل ترى نفسك كـ: ☐ غير مستخدم ☐ مبتدئ ☐ متوسط ☐ متقدم
6. كم عدد السنوات التي قضيتها وانت تستخدم التقنية في التعليم؟ ----------
7. هل تلقيت أي تدريب رسمي في مجال استخدام التقنية في التعليم؟ ☐ نعم ☐ لا

فيما يلي قائمة بالمحفزات التي تدعوا المعلمين لتوظيف التقنية في العملية التعليمية وقائمة أخرى بالمعوقات التي تواجه المعلمين أثناء استخدامهم التقنية في العملية التعليمية. الرجاء قراءة كل عبارة ومن ثم وضع دائرة حول الرقم الذي يحدد درجة موافقتك لها.

غير موافق بشدة	غير موافق	لا رأي لي	موافق	موافق بشدة
1	2	3	4	5

.1	استخدام التقنية في التعليم يُمَكّن الطلاب على اكتساب مهارات الحاسب الآلي الأساسية.	1	2	3	4	5
.2	استخدام التقنية يحسن عملية التعلم.	1	2	3	4	5
.3	استخدام التقنية يساعد على توفير الجهد والوقت في العملية التعليمية.	1	2	3	4	5
.4	استخدام التقنية في التعليم يثير الدافعية لدى الطلاب نحو التعلم.	1	2	3	4	5
.5	استخدام التقنية يساعد على توسيع ما تم تعلمه في الصف الدراسي وتطبيقه عملياً.	1	2	3	4	5
.6	إدارة المدرسة عامل مساعد في استخدام التقنية في التعليم.	1	2	3	4	5
.7	البرامج التدريبية المقدمة في مجال استخدام التقنية في التعليم ليست كافية.	1	2	3	4	5
.8	البرامج التدريبية المقدمة في مجال استخدام التقنية في التعليم ضعيفة.	1	2	3	4	5
.9	المقررات الدراسية المختصة باستخدام التقنية في التعليم ضمن برنامج إعداد المعلمين ليست كافية.	1	2	3	4	5
.10	عدم وجود الوقت الكافي والملائم للتعلم على استخدام التقنية في التعليم بشكل جيد.	1	2	3	4	5
.11	كثرة الأعطال عائق في استخدام التقنية في العملية التعليمية.	1	2	3	4	5
.12	التجهيزات التقنية المتوفرة حالياً في المدرسة ليست كافية.	1	2	3	4	5
.13	الأجهزة والبرامج التقنية المتوفرة حالياً في المدرسة قديمة ولا تعمل بشكل جيد.	1	2	3	4	5
.14	صعوبة إدارة الفصل المدعوم بالتقنية.	1	2	3	4	5
.15	كثرة عدد الطلاب عائق في استخدام التقنية داخل معمل الحاسب الآلي.	1	2	3	4	5
.16	أجد صعوبة في قياس وتقويم تعلم الطلاب الناتج عن استخدام التقنية.	1	2	3	4	5

يهدف هذا الاستبيان إلى التعرُّف على اهتماماتك الحالية نحو استخدامك للتقنية في العملية التعليمية. الرجاء قراءة كل عبارة بتمعن كامل ومن ثم اختيار الرقم الذي تراه مناسباً في تحديد درجة اهتمامك لها. تذكر أن تكون اختياراتك تعبَر عن وضعك الحالي.

لا تنطبق عليَ البتة	لا تنطبق عليَ الآن	تنطبق عليَ إلى حد ما الآن	تنطبق عليَ تماماً الآن
0	1 2	3 4 5	6 7

ضع دائرة حول رقم واحد فقط

.1	اهتم بمواقف الطلاب نحو استخدام التقنية في التعليم.	0	1	2	3	4	5	6	7
.2	أعرف حالياً أساليب أخرى قد تعمل بشكل أفضل من استخدام التقنية في التعليم.	0	1	2	3	4	5	6	7
.3	أنا مهتم كثيراً ببرنامج آخر غير برنامج استخدام التقنية في التعليم.	0	1	2	3	4	5	6	7
.4	أنا قلق لعدم وجود وقت كاف لتنظيم نفسي كل يوم استخدم فيه التقنية.	0	1	2	3	4	5	6	7
.5	أرغب في مساعدة المعلمين الآخرين في استخدامهم للتقنية في التعليم.	0	1	2	3	4	5	6	7
.6	لدي معلومات محدودة جداً حول استخدام التقنية في التعليم.	0	1	2	3	4	5	6	7
7	أرغب في معرفة أثر استخدام التقنية في التعليم على وضعي المهني.	0	1	2	3	4	5	6	7
8	أنا قلق بخصوص التعارض بين اهتماماتي ومسؤولياتي عندما استخدم التقنية في التعليم.	0	1	2	3	4	5	6	7
9	أنا مهتم بتعديل استخدامي للتقنية في التعليم.	0	1	2	3	4	5	6	7
10	أرغب في إقامة علاقات عمل مع طاقم التعليم الخاص بنا وطاقم تعليم من الخارج يستخدم التقنية في التعليم.	0	1	2	3	4	5	6	7
11	أنا مهتم بكيفية تأثير استخدام التقنية في التعليم على الطلاب.	0	1	2	3	4	5	6	7
12	أنا لا اهتم باستخدام التقنية في التعليم في الوقت الحالي.	0	1	2	3	4	5	6	7
13	أرغب في معرفة من سيضع القرارات بخصوص استخدام التقنية في التعليم.	0	1	2	3	4	5	6	7
14	أرغب في المناقشة حول إمكانية استخدام التقنية في التعليم.	0	1	2	3	4	5	6	7
15	أرغب في معرفة مصادر التعلم المتوفرة في حال قررنا تبني التقنية في التعليم.	0	1	2	3	4	5	6	7
16	أنا قلق لعدم قدرتي على إدارة كل ما يتطلبه استخدام التقنية في التعليم.	0	1	2	3	4	5	6	7
17	أرغب في معرفة كيف سيتغير تدريسي أو إدارتي في حال قررت استخدام التقنية في التعليم.	0	1	2	3	4	5	6	7

لا تنطبق عليَ البتة	لا تنطبق عليَ الآن	تنطبق عليَ إلى حد ما الآن	تنطبق عليَ تماماً الآن
0	1 2	3 4 5	6 7

ضع دائرة حول رقم واحد فقط

18	أرغب في إلمام المدارس الأخرى أو المعلمين الآخرين بتقدم استخدام التقنية في التعليم.	0	1	2	3	4	5	6	7
19	اهتم بتقييم أثري على الطلاب عندما استخدم التقنية في التعليم.	0	1	2	3	4	5	6	7
20	أرغب في تعديل أسلوب استخدام التقنية في التعليم.	0	1	2	3	4	5	6	7
21	أنا مشغول بأشياء علاوة على استخدام التقنية في التعليم.	0	1	2	3	4	5	6	7
22	أرغب في تعديل استخدامنا للتقنية في التعليم بناءً على خبرات طلابنا.	0	1	2	3	4	5	6	7
23	أقضي وقتاً قليلاً للتفكير حول استخدام التقنية في التعليم.	0	1	2	3	4	5	6	7
24	أرغب في استثارة طلابي حول دورهم في استخدام التقنية في التعليم.	0	1	2	3	4	5	6	7
25	أنا قلق بالنسبة للوقت المبذول في العمل مع المشكلات الغير تعليمية المتعلقة باستخدام التقنية في التعليم.	0	1	2	3	4	5	6	7
26	أرغب في معرفة ما سيتطلبه استخدام التقنية في التعليم في المستقبل العاجل.	0	1	2	3	4	5	6	7
27	أرغب في تنسيق جهودي مع الآخرين لزيادة آثاراستخدام التقنية في التعليم.	0	1	2	3	4	5	6	7
28	أرغب في الحصول على المزيد من المعلومات عن الالتزامات الخاصة بالوقت والجهد المطلوبة من قبل استخدام التقنية في التعليم.	0	1	2	3	4	5	6	7
29	أرغب في معرفة ما يفعله المعلمون الآخرون في مجال استخدام التقنية في التعليم.	0	1	2	3	4	5	6	7
30	حالياً أولويات أخرى تمنعني من تركيز انتباهي على استخدام التقنية في التعليم.	0	1	2	3	4	5	6	7
31	أرغب في تحديد كيفية اتمام أو تعزيز استخدام التقنية في التعليم أو كيفية استبداله بشيء آخر أفضل.	0	1	2	3	4	5	6	7
32	أرغب في استخدام التغذية الراجعة من الطلاب لعمل تغييرات في برنامج استخدام التقنية في التعليم.	0	1	2	3	4	5	6	7
33	أرغب في معرفة كيف سيتغير دوري عندما استخدم التقنية في التعليم.	0	1	2	3	4	5	6	7
34	تنسيق المهام والأشخاص يأخذ الكثير من وقتي عندما استخدم التقنية في التعليم.	0	1	2	3	4	5	6	7
35	أرغب في معرفة كيف يكون استخدام التقنية في التعليم أفضل مما لدينا حالياً.	0	1	2	3	4	5	6	7

جزاك الله خير الجزاء ولك مني خالص الشكر والتقدير

Appendix Q

Research Study Instrument

(Arabic Version for Female Teachers)

بسم الله الرحمن الرحيم

السلام عليكم ورحمة الله وبركاته **وبعد**

أختي المعلمة أحب أن أشكر لك مقدماً حسن تعاونك في إتمام هذه الدراسة، والتي تهدف إلى التعرف على اهتمامات معلمي ومعلمات المدارس بمنطقة المدينة المنورة نحو استخدامهم للتقنية في التعليم، وكذلك على الفروق في اهتمامات أفراد الدراسة نحو توظيفهم للتقنية باختلاف خصائصهم الشخصية والوظيفية، وأيضاً المعوقات التي تواجه المعلمين والمعلمات أثناء استخدامهم التقنية في العملية التعليمية وأخيراً تهدف إلى التعرف على المحفزات التي تدفعهم نحو استخدامها. كما أحب أن أنوه بأن المعلومات المقدمة لهذه الدراسة سوف تعامل بسرية تامة ولن تستخدم إلا لأغراض البحث العلمي فقط.

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المعلومات الشخصية والوظيفية

1. الجنس: ☐ ذكر ☐ أنثى
2. نوع البرنامج المدرسي: ☐ الرائدة ☐ تطوير ☐ عادي
3. المرحلة الدراسية التي تقومين بتدريسها: ☐ إبتدائي ☐ متوسط ☐ ثانوي
4. المنهج الدراسي الذي تقومين بتدريسه: ----------
5. بناءً على إستخدامك التقنية في التعليم، هل ترين نفسك كـ: ☐ غير مستخدمة ☐ مبتدئة ☐ متوسطة ☐ متقدمة
6. كم عدد السنوات التي قضيتها وانت تستخدم التقنية في التعليم؟ ----------
7. هل تلقيت أي تدريب رسمي في مجال استخدام التقنية في التعليم؟ ☐ نعم ☐ لا

فيما يلي قائمة بالمحفزات التي تدعوا المعلمات لتوظيف التقنية في العملية التعليمية وقائمة أخرى بالمعوقات التي تواجه المعلمات أثناء استخدامهن التقنية في العملية التعليمية. الرجاء قراءة كل عبارة ومن ثم وضع دائرة حول الرقم الذي يحدد درجة موافقتك لها.

غير موافق بشدة	غير موافق	لا رأي لي	موافق	موافق بشدة
1	2	3	4	5

.1	استخدام التقنية في التعليم يُمَكِّن الطالبات على اكتساب مهارات الحاسب الآلي الأساسية.	1	2	3	4	5
.2	استخدام التقنية يحسن عملية التعلم.	1	2	3	4	5
.3	استخدام التقنية يساعد على توفير الجهد والوقت في العملية التعليمية.	1	2	3	4	5
.4	استخدام التقنية في التعليم يثير الدافعية لدى الطالبات نحو التعلم.	1	2	3	4	5
.5	استخدام التقنية يساعد على توسيع ما تم تعلمه في الصف الدراسي وتطبيقه عملياً.	1	2	3	4	5
.6	إدارة المدرسة عامل مساعد في استخدام التقنية في التعليم.	1	2	3	4	5

.7	البرامج التدريبية المقدمة في مجال استخدام التقنية في التعليم ليست كافية.	1	2	3	4	5
.8	البرامج التدريبية المقدمة في مجال استخدام التقنية في التعليم ضعيفة.	1	2	3	4	5
.9	المقررات الدراسية المختصة باستخدام التقنية في التعليم ضمن برنامج إعداد المعلمات ليست كافية.	1	2	3	4	5
.10	عدم وجود الوقت الكافي والملائم للتعلم على استخدام التقنية في التعليم بشكل جيد.	1	2	3	4	5
.11	كثرة الأعطال عائق في استخدام التقنية في العملية التعليمية.	1	2	3	4	5
.12	التجهيزات التقنية المتوفرة حالياً في المدرسة ليست كافية.	1	2	3	4	5
.13	الأجهزة والبرامج التقنية المتوفرة حالياً في المدرسة قديمة ولا تعمل بشكل جيد.	1	2	3	4	5
.14	صعوبة إدارة الفصل المدعوم بالتقنية.	1	2	3	4	5
.15	كثرة عدد الطالبات عائق في استخدام التقنية داخل معمل الحاسب الآلي.	1	2	3	4	5
.16	أجد صعوبة في قياس وتقويم تعلم الطالبات الناتج عن استخدام التقنية.	1	2	3	4	5

يهدف هذا الاستبيان إلى التعرُّف على اهتماماتك الحالية نحو استخدامك للتقنية في العملية التعليمية. الرجاء قراءة كل عبارة بتمعن كامل ومن ثم اختيار الرقم الذي ترينه مناسباً في تحديد درجة اهتمامك لها. تذكر أن تكون اختياراتك تعبَر عن وضعك الحالي.

لا تنطبق عليَ البتة	لا تنطبق عليَ الآن	تنطبق عليَ إلى حد ما الآن	تنطبق عليَ تماماً الآن
0	1 2	3 4 5	6 7

ضع دائرة حول رقم واحد فقط

.1	اهتم بمواقف الطالبات نحو استخدام التقنية في التعليم.	0	1	2	3	4	5	6	7
.2	أعرف حالياً أساليب أخرى قد تعمل بشكل أفضل من استخدام التقنية في التعليم.	0	1	2	3	4	5	6	7
.3	أنا مهتمة كثيراً ببرنامج آخر غير برنامج استخدام التقنية في التعليم.	0	1	2	3	4	5	6	7
.4	أنا قلقة لعدم وجود وقت كاف لتنظيم نفسي كل يوم استخدم فيه التقنية.	0	1	2	3	4	5	6	7
5	أرغب في مساعدة المعلمات الأخريات في استخدامهن للتقنية في التعليم.	0	1	2	3	4	5	6	7
6	لدي معلومات محدودة جداً حول استخدام التقنية في التعليم.	0	1	2	3	4	5	6	7
7	أرغب في معرفة أثر استخدام التقنية في التعليم على وضعي المهني.	0	1	2	3	4	5	6	7
8	أنا قلقة بخصوص التعارض بين اهتماماتي ومسؤولياتي عندما استخدم التقنية في التعليم.	0	1	2	3	4	5	6	7
9	أنا مهتمة بتعديل استخدامي للتقنية في التعليم.	0	1	2	3	4	5	6	7
10	أرغب في إقامة علاقات عمل مع طاقم التعليم الخاص بنا وطاقم تعليم من الخارج يستخدم التقنية في التعليم.	0	1	2	3	4	5	6	7
11	أنا مهتمة بكيفية تأثير استخدام التقنية في التعليم على الطالبات.	0	1	2	3	4	5	6	7
12	أنا لا اهتم باستخدام التقنية في التعليم في الوقت الحالي.	0	1	2	3	4	5	6	7
13	أرغب في معرفة من سيضع القرارات بخصوص استخدام التقنية في التعليم.	0	1	2	3	4	5	6	7
14	أرغب في المناقشة حول إمكانية استخدام التقنية في التعليم.	0	1	2	3	4	5	6	7
15	أرغب في معرفة مصادر التعلم المتوفرة في حال قررنا تبني التقنية في التعليم.	0	1	2	3	4	5	6	7
16	أنا قلقة لعدم قدرتي على إدارة كل ما يتطلبه استخدام التقنية في التعليم.	0	1	2	3	4	5	6	7
17	أرغب في معرفة كيف سيتغير تدريسي أو إدارتي في حال قررت استخدام التقنية في التعليم.	0	1	2	3	4	5	6	7

لا تنطبق عليَ البتة	لا تنطبق عليَ الآن	تنطبق عليَ إلى حد ما الآن	تنطبق عليَ تماماً الآن
0	1 2	3 4 5	6 7

ضع دائرة حول رقم واحد فقط

18	أرغب في إلمام المدارس الأخرى أو المعلمات الأخريات بتقدم استخدام التقنية في التعليم.	0	1	2	3	4	5	6	7
19	اهتم بتقييم أثري على الطالبات عندما استخدم التقنية في التعليم.	0	1	2	3	4	5	6	7
20	أرغب في تعديل أسلوب استخدام التقنية في التعليم.	0	1	2	3	4	5	6	7
21	أنا مشغولة بأشياء علاوة على استخدام التقنية في التعليم.	0	1	2	3	4	5	6	7
22	أرغب في تعديل استخدامنا للتقنية بناءً على خبرات طالباتنا.	0	1	2	3	4	5	6	7
23	أقضي وقتاً قليلاً للتفكير حول استخدام التقنية في التعليم.	0	1	2	3	4	5	6	7
24	أرغب في استثارة طالباتي حول دورهن في استخدام التقنية أثناء التعليم.	0	1	2	3	4	5	6	7
25	أنا قلقة بالنسبة للوقت المبذول في العمل مع المشكلات الغير تعليمية المتعلقة باستخدام التقنية في التعليم.	0	1	2	3	4	5	6	7
26	أرغب في معرفة ما سيتطلبه استخدام التقنية في التعليم في المستقبل العاجل.	0	1	2	3	4	5	6	7
27	أرغب في تنسيق جهودي مع الأخريات لزيادة آثاراستخدام التقنية في التعليم.	0	1	2	3	4	5	6	7
28	أرغب في الحصول على المزيد من المعلومات عن الالتزامات الخاصة بالوقت والجهد المطلوبة من قبل استخدام التقنية في التعليم.	0	1	2	3	4	5	6	7
29	أرغب في معرفة ما تفعله المعلمات الأخريات في مجال استخدام التقنية في التعليم.	0	1	2	3	4	5	6	7
30	حالياً أولويات أخرى تمنعني من تركيز انتباهي على استخدام التقنية في التعليم.	0	1	2	3	4	5	6	7
31	أرغب في تحديد كيفية اتمام أو تعزيز استخدام التقنية في التعليم أو كيفية استبداله بشيء آخر أفضل.	0	1	2	3	4	5	6	7
32	أرغب في استخدام التغذية الراجعة من الطالبات لعمل تغييرات في برنامج استخدام التقنية في التعليم.	0	1	2	3	4	5	6	7
33	أرغب في معرفة كيف سيتغير دوري عندما استخدم التقنية في التعليم.	0	1	2	3	4	5	6	7
34	تنسيق المهام والأشخاص يأخذ الكثير من وقتي عندما استخدم التقنية في التعليم.	0	1	2	3	4	5	6	7
35	أرغب في معرفة كيف يكون استخدام التقنية في التعليم أفضل مما لدينا حالياً.	0	1	2	3	4	5	6	7

جزاك الله خير الجزاء ولك مني خالص الشكر والتقدير

Appendix R

Statements on the Stages of Concern Questionnaire Arranged According to Stage

Stage	Statement
Awareness	3. I am more concerned about another program rather than the program of technology use in teaching. 12. I am not concerned about the use of technology in teaching at this time. 21. I am preoccupied with things other than the use of technology in teaching. 23. I spend little time thinking about the use of technology in teaching. 30. Currently, other priorities prevent me from focusing my attention on the use of technology in teaching.
Informational	6. I have a very limited knowledge of the use of technology in teaching. 14. I would like to discuss the possibility of using technology in teaching. 15. I would like to know what resources are available if we decide to adopt technology in teaching. 26. I would like to know what the use of technology in teaching will require in the immediate future. 35. I would like to know how the use of technology in teaching is better than what we have now.
Personal	7. I would like to know the effect of the use of technology in teaching on my professional status. 13. I would like to know who will make the decisions in the use of technology in teaching. 17. I would like to know how my teaching or administration is supposed to change in case I decide using technology in teaching. 28. I would like to have more information on time and energy commitments required by the use of technology in teaching. 33. I would like to know how my role will change when I am using technology in teaching.

Stage	Statement
Management	4. I am concerned about not having enough time to organize myself each day in which I use technology. 8. I am concerned about conflict between my interests and my responsibilities when I am using technology in teaching. 16. I am concerned about my inability to manage all that the use of technology in teaching requires. 25. I am concerned about time spent working with nonacademic problems related to the use of technology in teaching. 34. Coordination of tasks and people is taking too much of my time when I am using technology in teaching.
Consequence	1. I am concerned about students' attitudes toward the use of technology in teaching. 11. I am concerned about how the use of technology in teaching affects students. 19. I am concerned about evaluating my impact on students when I am using technology in teaching. 24. I would like to excite my students about their part in the use of technology in teaching. 34. Coordination of tasks and people is taking too much of my time when I am using technology in teaching.
Collaboration	5. I would like to help other faculty in their use of technology in teaching. 10. I would like to develop working relationships with both our faculty and outside faculty using technology in teaching. 18. I would like to familiarize other *schools* or *teachers* with the progress of the use of technology in teaching. 27. I would like to coordinate my efforts with others to maximize the effects of the use of technology in teaching. 29. I would like to know what other faculty are doing in the area of the use of technology in teaching.

Stage	Statement
Refocusing	2. I now know of some other approaches that might work better than the use of technology in teaching. 9. I am concerned about revising my use of technology in teaching. 20. I would like to revise the approach of the use of technology in teaching. 22. I would like to modify our use of technology in teaching based on the experiences of our students. 31. I would like to determine how to supplement *or* enhance the use of technology in teaching or how to replace it with another thing better.

Appendix S

The Arabic-Translated vs. the Arabic Modified Statements on the Stages of Concern Questionnaire

	العبارات المترجمة إلى العربية	العبارات المترجمة إلى العربية ما بعد التعديل
1	اهتم بمواقف الطلاب نحو الابتكار.	اهتم بمواقف الطلاب نحو استخدام التقنية في التعليم.
2	أعرف حالياً أساليب أخرى قد تعمل بشكل افضل.	أعرف حالياً أساليب أخرى قد تعمل بشكل أفضل من استخدام التقنية في التعليم.
3	أنا مهتم كثيراً بابتكار آخر.	أنا مهتم كثيراً ببرنامج آخر غير برنامج استخدام التقنية في التعليم.
4	أنا قلق بخصوص عدم وجود وقت كاف لتنظيم نفسي كل يوم.	أنا قلق لعدم وجود وقت كاف لتنظيم نفسي كل يوم استخدم فيه التقنية.
5	أرغب في مساعدة المعلمين الأخرين في استخدامهم للابتكار.	أرغب في مساعدة المعلمين الآخرين في استخدامهم للتقنية في التعليم.
6	لدي معلومات محدودة جداً عن الابتكار.	لدي معلومات محدودة جداً حول استخدام التقنية في التعليم.
7	أرغب في معرفة أثر إعادة التنظيم على وضعي المهني.	أرغب في معرفة أثر استخدام التقنية في التعليم على وضعي المهني.
8	أنا قلق بخصوص التعارض بين اهتماماتي ومسؤلياتي.	أنا قلق بخصوص التعارض بين اهتماماتي ومسؤلياتي عندما استخدم التقنية في التعليم.
9	أنا مهتم بتعديل استخدامي للابتكار.	أنا مهتم بتعديل استخدامي للتقنية في التعليم.
10	أرغب في اقامة علاقات عمل مع طاقم التعليم الخاص بنا وطاقم تعليم من الخارج يستخدم هذا الابتكار.	أرغب في إقامة علاقات عمل مع طاقم التعليم الخاص بنا وطاقم تعليم من الخارج يستخدم التقنية في التعليم.
11	أنا مهتم بكيفية تأثير الابتكار على الطلاب.	أنا مهتم بكيفية تأثير استخدام التقنية في التعليم على الطلاب.
12	أنا لا اهتم بالابتكار في الوقت الحالي.	أنا لا اهتم باستخدام التقنية في التعليم في الوقت الحالي.
13	أرغب في معرفة من سيضع القرارات في النظام الجديد.	أرغب في معرفة من سيضع القرارات بخصوص استخدام التقنية في التعليم.
14	أرغب في المناقشة حول امكانية استخدام الابتكار.	أرغب في المناقشة حول إمكانية استخدام التقنية في التعليم.
15	أرغب في معرفة المصادر التعليمية المتوفرة في حال قررنا تبني الابتكار.	أرغب في معرفة مصادر التعلم المتوفرة في حال قررنا تبني التقنية في التعليم.
16	أنا قلق لعدم قدرتي على إدارة كل ما يتطلبه الابتكار.	أنا قلق لعدم قدرتي على إدارة كل ما يتطلبه استخدام التقنية في التعليم.
17	أرغب في معرفة كيف سيتغير تدريسي أو إدارتي.	أرغب في معرفة كيف سيتغير تدريسي أو إدارتي في حال قررت استخدام التقنية في التعليم.
18	أرغب في المام الأقسام الأخرى أو الأشخاص الآخرين بتقدم هذا الاسلوب الجديد.	أرغب في إلمام المدارس الأخرى أو المعلمات الأخريات بتقدم استخدام التقنية في التعليم.
19	أنا مهتم بتقييم أثري على الطلاب.	اهتم بتقييم أثري على الطالبات عندما استخدم التقنية في التعليم.
20	أرغب في تعديل أسلوب هذا الابتكار.	أرغب في تعديل أسلوب استخدام التقنية في التعليم.

	العبارات المترجمة إلى العربية	العبارات المترجمة إلى العربية ما بعد التعديل
21	أنا مشغول بأشياء علاوة على الابتكار.	أنا مشغول بأشياء علاوة على استخدام التقنية في التعليم.
22	أرغب في تغيير استخدامنا للابتكار بناءً على خبرات طلابنا.	أرغب في تعديل استخدامنا للتقنية في التعليم بناءً على خبرات طلابنا.
23	أقضي وقتاً قليلاً للتفكير حول الابتكار.	أقضي وقتاً قليلاً للتفكير حول استخدام التقنية في التعليم.
24	أرغب في استثارة طلابي حول دورهم في هذا الاسلوب.	أرغب في استثارة طلابي حول دورهم في استخدام التقنية في التعليم.
25	أنا قلق بشأن الوقت المبذول في العمل مع المشكلات الغير تعليمية المتعلقة بالابتكار.	أنا قلق بالنسبة للوقت المبذول في العمل مع المشكلات الغير تعليمية المتعلقة باستخدام التقنية في التعليم.
26	أرغب في معرفة ما سيتطلبه استخدام الابتكار في المستقبل العاجل.	أرغب في معرفة ما سيتطلبه استخدام التقنية في التعليم في المستقبل العاجل.
27	أرغب في تنسيق جهودي مع الاخرين لزيادة آثارالابتكار.	أرغب في تنسيق جهودي مع الآخرين لزيادة آثاراستخدام التقنية في التعليم.
28	أرغب في الحصول على المزيد من المعلومات عن الالتزامات الخاصة بالوقت والجهد المطلوبة من قبل الابتكار.	أرغب في الحصول على المزيد من المعلومات عن الالتزامات الخاصة بالوقت والجهد المطلوبة من قبل استخدام التقنية في التعليم.
29	أرغب في معرفة ما يفعله المعلمون الآخرون في هذا المجال.	أرغب في معرفة ما يفعله المعلمون الآخرون في مجال استخدام التقنية في التعليم.
30	حالياً أولويات أخرى تمنعني من تركيز انتباهي على الابتكار.	حالياً أولويات أخرى تمنعني من تركيز انتباهي على استخدام التقنية في التعليم.
31	أرغب في تحديد كيفية اتمام أو تعزيز أو استبدال الابتكار.	أرغب في تحديد كيفية اتمام أو تعزيز استخدام التقنية في التعليم أو كيفية استبداله بشيء آخر أفضل.
32	أرغب في استخدام التغذية الراجعة من الطلاب لعمل تغييرات في البرنامج.	أرغب في استخدام التغذية الراجعة من الطلاب لعمل تغييرات في برنامج استخدام التقنية في التعليم.
33	أرغب في معرفة كيف سيتغير دوري عندما استخدم الابتكار.	أرغب في معرفة كيف سيتغير دوري عندما استخدم التقنية في التعليم.
34	تنسيق المهام والأشخاص يأخذ الكثير من وقتي.	تنسيق المهام والأشخاص يأخذ الكثير من وقتي عندما استخدم التقنية في التعليم.
35	أرغب في معرفة كيف يكون هذا الابتكار افضل مما لدينا حالياً.	أرغب في معرفة كيف يكون استخدام التقنية في التعليم أفضل مما لدينا حالياً.

Appendix T

An SPSS Macro for Evaluating Multivariate Normality

```
preserve.
set printback=none.
************************************************************************
* Univariate and multivariate tests of skew and kurtosis, a list of the
* 5 cases with the largest Mahalanobis distances, a plot of the
* squared distances, critical values for a single multivariate outlier.
*
* from: DeCarlo, L. T. (1997). On the meaning and use of kurtosis.
*         Psychological Methods, 2, 292-307.
*
* To use the macro, one needs two lines, one to include the macro
* in the program, and the other to execute it. Open the data file, then
* type the commands in a syntax window as follows:
*
* include 'c:\spsswin\normtest.sps'.
* normtest vars=x1,x2,x3,x4 /.
*
* The first line includes the macro, which in this case is named
* normtest.sps and is located in the spsswin directory, and the
* second line invokes the macro for variables x1 to x4, for example.
* (variable names can be separated by spaces or commas)
*
* Updated 2002: the plot command of SPSS is replaced by graph
*
* Updated 11/97:
* This version uses a corrected two-pass algorithm to compute
* the variance, from Chan, T. F., Golub, G. H., & LeVeque, R. J.
* (1983). Algorithms for computing the sample variance: Analysis
* and recommendations. American Statistician, 37, 242-247.
* Fisher's g statistics are given.
* Mardia's p-value fixed (multiplied by 2), and the statistic is
* computed using the biased variance estimator, as in SAS & EQS
************************************************************************
define normtest (vars=!charend('/')).
matrix.
get x /variables=!vars /names=varnames /missing=omit.
compute n=nrow(x).
compute p=ncol(x).
compute s1=csum(x).
compute xbar=s1/n.
compute j=make(n,1,1).
compute xdev=x-j*xbar.
release x.
compute dev=csum(xdev).
compute devsq=(dev&*dev)/n.
compute ss=csum(xdev&*xdev).
* corrected two-pass algorithm.
compute m2=(ss-devsq)/n.
compute sdev=sqrt(m2).
compute m3=csum(xdev&**3)/n.
compute m4=csum(xdev&**4)/n.
compute sqrtb1=t(m3/(m2&*sdev)).
compute b2=t(m4/(m2&**2)).
compute g1=((sqrt(n*(n-1)))*sqrtb1)/(n-2).
compute g2=(b2-((3*(n-1))/(n+1)))*((n**2-1)/((n-2)*(n-3))).
******** quantities needed for multivariate statistics ********
compute s=sscp(xdev)/(n-1).
```

```
compute sb=s*(n-1)/n.
compute sinv=inv(s).
compute d=diag(s).
compute dmat=make(p,p,0).
call setdiag(dmat,d).
compute sqrtdinv=inv(sqrt(dmat)).
compute corr=sqrtdinv*s*sqrtdinv.
*** principal components for Srivastava's tests ***
call svd(s,u,q,v).
compute pc=xdev*v.
call svd(sb,aa,bb,cc).
compute pcb=(xdev*cc).
release xdev.
*** Mahalanobis distances ***
compute sqrtqinv=inv(sqrt(q)).
compute stdpc=pc*sqrtqinv.
compute dsq=rssq(stdpc).
release stdpc.
compute sqrtbbi=inv(sqrt(bb)).
compute stdpcb=pcb*sqrtbbi.
compute dsqb=rssq(stdpcb).
release stdpcb.
**************** univariate skew and kurtosis *****************
*** approximate Johnson's SU transformation for skew ***
compute y=sqrtb1*sqrt((n+1)*(n+3)/(6*(n-2))).
compute beta2=3*(n**2+27*n-70)*(n+1)*(n+3)/((n-2)*(n+5)*(n+7)*
                (n+9)).
compute w=sqrt(-1+sqrt(2*(beta2-1))).
compute delta=1/sqrt(ln(w)).
compute alpha=sqrt(2/(w*w-1)).
compute sub1=delta*ln(y/alpha+sqrt((y/alpha)&**2+1)).
compute psub1=2*(1-cdfnorm(abs(sub1))).
print {n}/title"Number of observations:" /format=f5.
print {p}/title"Number of variables:" /format=f5.
print {g1,sqrtb1,sub1,psub1}
 /title"Measures and tests of skew:"
 /clabels="g1","sqrt(b1)","z(b1)","p-value"
 /rnames=varnames /format=f10.4.
*** Anscombe & Glynn's transformation for kurtosis
compute eb2=3*(n-1)/(n+1).
compute vb2=24*n*(n-2)*(n-3)/(((n+1)**2)*(n+3)*(n+5)).
compute stm3b2=(b2-eb2)/sqrt(vb2).
compute beta1=6*(n*n-5*n+2)/((n+7)*(n+9))*sqrt(6*(n+3)*(n+5)/
                (n*(n-2)*(n-3))).
compute a=6+(8/beta1)*(2/beta1+sqrt(1+4/(beta1**2))).
compute zb2=(1-2/(9*a)-((1-2/a)/(1+stm3b2*sqrt(2/(a-4))))
            &**(1/3))/sqrt(2/(9*a)).
compute pzb2=2*(1-cdfnorm(abs(zb2))).
compute b2minus3=b2-3.
print {g2,b2minus3,zb2,pzb2}
 /title"Measures and tests of kurtosis:"
 /clabels="g2","b2-3","z(b2)","p-value"
 /rnames=varnames /format=f10.4.
compute ksq=sub1&**2+zb2&**2.
compute pksq=1-chicdf(ksq,2).
compute lm=n*((sqrtb1&**2/6)+(b2minus3&**2/24)).
compute plm=1-chicdf(lm,2).
```

```
print
 /title"Omnibus tests of normality (both chisq, 2 df):".
print {ksq,pksq,lm,plm}
 /title"  D'Agostino & Pearson K sq    Jarque & Bera LM test"
 /clabels="K sq","p-value","LM","p-value"
 /rnames=varnames /format=f10.4.
do if p>1
print
 /title"*************** Multivariate Statistics ***************".
*** Small's multivariate tests ***
compute uinv=inv(corr&**3).
compute uinv2=inv(corr&**4).
compute q1=t(sub1)*uinv*sub1.
* note: the variant of Small's kurtosis uses Anscombe & Glynn's
* transformation in lieu of SU (A & G is simpler to program)
compute q2=t(zb2)*uinv2*zb2.
compute pq1=1-chicdf(q1,p).
compute pq2=1-chicdf(q2,p).
print /title"Tests of multivariate skew:".
print {q1,p,pq1}/title"  Small's test (chisq)"
 /clabels="Q1","df","p-value"/format=f10.4.
*** Srivastava's multivariate tests ***
compute pcs1=csum(pc).
compute pcs2=csum(pc&**2).
compute pcs3=csum(pc&**3).
compute pcs4=csum(pc&**4).
release pc.
compute mpc2=(pcs2-(pcs1&**2/n))/n.
compute mpc3=(pcs3-(3/n*pcs1&*pcs2)+(2/(n**2)*(pcs1&**3)))/n.
compute mpc4=(pcs4-(4/n*pcs1&*pcs3)+(6/(n**2)*(pcs2&*(pcs1&**2)))
            -(3/(n**3)*(pcs1&**4)))/n.
compute pcb1=mpc3/(mpc2&**1.5).
compute pcb2=mpc4/(mpc2&**2).
compute sqb1p=rsum(pcb1&**2)/p.
compute b2p=rsum(pcb2)/p.
compute chib1=sqb1p*n*p/6.
compute normb2=(b2p-3)*sqrt(n*p/24).
compute pchib1=1-chicdf(chib1,p).
compute pnormb2=2*(1-cdfnorm(abs(normb2))).
print {chib1,p,pchib1}
 /title"  Srivastava's test"
 /clabels="chi(b1p)","df","p-value"/format=f10.4.
print /title"Tests of multivariate kurtosis:".
print {q2,p,pq2}
 /title"  A variant of Small's test (chisq)"
 /clabels="VQ2","df","p-value"/format=f10.4.
print {b2p,normb2,pnormb2}
 /title"  Srivastava's test"
 /clabels="b2p","N(b2p)","p-value"/format=f10.4.
*** Mardia's multivariate kurtosis ***
compute b2pm=csum(dsqb&**2)/n.
compute nb2pm=(b2pm-p*(p+2))/sqrt(8*p*(p+2)/n).
compute pnb2pm=2*(1-cdfnorm(abs(nb2pm))).
print {b2pm,nb2pm,pnb2pm}
 /title"  Mardia's test"
 /clabels="b2p","N(b2p)","p-value"/format=f10.4.
compute q3=q1+q2.
```

```
compute q3df=2*p.
compute pq3=1-chicdf(q3,q3df).
print /title"Omnibus test of multivariate normality:".
print {q3,q3df,pq3}
 /title"  (based on Small's test, chisq)"
 /clabels="VQ3","df","p-value"/format=f10.4.
end if.
compute cse={1:n}.
compute case=t(cse).
compute rnk=rnkorder(dsq).
compute top=(n+1)-rnk.
compute pvar=make(n,1,p).
compute ddf=make(n,1,(n-p-1)).
compute ncase=make(n,1,n).
compute a01=make(n,1,(1-.01/n)).
compute a05=make(n,1,(1-.05/n)).
compute mahal={case,rnk,top,dsq,pvar,ddf,ncase,a01,a05}.
save mahal /outfile=temp
 /variables=case,rnk,top,dsq,pvar,ddf,ncase,a01,a05.
end matrix.
get file=temp.
sort cases by top (a).
do if case=1.
compute f01=idf.f(a01,pvar,ddf).
compute f05=idf.f(a05,pvar,ddf).
compute fc01=(f01*pvar*(ncase-1)**2)/(ncase*(ddf+pvar*f01)).
compute fc05=(f05*pvar*(ncase-1)**2)/(ncase*(ddf+pvar*f05)).
print space.
print
 /'Critical values (Bonferroni) for a single multivar. outlier:'.
print space.
print
 /'  critical F(.05/n) ='fc05 (f5.2)'  df ='pvar (f3)','ddf (f4).
print
 /'  critical F(.01/n) ='fc01 (f5.2)'  df ='pvar (f3)','ddf (f4).
print space.
print /'5 observations with largest Mahalanobis distances:'.
end if.
execute.
do if top < 6.
print
 /'  rank ='top (f2)'  case# ='case (f4)'  Mahal D sq ='dsq (f10.2).
end if.
execute.
compute chisq=idf.chisq((rnk-.5)/ncase,pvar).
graph
 /title="Plot of ordered squared distances"
 /scatterplot (overlay)=dsq with chisq.
execute.
!enddefine.
restore.
```

Appendix U

Follow-up Support Activities

Follow-up Support Activities

There are several kinds of follow-up activities approaching in different ways, such as peer coaching, peer review, collegial study groups, and action research.

1. ***Peer Coaching***

It is a school-based job-embedded follow-up support leading teachers to positive changes in their teaching practice. It allows two teachers or more to consult with each other, to observe each other's classroom, and to share ideas; skills; and study materials regarding technology implementation for the purpose of helping each other with technology implementation efforts.

2. ***Peer Review***

Similar to the peer coaching, it is a school-based job-embedded follow-up support making a significant difference in the struggling teacher's practice. It allows a new teacher who needs support and assistance to consult with a skilled teacher who works as a mentor providing feedback and advice to the new teacher. Both of them observe one another's classroom, and share ideas, teaching practices and study materials to help each other with technology integration into curriculum.

3. ***Collegial Study Groups***

Arranging study groups by teaching level or subject matter and providing each group with sufficient time to work are going to maintain ongoing conversations on new concepts and skills regarding technology implementation and provide big opportunities for cooperative planning and problem solving. The results drawing from each study group must be appraised and used by the school or school district.

4. ***Action Research***

It is a practical process linked with the daily work of the teachers as well as helping them change their classroom practice. It allows teachers to research new applications and real world problems and model them for their students.

Appendix V

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Sincerely,

Nancy Reynolds — October 19, 2010

Nancy Reynolds for SEDL — Date signed

Agreed and accepted:

Signature: _____ — 10/19/2010

Date signed

Printed Name: Moatasim Barri