CONCERNS AND PROFESSIONAL DEVELOPMENT NEEDS OF SCIENCE FACULTY AT TAIBAH UNIVERSITY IN ADOPTING BLENDED LEARNING

by

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AN ABSTRACT OF A DISSERTATION

submitted in partial fulfillment of the requirements for the degree
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ABSTRACT

The purpose of this study was to obtain Science faculty concerns and professional development needs to adopt blended learning in their teaching at Taibah University.

To answer these two research questions the survey instrument was designed to collect quantitative and qualitative data from close-ended and open-ended questions.

The participants' general characteristics were first presented, then the quantitative measures were presented as the results of the null hypotheses. The data analysis for research question one revealed a statistically significant difference in the participants' concerns in adopting BL by their gender sig = .0015. The significances were found in stages one (sig = .000) and stage five (sig = .006) for female faculty. Therefore, null hypothesis 1.1 was rejected (There are no statistically significant differences between science faculty's gender and their concerns in adopting BL). The data analysis indicated also that there were no relationships between science faculty's age, academic rank, nationality, country of graduation and years of teaching experience and their concerns in adopting BL in their teaching, so the null hypotheses 1.2-7 were accepted (There are no statistically significant differences between Science faculty's age and their concerns in adopting BL, there are no statistically significant differences between Science faculty's academic rank and their concerns in adopting BL, there are no statistically significant differences between Science faculty's nationality and their concerns in adopting BL, there are no statistically significant differences between Science faculty's content area and their concerns in adopting BL, there are no statistically significant differences between Science faculty's country of graduation and their concerns in adopting BL and there are no

statistically significant differences between Science faculty's years of teaching experience and their concerns in adopting BL).

The data analyses for research question two revealed that there was a statistically significant difference between science faculty's use of technology in teaching by department and their attitudes towards technology integration in the Science curriculum. Lambda MANOVA test result was sig =.019 at the alpha = .05 level. Follow up ANOVA result indicated that Chemistry department was significant in the use of computer-based technology (sig =.049) and instructional technology use (sig =.041). Therefore, null hypothesis 2.1 was rejected (There are no statistically significant differences between science faculty's attitudes towards technology integration in the Science curriculum and faculty's use of technology in teaching by department). The data also revealed that there was no statistically significant difference ($p<.05$) between science faculty's use of technology in teaching by department and their instructional technology use on pedagogy. Therefore, null hypothesis 2.2 was accepted (There are no statistically significant differences between science faculty's perceptions of the effects of faculty IT use on pedagogy and faculty's use of technology in teaching by department). The data also revealed that there was a statistically significant difference between science faculty's use of technology in teaching by department and their professional development needs in adopting BL. Lambda MANOVA test result was .007 at the alpha = .05 level. The follow up ANOVA results showed that the value of significance of Science faculty's professional development needs for adopting BL was smaller than .05 in the Chemistry department with sig =.001 in instructional technology use. Therefore, null hypothesis 2.3 was rejected (There are no statistically significant differences between Science faculty's perceptions of technology professional development needs and faculty's use of technology in teaching by department).

Qualitative measures included analyzing data based on answers to three open-ended questions, numbers thirty-six, seventy-four, and seventy-five. These three questions were on blended learning concerns comments (question 36, which had 10 units), professional development activities, support, or incentive requested (question 74, which had 28 units), and the most important professional development activities, support, or incentive (question 75, which had 37 units). These questions yielded 75 units, 23 categories and 8 themes that triangulated with the quantitative data. These 8 themes were then combined to obtain overall themes for all qualitative questions in the study. The two most important themes were "Professional development" with three categories; Professional development through workshops (10 units), Workshops (10 units), Professional development (5 units) and the second overall theme was "Technical support" with two categories: Internet connectivity (4 units), and Technical support (4 units).

Finally, based on quantitative and qualitative data, the summary, conclusions, and recommendations for Taibah University regarding faculty adoption of BL in teaching were presented. The recommendations for future studies focused on Science faculty Level of Use and technology use in Saudi universities.

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DEDICATION

To my wonderful parents who encouraged me to achieve this goal.

To my beloved wife, Abeer, who stood beside me to accomplish our dream.

To my precious children, Abdulaziz, Lara, and Mohanad, who give me hope and joy day after day, and to whom I wish all success and happiness.

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CHAPTER 1- Introduction

Economic Development and Higher Education in Saudi Arabia

The need to compete in an increasingly global economy is forcing the government of Saudi Arabia to rapidly expand educational opportunities in a country that is trying to reduce its dependency on oil (El-Rashidi, 2007). The country also has other issues: "limitation of places, depletion of resources, and quality measures" (Alkhazim, 2003, p. 1). International competitiveness to enhance economic development is a priority. The Saudi Arabia (SA) Ministry of Education's mission is that SA students "be able to face international competition both at the scientific as well as technological levels" (Saudi Arabia, Ministry of Education, 2007, p. 12).

Rapid expansion of higher education opportunities is important, since 60% of the population is under the age of 25 (El-Rashidi, 2007), first-time job seekers 20-24 years of age were half of the unemployed in 2008, and in that year the country already faced an "unemployment crisis" (Mills, 2008). Unemployment was 11% in 2008, which was exacerbated by the fact that roughly 80% of SA employees are likely to be foreign, largely due to a lack of Saudi competitive skills, educational services and programs (AME News, 2008).

The goal of the Saudi Arabian educational system is to develop one that is parallel to educational systems in industrially developed countries. In 2007, alone, over fifteen billion dollars was spent on educational development, mostly to either enhance existing institutions of higher education or to open new ones (AME News, 2008). Over 100 new institutes of higher education, including 12 comprehensive universities, are under construction (Mills, 2008). These universities will be designed to incorporate advanced technologies in order to compete in an increasingly global economy (Wagner, 2008).

To that end, SA established the Aafaq project – a plan for university education in the kingdom (2007) that will help Saudi universities enhance their electronic learning environments. The Aafaq project aims to improve higher education in fields related to faculty, students, educational technologies and information technology. It also aims at adopting different approaches to integrate technology into teaching. The Research Institute at King Fahd University of Petroleum and Minerals was assigned to design the plan for Saudi higher education for the next twenty-five years, with the goal of becoming one of the best higher education systems in the world. To bring this about, e-learning was introduced as a key component of this transition.

The Growth of E-Learning

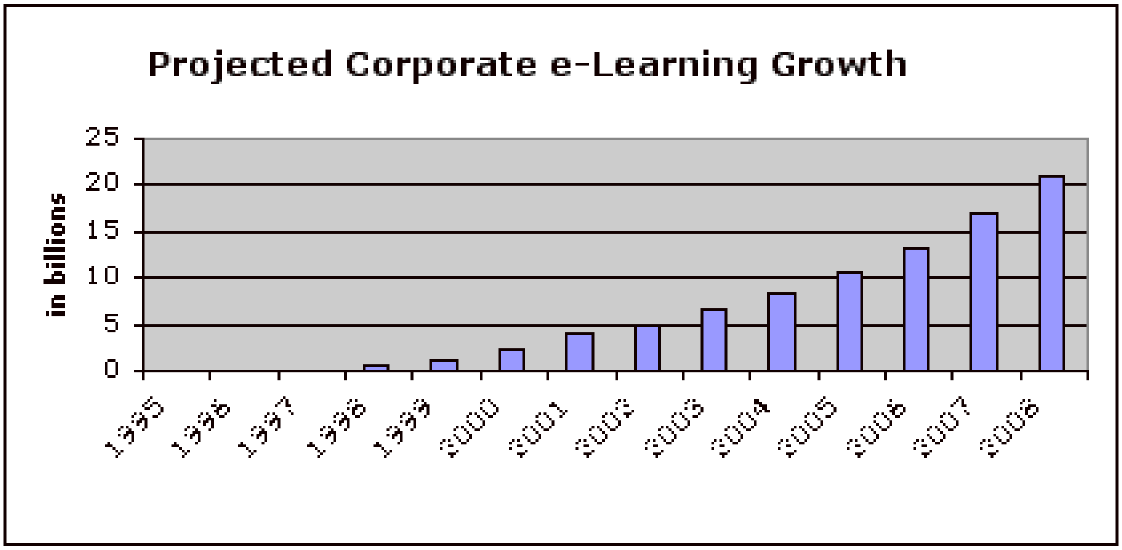
> Students, with the advantage of youth and the capacity to embrace new technology on their side, are likely to adapt to innovations with an ease that their faculty …cannot imagine…and those who are meant to be taught end up grasping the medium of education…at a faster rate than those who are meant to teach, (Tomorrow's Faculty , 2009, para1).

E-learning has grown tremendously throughout the world in the last ten years, including SA (Bonk & Graham, 2006). The roots of e-learning are in distance education. "Distance education" is an umbrella term that applies to all learning that is separated by time and distance and accessed via electronic means, whether it is via satellite, cable, internet, or other electronic media. While it has had several definitions through time (Keegan, 1980; Keegan, 1993), distance education is defined as "planned learning that normally occurs in a different place from teaching, requiring special course design and instruction techniques, communication through various technologies, and special organizational and administrative arrangements" (Moore and Kearsley 2005, p. 2). For the purposes of this study, Keegan's definition of distance education is used, since it is the most inclusive. While Keegan laid the theoretical groundwork, Cross (2004) is credited with inventing the term" e-learning" in 1998, though Clark (2007) asserted that the term first appeared in 1997 and credited it to Aldo Morri. The term "e-learning" has changed over the years to include internet- or web-based learning and electronic-based (including digital collaborations, satellite, etc.), among others (Rosenberg, 2001). Within the United States, this term has been generally used for business and training (Rossett & Sheldon, 2001).

The definitions of e-learning vary. The term e-learning is relatively new and many words are used to describe roughly the same activity (Mason & Rennie, 2006, p. xv). Some definitions focus on content, others on communication, and others on technology (Mason & Rennie, 2006). It is distinct from online learning, which is solely delivered via the internet, with the implication that it is largely, if not all, asynchronous. No one definition exists globally (Wilson, 2001, cited in the *Open and Distance Learning Quality Council Newsletter*). E-learning has grown substantially in SA and is projected to grow at an increasingly rapid rate in the years to come due to King Abdullah's emphasis on this learning modality.

Figure 1.

Growth of E-learning



Source: http://www.nwlink.com/~donclark/hrd/elearning/growth.html

Moreover:

> The Saudi Arabian e-learning industry is projected to reach USD 125 million in 2008 and is set to grow at a compound annual rate of 33 per cent over the next five years…. The growth is being driven by the Saudi Ministry of Education's initiatives for the integration of Information and Communication Technology (ICT)…. (al Bawaba, 2008, p. 1)

Due to the SA government's priorities for using e-learning in education, and particularly higher education, to enhance Saudi global competitiveness economic growth, pedagogical changes must be made. These changes will also hasten faculty development needs, as faculty begin to make the change from face-to-face teaching to using more technologically advanced teaching modalities.

"Charting a Course" for E-Learning in Saudi Arabian Universities

The term 'Higher Education", as used in Saudi Arabia, refers only to university education. The Saudi Ministry of Higher Education has its own definition of e-learning, which is more general and reflects the broad approach taken to e-learning in Saudi

Arabia:

> … the use of technology and modern communication methods such as computers, networks, multimedia, data bases, electronic libraries, and internet, either outside or inside the classroom setting. (Ministry of Higher Education, 2007, p. 23)

The development of e-learning in SA is attributable to a decree by King Abdullah, who in 2001 established a national plan for utilization of information technology. This plan recommended e-learning to be used in higher education and the establishment of a national center to "provide technical support as well as the tools and means necessary for the development of E-learning content" (King Abdullah, 2001, cited in NCELDL, 2008). The reason for this national plan and the development of National Center for E-Learning and Distance Learning (NCELDL) was "the increasing demand resulting from rapid population growth, lack of teachers and instructors in terms of both quality and quantity, and high financial costs…." (NCELDL, 2008). This desire, based on collaborative efforts with universities around the world, resulted in a new model for higher education

> The use of technology in both education and administration will enhance the education process, thereby facilitating a metamorphosis of the traditional educational model….wedded to electronic model, it will result in a blended model using state-of-the-art instructional equipment and tools to aid explanation of the learning content. (NCELDL, 2008, para 3)

In 2007, the Ministry of Higher Education distributed a survey to faculty representatives in universities in SA in order to learn more about e-learning. The number of faculty representatives contacted, the return rate, and the numbers of universities in the study were not provided. The lack of specific information provided in this survey is not unusual for SA, due to the proprietary nature of education at each educational institution and throughout Gulf countries, as well. However, the survey results provide some insight into the evolving nature of e-learning in SA. The survey found:

- E-learning and distance education were applied at different levels among universities due to the lack of infrastructure.
- Some e-learning centers had been established, while others only offered e-learning/distance education courses.
- No clear plan in adopting e-learning/distance education.
- No specific budget for adopting e-learning/distance education at most universities.
- Different learning management systems (LMS) were used, such as WebCt, Moodle, EMES and Jusur (a learning management system in Arabic).
- No connection between libraries and e-learning/distance education centers.
- No strategic future plan for adopting e-learning/distance education.
- No coordinated research in Saudi Arabia, due to the lack of a central database of dissertations, such as (UMI).
- A lack of research on e-learning/distance education (Ministry Of Higher Education, 2007).

These survey results indicated the evolving nature of e-learning in higher education institutions, the efforts that must be made to integrate e-learning and attendant structures, pedagogical approaches, and the technologies needed for the evolution of traditional learning into e-learning in Saudi universities. This survey also resulted in three national plans, one for improving higher education at a national level, one for information technology, and one for e-learning/distance learning. In order to bring this about, the plan established the National Center for E-Learning and Distance Learning. It was created to help universities, community colleges and institutions to achieve their goals to improve student’s achievement by adapting new instructional strategies (Ministry Of Higher Education, 2007). The NCELDL (2007) had the following goals:

- Develop research and development agendas aimed at facilitating e-learning across higher education sectors.
- Work across all universities in e-learning infrastructure development, nationally and internationally.
- Develop at least three new e-learning programs by 2009.
- Provide complete e-learning solutions to at least three strategic partners by end of 2010.

Due to the ambitious nature of these goals for facilitating e-learning, faculty professional development needs will increase. E-learning is in its infancy in Saudi Arabia, as the Kingdom looks toward educating its growing college-age population in ways that will make it competitive internationally. What needs to be developed are the “building blocks” for making e-learning and its attendant goals of student-centered learning, technology integration and faculty pedagogical enhancement function within the framework of a burgeoning Saudi Arabian higher education system.

The Rise of Blended Learning

In a world that is becoming increasingly dependent on technology, policy makers everywhere are questioning whether the traditional classroom experience is sufficient for students in the 21st century, not only in the U.S. (Partnership for 21st century skills, 2008), but also in the world (Bonk & Graham, 2006). “Universities are facing a restructuring of traditional educational paradigms. Faculty are being asked to move away from a teacher-centered focus to a more student-centered focus and become facilitators of learning. Students are asked to take more responsibility for their learning" (O'Laughlin, 2007. p.5).

As universities plan to make it a priority to exemplify best practices in teaching and educating students through technology and newer pedagogies, online learning, face-to-face learning, and unique combinations of the two are being explored in order to fulfill these goals, whether as a transitional approach to e-learning or as an option to traditional classroom instruction in what is referred to as a "blended" (or hybrid) course (Allen, Seaman & Garrett, 2007). A blended course is one in which "a significant portion of the learning activities has been moved online" (Beck, 2009, para. 1).

Blended learning is not new, though its use has steadily risen in higher education due to pedagogical, economic and other reasons and, while it will grow (O'Laughlin, 2007; Ross & Gage, 2006), recent research supported by the Sloan-C Consortium (Allen, Seaman & Garrett, 2007) indicate that its use is complex and varied, and reflects a dynamic state of flux in higher education. On the one hand, as technologies become faster and cheaper, more and greater opportunities for education can be provided to more people via online learning. On the other hand, many people choose blended learning for its mix of online convenience and face-to-face instruction (O'Laughlin, 2007). The movement to technology-enhanced instruction, in whatever its form, is changing higher education worldwide.

Graham Spanier (2007), President of Pennsylvania State University, in an address to the faculty on "educating our youth for the global economic revolution" had this to say about blended learning:

> I believe the single greatest unrecognized trend in education today is the merger of traditional classroom instruction with online learning and

web-based instruction... (para. 61)

Universities everywhere are restructuring their curricula and delivery modes. Faculties are being asked to move away from teacher-centered curricula to student-centered curricula, and "what is emerging is a new model for delivering courses" (O'Laughlin, 2007, p. 5). Because blended learning offers the convenience of the online format (and attendant cost savings) without the loss of face-to-face learning, it is considered to be the "best of both worlds" (O'Laughlin, 2007, p 5.; Arabasz & Baker, 2003; Dziuban, Hartman, & Moskal, 2004; Gray, 2007). However, "The hybrid or reduced face-to-face course is in many ways the most innovative path, the most difficult to achieve, and where the greatest reward may lie in the long run" (Ross & Gage, 2006, p. 156).

Blended Learning – Definitions and Background

The term "blended learning" has undergone different definitions according to varying methods of application and intended purposes. According to Dzakiria, Mustafa, and Abu Bakar (2006) blended learning (BL) has many different, and sometimes contrasting, definitions. Therefore, there is no one definition that most researchers use. Despite this variety of definitions, most BL definitions agree on the core aspect of "mix, blend, or hybrid", while each of them is distinguished through the components that instructors blend together. As a result, the studies that define BL fall in one of four groups (Driscoll, 2002). The researcher developed a chart to illustrate Driscoll's four types of blended learning (see Table 1 below).

Table 1

Driscoll's Four Blended Learning Groups With Examples

	Blended Learning Group	**Definition**
1	A blend between two or more modes of web-based technology	"…the orchestrated application and integration of instruction, tools, performance support, collaboration, practice, and evaluation to create a unified learning and performance environment" (Elsenheimer, 2006, p. 26).
2	A blend between two pedagogical methods	"Learning activities of differing kinds and venues to synergistically achieve overarching learning objectives" (Howard, Remenyi and Pap, 2006, p. 11)
3	A blend between traditional face-to-face and online learning	"The planned integration of online and face to face instructional approaches in a way that maximizes the positive feature of each respective delivery mode" (Ragan, para. 4)
4	A blend or mix instructional technology with actual job tasks	"…producing learning, reaching out to students through distance education technologies, and promoting a strong sense of community among learners" (Rovai and Jordan, 2004, p. 11)

Driscoll, M. (2002). Blended learning. *E - Learning, 3*(3), 54.

Most research uses Driscoll's third category, which defined BL as a blend between traditional face-to-face and online learning and use this definition (Davis & Fill, 2007; Duhaney, 2004, Motteram, 2006; Tang & Byrne, 2007; Yoon & Lim 2007). For the purposes of this study, Driscoll's third category definition (2002) will be used, since SA universities are either using it now or are adopting it into a BL approach.

Cultural Factors Affecting Blended Learning Adoption in Saudi Arabia

It is important to study ways of adopting blended learning in Saudi Arabia Science faculty for many reasons. First, there is a shortage of Saudi Science faculty. Second, due to the religion and customs of Saudi Arabia, universities have two separate campuses, one for males and one for females, because male instructors are not permitted to teach female students in face-to-face sessions. However, the shortage of female Science instructors in Saudi higher education institutions has created a need for the male Science instructors to teach female students through closed circuit television, which is expensive. Additionally, new opportunities have opened up for women, due to a Cabinet decision in 2004 that expanded job opportunities. Now, “one third of government jobs are held by women” (Ghafour, 2007, para 1). Many new schools and colleges are being built for women. However the building has not caught up with the need, since “women graduates currently outnumber their male counterparts, constituting 56.5 percent of the total” (Ghafour, 2007, para 1). In 2008, the first women’s university was established in Riyadh, Al-Amira Noura. However, faculty and institutions are grappling with the many educational, cultural, and structural issues inherent in such an unprecedented and rapid expansion of higher education opportunities. Thus, adopting e-learning and blended learning in teaching at the university level is necessary, because it is more cost-efficient. It also provides more options for teaching without crossing the cultural boundaries of the Saudi society.

Theoretical Framework – Concerns-Based Adoption Model

Because of the rapid changes being brought about by the initiatives of the SA government and the Ministry of Higher Education, there is a need to view these rapid changes from the perspective of higher education faculty, who are being asked to make this transition to more modern teaching technologies, such as blended learning, in an expeditious manner. While a number of potentially relevant and useful change and diffusion models exist, the Concerns-Based Adoption Model (CBAM) (Hall, George, & Rutherford, 1979; Hall & Hord, 1987, 2006) theory provides a theoretical background for examining their concerns as these technologies are adopted. This model has widespread acceptance in educational research because it "maintains a participant-based focus on understanding an individual's attitudes, perceptions, thoughts and considerations toward an innovation" (Petheridge, 2007, p. 4) and is often used for technology adoption (Hall & Hord, 2006).

The Concern's-Based Adoption Model (CBAM) theory (Hall, Wallace & Dossett, 1973) grew out of the work of Frances Fuller (1969) and others, as a way to assess change in education. It is a tool for the individual to address changes in educational settings in ways that include the individual and the organization in the change process. The Stages of Concern model provides a framework to view the "personal side of the change process" (George, Hall, & Stiegelbauer, 2006). The central assumption of CBAM is that the change process cannot progress without taking into account its impact on the people involved in the organization (Petheridge, 2007). When higher education faculties are asked to adopt new technology, they examine their beliefs, assumptions, and values, in light of these changes. Using Hall and Hord's (2006) stages of concern framework, these concerns can be identified and faculty can be supported with interventions appropriate to their level of concern (Petheridge, 2007).

CBAM assigns individuals into one of its seven stages based on the amount of concern they have towards a change or innovation. The seven concern stages (Hall and Hord, 2006) are: (1) refocusing, (2) collaboration, (3) consequence, (4) management, (5) personal, (6) informational and (7) awareness. "The Stages of Concern defines human learning and development as going through seven stages, during which a person's focus or concern shifts in rather predictable ways" (Sweeny, 2003, para.8). Thus, the theory helps Taibah University administrators to design professional development based on the types of concerns science faculty have regarding the new change. These sessions help in decreasing the instructors' concerns in order for them to be able to adopt BL.

According to the research literature, there are five assumptions related to CBAM theory (Anderson, 1997):

1. Change is a process, not an event;
2. Change is accomplished by individuals;
3. Change is a highly personal experience;
4. Change involves developmental growth in feeling and skills; and
5. Change can be facilitated by interventions directed toward the individuals, innovations, and contexts involved. (p. 333)

In examining the personal element of change, the CBAM model presents "how our feeling and perceptions evolve as the change process unfolds, which we have named the "Stages of Concern" (SOC)" (Hall & Hord, 2006, p. 134). The concerns are defined as complex representations of feelings, thoughts, considerations, and preoccupations towards a certain task (Hall & Hord, 2006). Furthermore, potential users' concerns are important for the adoption process of higher education innovations, and therefore, should be addressed throughout the implementation of a new innovation (Lee & Lawson, 2001 cited in Petheridge, 2007).

Participant-Based Approach to Change: The Stages of Concern (SOC)

According to Hall and Hord's (2006) SOC theory, an individual's concerns change when the user becomes more experienced in the use of an innovation "thoughts shift from the struggles of figuring out what to do to the satisfactions of seeing what happens with students, and of talking with others about the benefits of the change" (p. 134). User concerns (emotions, perceptions, attitudes, and feelings) related to the adoption of new instructional technologies appear to be developmental, in that earlier concerns must first be faced (lowered in intensity) before later concerns can be addressed (Petheridge, 2007). In order to learn how to change behaviors and practices, research was conducted on Fuller's innovation (Hall & Hord, 2006), through this work Hall and Hord further categorized Fuller's four levels of concerns (impact, task, self, and unrelated) into seven stages, which preserved Fuller's concerns while elucidating certain levels more fully (Table 2). According to Hall and Hord (2006), "the self and impact areas have been clarified by distinguishing stages within each. Self-concerns are now divided into two stages- informational and personal- and impact concerns into three- consequences, collaboration, and refocusing" (p. 139). The "task" and "unrelated" levels are clarified, respectively, as "management" and "awareness" concerns in this version of the model (Hall and Hord, 2006). With further studies and applications of the model, Hall and other researchers created seven stages of concern displayed in Table 2.

Table 2

Stages of Concern

	Stage of Concern	***Expression of Concern***
Impact	6. Refocusing	I have some ideas about something that would work even better.
	5. Collaboration	How can I relate what I am doing to what others are doing?
	4. Consequence	How is my use affecting learners? How can I refine it to have more impact?
Task	3. Management	I seem to be spending all my time getting materials ready.
Self	2. Personal	How will using it affect me?
	1. Informational	I would like to know more about it.
Unrelated	0. Awareness	I am not concerned about it.

Source: Hall, G. E., & Hord, S. M. (2006). *Implementing change: Patterns, principles, and potholes* (2nd ed.). Boston: Pearson/Allyn & Bacon, p. 139.

The SOC has been found useful in identifying the most intense area of concern of those involved in an innovation and has provided an understanding of some of the characteristics of potential adopters (e.g. age, amount of training, discipline, departmental support) that may influence concerns (Petheridge, 2007). This research has also provided some information for providing faculty professional development needs and other interventions that can support higher education faculty and staff involved in the process of adopting BL (Petheridge, 2007; Adams, 2002; Rakes & Casey, 2002).

The Stages of Concern About an Innovation

Higher education organizations are bureaucracies that are slow to change (Petheridge, 2007). Faculty members tend to resist change, as a result, since reforms come and go. Although the CBAM SOC model was developed in the 1970s, it has been updated to include three dimensions: measuring implementation in schools: the stages of concern questionnaire, measuring implementation in schools: levels of use, and measuring implementation in schools and innovation configurations.

> The emergence and resolution of concerns about innovations appear to be developmental, in that those earlier concerns must first be resolved (lowered in intensity) before later concerns can emerge (increase in intensity) (George, Hall, & Stiegelbauer, 2006, p.7).

Additionally, CBAM has been translated into several foreign languages, due to its applicability in other countries (George, Hall, & Stiegelbauer, 2006). CBAM has two uses: 1) as a tool for researchers to understand and evaluate a change process and its implementation, and 2) "as a means to develop, focus and support professional development" (George, Hall, & Stiegelbauer, 2006, p. 59) (see Table 3).

Table 3

Stages of Concern About An Innovation

Impact	6	Refocusing	The individual focuses on exploring ways to reap more universal benefits from the innovation, including the possibility of making major changes to it or replacing it with a more powerful alternative.
	5	Collaboration	The individual focuses on coordinating and cooperating with others regarding use of the innovation.
	4	Consequence	The individual focuses on the innovation's impact on students in his or her immediate sphere of influence. Considerations include the relevance of the innovation for students; the evaluation of student outcomes, including performance and competencies; and the changes needed to improve student outcomes.
Task	3	Management	The individual focuses on the processes and tasks of using the innovation and the best use of information and resources. Issues related to efficiency, organizing, managing, and scheduling dominate.
Self	2	Personal	The individual is uncertain about the demands of the innovation, his or her adequacy to meet those demands, and/or his or her role with the innovation. The individual is analyzing his or her relationship to the reward structure of the organization, determining his or her part in decision making, and considering potential conflicts with existing structure or personal commitment. Concern also might involve the financial or status implications of the program for the individual and his or her colleagues.
	1	Informational	The individual indicates a general awareness of the innovation and interest in learning more details about it. The individual does not seem to be worried about himself or herself in relation to the innovation. Any interest is in impersonal, substantive aspects of the innovation, such as its general characteristics, effects and requirements for use.
Unrelated	0	Unconcerned	The individual indicates little concern about or involvement with the innovation.

Source: George, A. A., Hall, G. E., Stiegelbauer, S. M., & Southwest Educational Development Laboratory. (2006). *Measuring implementation in schools: The stages of concern questionnaire*. Austin, TX: Southwest Educational Development Laboratory, *p. 8.*

Faculty members' involvement in implementing change in technology use has been considered important in many studies (Ali, 2003; Morgan, 2003; Rogers, 2000; Surry & Land, 2000, Petheridge, 2007). Furthermore, other studies had indicated that faculty's resistance to such technology changes was regarded as a major obstacle in the face of implementing electronic environments such as distance learning, online learning, e-learning, and blended learning (Petheridge, 2007; Adams, 2002; Atkins & Vasu, 2000; Bluhm & Kishner, 1988; Newhouse, 2001; Whiteside & Hames, 1985). CBAM theory and the stages of innovation questionnaire has increasingly been used as a theoretical framework for studying faculty adoption of technology in universities in the United States and providing direction for professional faculty development needs (Alexandrovich, 1998; Owusu-Ansah, 2001; Julius, 2007; Petheridge, 2007).

CBAM and Faculty Technology Adoption: Middle East, Africa and Saudi Arabia

CBAM has been used in a small number of studies of technology adoption in the Middle East, Africa, and Saudi Arabia (SA), with many of the same findings as in the U.S. Yidana studied CBAM and faculty adoption of technology in two universities in Ghana (2007), and Alshammari (2001) studied CBAM and the adoption of the Information Technology Curriculum in Kuwait in 2001. Both studies stressed the need for faculty professional development and administrative support for this change.

Because so few studies have been done at the university level on CBAM, studies done by Allhibi (2001) and Aljunaidi (2008) in SA provide some insight into some needs to be addressed in the adoption of blended learning in Saudi Arabia. Allhibi (2001) studied the differences between Science and Social Sciences faculty in internet adoption. In Allhibi's study, the internet was found to be in the "early stages of proliferation"

(2001, p. x) when he studied the adoption of the internet in two Saudi universities, King Saud and in Umm Al-Qura, where the researcher was a lecturer. Differences were found between the Social Sciences and Sciences group in adopting the use of the internet in teaching, with the Science group having more internet users than the Social Sciences group. Also, a higher percentage of the Science group adopted internet use earlier than the Social Sciences group. A higher level of use would connote a higher level of concern on the CBAM scale. The effect of contextual factors on technology adoption was noted in a study by Aljunaidi (2008), which found that academic rank, content area, and country of graduation were found to have a statistically significant relationship with the adoption and integration of WBI.

A problem with finding research in SA is that, while there may have been dissertations or studies done on CBAM, e-learning, or blended learning by Saudis who graduated from universities in other countries, it is not possible to know what studies or dissertations have been done within Saudi Arabia, itself. The nature of research and higher education in SA does not lend itself to research sharing. There is no equivalent to *Dissertation Abstracts* in SA, and universities maintain only their own research databases. Therefore, there it is not possible to know what, if any dissertations have been written on these topics within Saudi Arabia, itself.

Cultural and Religious Constraints of University Teaching in Saudi Arabia

Saudi Arabia is a young country, with 60% of the population under the age of 25 (El-Rashidi, 2007). There are not enough faculty to teach these students face-to-face. Moreover, the culture and the religious setting of the Saudi societies require separate colleges for men and women, because women cannot be seen by male faculty. Since there is a shortage of women faculty created by the growing number of female students taking classes, and closed circuit is expensive, e-learning provides a way to have male faculty teach female students in a culturally acceptable way.

In summary, CBAM studies in the Middle East, Africa, and SA found much the same as in those in the U.S. Selected contextual factors (gender, age, academic rank, nationality, area of content, country of graduation, and years of teaching experience), and technographic factors (attitudes towards technology integration in the Science curriculum, perceptions of the effects of BL use on pedagogy, and perceptions of technology professional development needs) have been found to influence the faculty member's stage of concern (unrelated, self, task and impact) in the adoption of technology in higher education. Faculty with no or little knowledge of e-learning, blended learning, or other online technologies had lower level concerns than those who had adopted the technology and were using it. Administrative support varied. However, technology adoption was to some degree dependent upon administrative training and support to make the needed changes expeditiously.

CBAM's Application to Science Faculty at Taibah University in Saudi Arabia

According to CBAM theory, faculty concerns toward offering a BL course can range between stages zero and six. As applied to Science faculty in Saudi Arabia, stage Zero "Awareness", relates to faculty's unconcern to adopt BL. Stage three, Consequence and Management, relates to skills that faculty need in order to offer online courses. Stage five, Collaboration, would relate to faculty concerns about BL outcomes, because people in this stage would be sufficiently knowledgeable that faculty would then be interested in the impact that the new method would have on learners (Bybee, 1996, para. 9). Faculty with the highest level of concerns, Stage six, Refocusing, would have more change concerns than faculty situated in Stage zero, Unrelated, since they would be knowledgeable about technology and using it, already, to a high degree, in their teaching. Thus, they would be interested in its impact and possible alternatives.

Based on previous studies, in order to prevent Taibah University Science faculty from a range of possible problems in adopting BL, it would be beneficial to begin professional development activities by providing the faculty with different examples of successful applications of BL in higher education institutions. According to Allhibi's (2001) study, since Science faculty were more willing to adopt the internet, (96.3%) compared with the Social Sciences group (62.1%), it is more likely that Taibah University Science faculty would be favorable toward adopting BL in their teaching. Adverse administrative support issues (lack of professional development, limited access to technology, etc.) were found in the NCELDL (2008) report, which have been found to negatively affect faculty adoption (Alshammari, O'Laughlin, 2007; Petheridge, 2007).

Statement of the Problem

The Ministry of Higher Education of Saudi Arabia promotes university faculty use of blended learning in instruction, since it provides a more cost-efficient and pedagogically sound way to blend traditional modes of teaching with new technologies. Blended learning also provides a way to bridge this new technology with cultural and religious practices. However, little is known about what concerns Saudi faculty have with using blended learning at Taibah University or what professional development will be needed to bring it into widespread use.

Purpose of the Study

This study investigated the concerns of Science faculty in the three departments (Biology, Chemistry and Physics) in Taibah University, Saudi Arabia, in adopting blended learning and investigates Taibah faculty's professional development needs in adopting and implementing BL, as well. This study was a response to Aafaq's (Future plan for Higher Education in Saudi Arabia, 2007) call for conducting studies on the current reality and future of higher education in Saudi Arabia. It was driven by the lack of empirical data and assessment on BL in Saudi Arabia. Further, information from this study can be used to design a professional development program for faculty training in the adoption of blended learning at Taibah University, thus preserving scarce Science teaching resources.

Significance of the Study

It will be the first study to examine the concerns and professional development needs of science faculty in using blended learning in the university setting in Saudi Arabia and also at Taibah University. The findings will begin a dialog on blended learning in Saudi Arabia, in particular, and add to the literature on blended learning, in general.

Research Questions and Null Hypotheses

This study investigated the concerns of science faculty at Taibah University in adopting blended learning and how these concerns relate to faculty professional development needs. There are two primary research questions:

1. What are Science faculty concerns in adopting blended learning at Taibah University?

2. What are Science faculty professional developments needs in order to adopt blended learning at Taibah University?

Research Question #1: Is there a significant relationship between science faculty contextual characteristics (gender, age, academic rank, nationality, content area, country of graduation, and years of teaching experience) and their concerns in adopting BL?

Null Hypotheses:

Ho 1.1. There are no statistically significant differences between science faculty gender and their concerns in adopting BL.

Ho 1.2. There are no statistically significant differences between Science faculty age and their concerns in adopting BL.

Ho 1.3. There are no statistically significant differences between Science faculty academic rank and their concerns in adopting BL.

Ho 1.4. There are no statistically significant differences between Science faculty nationality and their concerns in adopting BL.

Ho 1.5. There are no statistically significant differences between Science faculty content area and their concerns in adopting BL.

Ho 1.6. There are no statistically significant differences between Science faculty country of graduation and their concerns in adopting BL.

Ho 1.7. There are no statistically significant differences between Science faculty years of teaching experience and their concerns in adopting BL.

Research Question #2: Is there a significant relationship between science faculty technographic characteristics (attitudes toward technology integration in the Science curriculum, perceptions the effects of BL use on pedagogy, and perceptions of technology professional development needs) and faculty use of technology in teaching by department?

Null Hypotheses:

Ho 2.1. There are no statistically significant differences between science faculty attitudes towards technology integration in the science curriculum and faculty use of technology in teaching by department.

Ho 2.2. There are no statistically significant differences between science faculty perceptions of the effects of faculty IT use on pedagogy and faculty use of technology in teaching by department.

Ho 2.3. There are no statistically significant differences between Science faculty perceptions of technology professional development needs and faculty use of technology in teaching by department.

Three survey instruments were combined into one in order to examine these questions. The instruments used will be:

1) Section one is The *Measuring implementation in schools: The stages of concern questionnaire for innovation* from the SEDL (Southwest Educational Development Laboratory) validated instrument in Arabic. The purpose of this part of the survey on technology adoption levels of faculty was to assess Taibah University Science Faculty members' concerns in using BL and technology innovation. (See Appendix B for SEDL License Agreement).

2) Sections two through four were from Yidana's survey (2007) of faculty perceptions of technology use in teaching. (See Appendix C for Yidana's permission).

3) Section five of the survey was revised from one created by Petherridge (2007) on faculty attitudes toward technology integration into the curriculum. (See Appendix D for Petherridge's permission).

4) Section six of the survey on demographics was constructed by the researcher to apply to the research questions. (See Appendix E for Alshammari's permission).

Delimitation of the Study

This study was limited to the professional development needs of Science faculty of Taibah University in SA, since it is very difficult to obtain information from faculty from other departments at Taibah University, and the researcher is a faculty member in Science.

Limitation of the Study

While data from this study might provide limited information for use in the professional development needs of Science faculty at other SA universities, further extrapolation regarding specific needs would be required, due to the different student body compositions and missions of these universities.

Definition of Terms

For the purposes of this study, the following definitions will be used throughout:

Blended Learning (BL): "Blended learning is the planning integration of online and face to face instructional approaches in a way that maximizes the positive feature of each respective delivery mode" (Ragan, 2009, para. 4).

Concerns: Concerns are a combined representation of feelings, preoccupation, reflection and contemplation concerning a particular issue (Fuller, 1969; Hall, George &

Rutherford, 1979; Hall & Hord, 1987; Hall & Hord, 2006).

Concerns-Based Adoption Model (CBAM): the concern based adoption model theory: assigns individuals into one of its seven stages based on the amount of concern they have towards a new change. The seven concern stages are: (1) refocusing, (2) collaboration, (3) consequence, (4) management, (5) personal, (6) informational and (7) awareness (Hall and Hord, 2006).

Faculty: In Saudi Arabian universities, faculty structure is different than in the United States. Lecturers and Teaching Assistants have full-time positions and are accorded status as faculty should they obtain a doctorate. To move from Teaching Assistant or Lecturer to Assistant Faculty, one must obtain a Ph.D. In essence, teaching duties are quite similar, except that Teaching Assistant and Lecturer teach more classes and generally do not do research.

Jusur Learning Management System: This is an Arabic language LMC designed by the National Center for E-learning and Distance Learning in Saudi Arabia, which is similar to Blackboard.

Web-Based Learning Management System: “whatever the term, the software provides a means of administering e-learning by providing an access system as well as a tracking system for student progress. Of course facilities for communication, assessment and content display are also part of the platform” (Mason and Rennie, 2006, p. 71).

E-Learning: “is the effective learning process created by combining digitally delivered content with (learning) support and services” (Open and Distance Learning Quality Council of the United Kingdom, http://www.odlqc.org.uk/odlqc/n19-e.htm).

Abbreviations

BL: Blended Learning

CBAM: Concerns-Based Adoption Model

NCELDL: The National Center for E-Learning and Distance Learning in Saudi Arabia

SA: Saudi Arabia

SEDL: Southwest Educational Development Laboratory

SoC: Stages of Concern

CHAPTER 2- Literature Review

Chapter Overview

The chapter begins with a background overview of Fuller's Levels of Concern (1969), which form the basis of the Concerns Based Adoption Model (CBAM) (Hall and Hord, 2006), as well as studies of its application in higher education. The chapter then provides a general overview of e-learning's foundations in distance education. E-learning in Saudi Arabia is then discussed in terms of the Aafaq project sponsored by the Saudi Arabian Ministry of Higher Education. The Aafaq project is the strategic plan for the introduction of e-learning and other new technologies into higher education. This is the framework for the use of blended learning in the modern university classroom. The chapter then focuses on defining blended learning, studies of its use in higher education, its application in higher education in Saudi Arabia, and ends with the use of BL in teaching Science in higher education in Saudi Arabia.

Fuller's Levels of Concerns – Participant-Based Change

The notion of identifying one's feelings and perceptional concerns was first introduced by Frances Fuller (1969). Fuller was a counseling psychologist at the University of Texas at Austin. After teaching a required psychology education course for student teachers, Fuller found that the final course evaluation showed that 97 out of 100 rated the course "irrelevant" and "a waste of time". So, after investigating the reasons for such results, Fuller (1969) found that the three students who rated the course positively actually "were all middle aged men and women with considerable teaching or similar experience" (p.208). Thus, Fuller hypothesized that the three students' concerns were different since they already had previous background about education (Hall and Hord, 2006). As a result, Fuller started to conduct in-depth studies about the concerns of student teachers. She created a model showing how, with increasing knowledge and experience in a teacher education program, the student teachers' concerns moved through four levels: unrelated, self, task, and impact (Hall and Hord, 2006).

1. Unrelated Concerns: most frequently found among student teachers who have not had any kind of direct contact with a school setting or school-age children. So, their concerns are not related to teaching but rather focused on their college life or about other courses outside their field of education.
2. Self Concerns: Student teachers begin to develop self concerns when they begin their actual student teaching. Although they have concerns about their teaching, these concerns are still self-centered.
3. Task Concerns: student teachers develop task concerns after a short period of teaching due to the fact that their teaching becomes their central task.
4. Impact Concerns: concerns that focus on what is happening with students and what the teacher can do to be more effective in improving students' outcomes.

At the end of her study, Fuller (1969, p. 215) found that over two-thirds of the concerns of student teachers were in the self and task areas "77 percent concerned with self and 22 percent with pupil learning", whereas two-thirds of the concerns of the experienced teachers were in the task and impact areas. Fuller (1969) found that

> The specific concerns we have observed are concerns about the ability to understand pupils' capacities, to specify objectives for them, to assess their gain, to partial out one's own contribution to pupils' difficulties and gain and to evaluate oneself in terms of pupil gain. (p. 221**)**

Fuller then created the Concerns-Based Adoption Model (CBAM) theory. Based on Fuller's work, Hall, George, and Rutherford (1979) expanded it, and identified the Stages of Concern (SoC) as one of the basic dimensions of the model. Other dimensions were later identified, such as level of use (LOU) of an innovation and the innovation configuration (IC), which identifies how stakeholders describe the innovation.

Concerns-Based Adoption Model (CBAM) Theory

The Concerns-Based Adoption Model (CBAM) theory assigns individuals into one of its seven stages based on the amount of concern they have towards a new change (Hall and Hord, 2006). The seven concern stages are: (1) refocusing, (2) collaboration, (3) consequence, (4) management, (5) personal, (6) informational and (7) awareness (Hall and Hord, 2006). "The Stages of Concern define human learning and development as going through seven stages, during which a person's focus or concern shifts in rather predictable ways" (Sweeny, 2003, para.8). Thus, the theory helps administrators to design professional development sessions based on the types of concerns that the faculty has regarding change. These sessions help to decrease the instructors' concerns in order for them to be able to adopt the new change.

According to Hall & Hord (2001, 2006), there assumptions are related (Anderson, 1997) to CBAM theory:

1. Change is a process, not an event; a one-time approach will not affect change.
2. Change is accomplished by individuals; organizational leaders need to help individuals change.
3. Change is a highly personal experience; it involves a change in concern and attitude.
4. Change involves developmental growth in feeling and skills;
5. Change can be facilitated by interventions directed toward the individuals, innovations, and contexts involved. (p. 333).

Stages of Concern

Hall and Hord, through further research, categorized Fuller's four levels of concerns- impact, task, self, and unrelated, into seven stages of concerns, which further delineated them, yet preserved Fuller's original concerns (Table2). According to Hall and Hord (2006), "The self and impact areas have been clarified by distinguishing stages within each. Self-concerns are now divided into two stages- informational and personal- and impact concerns into three- consequences, collaboration, and refocusing" (p. 139). The "task" and "unrelated" levels are clarified, respectively, as "management" and "awareness" concerns in this version of the model. With further studies and applications of the model, Hall and other researchers created definitions for each of the seven stages of concern displayed in Table 3.

The theory, as applied to Science faculty in Saudi Arabia, those who have information and computer skills would be situated in the lowest concern level of awareness with a "zero". The concern would be with faculty abilities and attitudes towards using the computer, software, and internet. Moreover, stage three, Management, would relate to skills those faculty members needed in order to offer online courses. Additionally, stage five, Consequence, would relate to faculty concerns about BL outcomes, because those in this stage would be interested in the impact that the new method has on learners (Bybee, 1996, para. 9). Therefore, faculty with high concerns, in stage six, would have more change concerns than faculty in stage zero, who would be unaware of this method. Higher skills and abilities would mean fewer faculty change concerns. A higher level of impact concerns would reflect familiarity with the innovation to the degree that alternatives could be envisioned and applied. According to CBAM theory, faculty concerns would be anywhere between stages zero to six, based on their level of concerns towards offering a BL course.

CBAM and Selected Contextual Characteristics

Privateer (1999) stated that the "opportunity for real change lies in creating new types of faculty, new uses of instructional technology, and new kinds of institutions whose continual intellectual self-capitalization continually assures their status as learning organizations" (p.73). Most of the literature on college and university faculty found that faculty contextual characteristics (gender, age, academic rank, nationality, country of graduation, content area and teaching experience) were related to levels of concern in integrating technology into their teaching.

Gender

Owusu-Ansah (2001) found that the male faculty were less interested and willing to adopting technology-based distance education than female faculty. Alshammari (2000) found that gender had a significant relationship with the stages of concerns (management and refocusing stages) towards the implementation of the information technology curriculum in Kuwait.

Age

Age was found to be unrelated to a higher level of concern in integrating technology into instruction in earlier studies cited by Hall & Hord (2006). However, recent dissertations have found that age is related to a higher level of concern by most college and university faculty. Petherbridge (2007) studied the adoption of a Learning Management Systems (LMS) in a higher educational setting (n=1196, response rate of 29.5%) using the Stages of Concern questionnaire. Age was found to be predictive of a high level of concern in integrating LMS's into teaching. Owusu-Ansah (2001) also found that the older the faculty members were the less interested they were in using technology and the higher their concerns were in integrating technology-based distance education into instruction. Adams (2002) in a study that examined postsecondary faculty concerns related to the integration of technology into teaching practices, compared these concerns with demographic variables (n=589, response of the rate 39%) and found that the older post secondary faculty expressed higher concerns than the younger faculty did. According to Adams (2002) those younger faculty, in the 18-34 age range, also had a higher level of computer integration. While the response rate was low, the findings were consistent with recent dissertations and studies on higher education faculty in the U.S.

In Saudi Arabia, Al-Saif (2005) identified factors relating to organization, personal characteristics, curriculum, technology, and culture that motivated or inhibited the use of web-based instruction at the University of Qassim in Saudi Arabia (n=500, response rate of 42.6%). He found that faculty age played a role in the use of web-based Instruction (WBI); and faculty over fifty five years old were less likely to be interested in internet use then younger faculty members.

Academic Rank

Alharbi (2002) found that academic rank had a significant relationship with faculty attitudes toward implementation of online courses. Al Saif (2005) found that academic rank had a significant relationship with faculty use of the internet and affected the use of WBI. Al Saif (2005) also found that academic rank play important role in motivating faculty to use WBI with high motivation to use WBI with less academic rank professors and less motivated to use WBI with high academic rank. Moreover, Aljunaidi's study (2008) found that academic rank had a statistically significant relationship with adopting WBI. Aljunaidi (2008) found that most of faculty who adopted WBI were lecturers and teaching assistants (151), while only 66 who adopted the WBI had a Ph.D.

Country of Graduation

Most of the recent dissertations conducted by Saudi researchers in the United States studied the country of graduation as a factor that may play an important role in faculty's motivation in integrating online learning in their teaching. Alharbi (2002) in his study faculty adoption of internet technology in Saudi Arabian Universities (n=237) revealed that country of graduation had a significant relationship with faculty attitudes toward the adoption of online courses. The study found that faculty members who obtained their degree from a Western country showed positive attitudes and were also interested in adopting online courses, while other faculty members who graduated from Saudi Arabia or another Arab country showed a negative attitude and were not interested in adopting online courses. Alharbi (2002) mentioned that the reason behind this difference was that the faculty who obtained their degree from a Western country had experience with distance education, while those who graduated from SA and other Arab countries did not. Moreover, Aljunaidi (2008) also found that there was a statistically significant relationship between adoption and integration of WBI and the country of graduation.

Content Area

Adams (2002) studied faculty members at a metropolitan postsecondary institution and found that there was a significant correlation between the level of computer integration and teaching discipline, as well as age and years of teaching experience. Faculty members in the Sciences (Astronomy, Botany, Engineering, Agronomy, etc.) had lower concerns than those in the Social Sciences and Liberal Arts (English, Sociology, Educational Administration, etc.), though the differences weren't as high as they could be. These low differences could be attributable to Biglan's clustering of academic areas in which Ceramics was considered a "Hard" discipline and Accounting, Finance and Economics were considered "Soft" disciplines. Owusu-Ansah (2001) surveyed university faculty at three Southern U.S. universities using the Stages of Concern questionnaire on their perceptions of institutional support and their attitudes toward adopting technology-based distance education (TBDE) (n=1000, response rate of 33.4%). Nursing faculty were found to use TBDE the most and had the lowest concerns while Art had the highest concerns and the least interest in using TBDE. Petherbridge (2007), using stepwise regression analysis, also found that content area was predictive of lower concerns and higher technology integration.

In Saudi Arabia, three dissertations found links between content area and stages of concern. Allhibi (2001) also found that there were differences between the Social Sciences and Sciences group in adopting the use of the internet in teaching, with the Science group having more internet users than the Social Sciences group. Also, a higher percentage of the Science group adopted internet use earlier than the Social Sciences group. A higher level of use would connote a higher level of concern on the CBAM scale. Supporting these demographic variables' effect on levels of concern was a study by Aljunaidi (2008), (n=500, response rate of 66 %) which found that content area was found to have a statistically significant relationship with the adoption and integration of

WBI.

Teaching Experience

Teaching experience was related to faculty concerns. Petherbridge (2007) found that years of teaching were predictive of high faculty concerns, because faculty who had been teaching 9 – 16 years, or the faculty who had been teaching the longest, were most concerned. Owusu-Ansah (2001) found that the longer the faculty taught the less interested they were in using technology-based distance education. Adams (2002) had similar findings. His findings indicated that the faculty with 0 to 3 years of teaching experience had the lowest level of concerns and a significantly higher level of technology integration than those with 10 to 19 years of teaching experience. They also demonstrated the least interest in integrating technology into teaching. In Saudi Arabia, Al-Saif (2005) found that faculty members who had taught many years using traditional methods found it more difficult to adopt new methods in their teaching through the use of web-based instruction.

CBAM and Selected Technographic Characteristics

It is important for university administration to know the faculty skills that relate to technology integration in teaching prior to adopting a new innovation. According to Rakes and Casey (2002) administration must provide faculty members with information about how to integrate technology into teaching in order for faculty to be able to integrate the new innovation. In order to integrate newer technologies, such as e-learning and blended learning into instruction, Zemsky *&* Massy (2004) also stated, “what is required is a commitment to organized quality processes that transcend curricular innovation, stress technology as an important tool for improvement, and do not assume things are going well, absent evidence to the contrary"(pp.57-58).

The concept of "technograhic" factors comes from Mitra & Hullet (1997 cited in Petherbridge, 2007) in which the concept of demographics was extended to "technology use and exposure" (p. 57). Thus, the term "technographics" was coin. "Technographics can include prior exposure to technology, categories of technology use, and a variety of factors that may address the technological characteristics of people" Petherbridge (2007, p. 57). Like Petheridge, this study of technographic characteristics will include, attitudes toward teaching with technology, prior technology use in teaching and technology related professional development,.

Attitudes toward using Technology in Teaching

Many faculty members are slow in integrating technology into teaching because they think that using technology will not improve their students' learning (Neal, 1998; Reid, 1996; cited in Rogers, 2000). This can be true if technology is used improperly. However, if sufficient and appropriate training is provided, then university administration provide professional development in technology integration in teaching before providing or asking faculty members to adopt this innovation. Petherbridge (2007) found that faculty with positive attitudes toward teaching with technology had lower unrelated and task concerns scores while faculty with negative attitudes toward technology had increased unrelated concerns scores. Faculty with pre-existing negative attitudes toward integrating technology in teaching focused on non-technological issues.

In Saudi Arabia, Alsaif (2005) found that university faculty had more positive attitudes toward using technology in their teaching at the university due to required university technology use, "opportunities for scholarly pursuit" and "enhanced job security" (p. 58). Allhibi (2007) found that the use of the internet was in the early stages in the two universities that he studied in Saudi Arabia, and faculty stages of concerns were "not intensely concerned about the internet's consequences for students (low stage 4)", as would be expected from low use (p. 101). Skill-oriented training programs were recommended to "lessen faculty fear" (Allhibi, 2007, p.117).

Technology Use in Teaching

Petherbridge (2007) found that faculty members who had prior experience with using a campus LMS had lower unrelated concerns scores. While Todd (1993), in a study to determine faculty concerns about integrating computers into teacher education courses, also found that experienced users who developed instructional units in which they integrated technology into their teaching had more intense concerns about the impact stages of use than did the inexperienced users who had not yet integrated technology. Alsaif (2005) also found that faculty members with computer skills were more likely to use technology in teaching than other faculty members who did not have them. In addition, Hall & Hord (2001) stated that Awareness, Informational, Personal, and Management (stages 0, 1, 2, 3) concerns lower with increased technology use.

Technology-Related Professional Development

To achieve effective use of technology in the classroom, Rogers (2000) stated that there was a need for a major "shift from teaching to learning which requires adequate training in technology and learning styles (p. 19)". Petherbridge (2007) found that faculty impact-consequence concerns scores increased due to their participation in technology-related training. In addition, Petherbridge (2007) stated that "faculty members will need a variety of professional development activities in order to move beyond intrinsic concerns associated with using a new innovation, achieving the ‘ideal’ concerns area of impact-consequence and impact-collaboration (p.246)”.

Petheridge’s (2007) recommendations concluded by suggesting that university administrators needed to create technology-integrated professional development training sessions which would motivate faculty members to improve their students’ learning and collaboration. Adams (2002) found a correlation between faculty attendance in technology integration professional development sessions and increased levels of technology use in teaching. Alsaif (2005) also found that a lack of training by faculty on innovations was the main reason that faculty members did not integrate the innovation. In general, most studies found that university professional development increased faculty use of technology and enhanced attitudes toward integrating technology into instruction.

E-Learning

The roots of e-learning are in distance education. Distance education has several definitions. Distance education is defined as “a planned learning that normally occurs in a different place from teaching, requiring special course design and instruction techniques, communication through various technologies, and special organizational and administrative arrangements” (Moore & Kearsley, 2005, p. 2). Holmberg (1995) defined distance education as covering the various forms of study at all levels, which are not under the continuous, immediate supervision of tutors present with their students in

> lecture rooms or on the same premises but which, nevertheless, benefit from the planning, guidance and teaching of a supporting organization, (p. 2)

Keegan (cited in Falowo, 2007) defines distance education as

> 1-the quasi-permanent separation between teacher and student throughout the length of the learning process; 2- the influence of an educational organi-

> zation both in the planning and preparation of learning materials and in the provision of student support services; and 3-the use of technical media: print, audio, video, or computer to unite teacher and learner to carry out the content of the course. (p. 318)

Thus, because of the growing demands of obtaining jobs, students had to quit school, therefore distance education can provide many people with the chance to complete their studies while working. Distance education also provides the chance for people to gain degrees from foreign universities without leaving their home countries, as well as their jobs or homes.

E-Learning Types

According to the reviewed literature, there are two types of e-learning: synchronous and asynchronous (Fallon and Brown, 2003). Synchronous e-learning requires the presence of both the instructors and students at the same time by using any software package and internet to collaborate and clarify the subject matter being studied. Moreover, students and instructors are able to record the discussion during the meeting and utilize it in the future.

Asynchronous e-learning does not require instructors and students to meet at the same time. Students are able to access the course material at any time that is appropriate for them. Henderson (2003) added another type of e- learning called self-directed learning. In this type of e-learning, “there is no instructor or group of peer students to communicate with” (Henderson, 2003, p. 130). The student interacts with the course materials alone, at any time.

Horton (2006) identified some activities that determine the kind of e-learning that instructors should use in their course in the following table (5):

Table 4

When to choose Synchronous and Asynchronous

Synchronous	**Asynchronous**
Learners need to discuss issues with other learners at length	Learners are from a wide span of time zone and countries
Learners need the motivation of scheduled events reinforced by peer pressure	Learners have inflexible or unpredictable work schedules
Most learners share the same needs and have the same questions	Learners cannot wait for a class to form
	Learners have unique individual needs

Source: Horton, W. K. (2006). *E-learning by design*. San Francisco: Pfeiffer, p. 364.

E-Learning Advantages

According to Lai (2005) there are the four R's which students benefit from in e-learning: Relationships, Reflection, Resourcefulness, and Resilience. Students are able to form different *relationships* during course orientation sessions through collaborating with each other. According to Lai (2005) such collaboration helps the students to facilitate the difficulties they might face during the course. In addition, students are required to provide *reflections* in e-learning courses. Therefore, e-learning courses offer a good chance for students to develop a reflection manner in which is "a clear indicator of both academic ability and a commitment to succeed" (p. 40). Moreover, e-learning has a *resourcefulness* feature**.** It involves the use of different technologies and resources and students need to know how to use them. Therefore, e-learning courses give students the chance to increase their technological knowledge and skills. All of these features make a resilient environment. Students have motivation to succeed: the heavy load of individual work they carry throughout an e-learning course make the students want to obtain a high score at the end of the course. Therefore, students will develop skills such as time-management that are necessary for success.

Rosenberg (2001) identified different benefits of e-learning in several domains. For instance, e-learning lowers the costs of education for both learners and educators. Its content is timely and dependable. The following table shows in detail the eleven benefits that Rosenberg identified.

Table 5

E-learning Advantages

Lowers Costs	It cuts travel expenses, reduces training time, eliminates or significantly reduces need for a class room/instructor infrastructure, and startup investment can be quickly recovered through delivery savings.
Enhances Responsiveness	Can reach an unlimited number of people virtually simultaneously, critical when business practices and capabilities have to change fast.
Consistent or Customized Messages	Standardized content that can be customized for different learning needs or different groups of people.
Timely and Dependable Content	Can be updated instantaneously, easily and quickly upgraded, immediately distributed to large numbers.
Learning is 24/7	People can access e-learning anywhere and anytime. It's "just in time –any time" approach makes an organization's learning operations truly global.
No "Ramp-Up" Time	With so many millions of people already on the web and comfortable with browser technology learning to access e-learning is quickly becoming an issue.
Has Universality	Web-enabled, takes advantage of the universal Internet protocols and browsers, platform and operating system differences are fading.
Builds Community	Enables the building of enduring communities of practice long after training ends and serves as a motivator for organizational learning.
Is Scalable	Programs can move from 10 participants to 100,000 participants with little incremental cost (as long as infrastructure is in place).
Leverages Corporate Investment	Uses huge investment in installed corporate and institutional intranets.
Enhances Customer Service	Helps customers to derive increased benefit from the corporation or institutional website.

Source: Rosenberg, M. J. (2001). *E-learning: Strategies for delivering knowledge in the digital age*. New York: McGraw-Hill, p. 30-31.

Lai (2005) explained that such collaboration helped students to facilitate the difficulties they can face during the course. Therefore, e-learning courses offered an opportunity for students to develop a reflection manner that was "a clear indicator of both academic ability and a commitment to succeed" (Lai, 2005, p. 40). Wilson (1996) also found that e-learning required one to be resourceful and reflective (Herrington & Oliver (2002). It also involved the use of different technologies and resources which students needed to know how to use (Cushing, 1998). Therefore, e-learning courses provided students the chance to increase their intellectual and technological knowledge and skills (Allen & Seaman (2006). All of these features made for a resilient environment in which students develop skills, such as time-management, that were necessary for occupational success.

E-Learning Disadvantages

Disadvantages to e-learning vary, and encompass pedagogical, social, and technological factors (Henderson, as cited in Mackay & Stockpart, 2006) identified these disadvantages in e-learning:

- Lack of concrete learning activities. Carrying activities electronically could, if not properly planned, eliminate the chance to do hands-on activities that demand students to physically, feel, observe objects. Therefore, e-learning could prevent students to fully experiment on certain objects and therefore limit the learning outcomes of the course.
- Limited interaction. E-learning environments are considered boring for students if they do not have the chance to interact with other students during the learning process.
- Limited motivation to complete e-learning courses. Because students have limited interaction with the instructor and don't fully have an interaction with their peers, students could lose the motivation to learn and complete the course.
- Technical difficulties. Students may not have been properly introduced to the technologies introduced, may not wish to use this technology, or may experience technical difficulties when the course website is not operating.

Therefore, e-learning instructional designers and instructors should take these disadvantages into consideration when designing e-learning courses. For example, students must be given the chance to interact with each other by assigning them to do activities with real objects, dividing them into study groups, requiring discussions, designing authentic, real-time activities on projects that affect students' lives, providing support staff contacts for technical difficulties, and providing learning process guidelines to aid students in coping with e-learning and also using learning management systems (O'Laughlin, 2007; Petheridge, 2007; Rakes & Casey, 2002; Rogers, 2000).

E-Learning in Saudi Arabia Higher Education

The Saudi government has chosen to improve its educational system by adopting new technology-assisted teaching methods of e-learning and blended learning. It specifically wants to apply the most successful ways in education to solve its current educational and teaching problems. The educational system in Saudi Arabia is developing in order to become parallel to educational systems in first world countries. For this reason, the Saudi government has established the National Plan for Communication and Information Technology to help universities, community colleges and institutions to achieve their goals to improve student's achievement by adapting new instructional strategies (Ministry Of Higher Education, 2007). The National Plan for Communication and Information Technology recommends applying E-learning and distance learning in higher education. Moreover, a national center of E-learning and Distance learning will provide technical support for the development of E-learning content in Saudi universities (Ministry Of Higher Education, 2007).

In introducing e-learning into Saudi higher education, a specific definition is required. Yet, Saudi faculty is still in the process of learning what e-learning is. This lack of knowledge is reflected in earlier definitions, even as late as 2002, which reflected their lack of knowledge of the internet and online learning, in general, and e-learning in particular. Al-Kalifah (2002) defined it as “one kind of distance education. It is known as a process of gaining skills and knowledge through studied interactions with educational courses that are easy to approach through using browsing programs, such as Netscape and Internet Explorer" (p. 432). Al-Kalifah thought that merely browsing the Web constituted e-learning. Al-Mobirek (2002), another well-known Saudi educator, defined e-learning as “the kind of learning based on World Wide Web. Through the use of it the educational company designs a special website with some certain educational programs" (p. 337). This definition reflected the thought that e-learning was the construction of a website to be browsed.

This lack of understanding created the need for a uniform definition of e-learning that applied to Saudi Arabia. Finally, the Saudi Ministry of Higher Education developed a common definition of e-learning in 2007:

> a learning approach through the use of technology and modern communication methods such as computers, networks, multimedia, data bases, electronic libraries, and internet either outside or inside the classroom setting. In short, it is the use of all kinds of technology to deliver information for learners in a short period of time with least effort and more benefit(Ministry of Higher Education, 2007, p. 2)

Once the Ministry was knowledgeable to accurately define e-learning, then it was able to begin to develop programs and structures to support e-learning in Saudi Arabian universities.

Current Status of E-learning in Saudi Arabia

The Ministry of Higher Education (2007) distributed a survey among universities working with the e-learning project. Its purpose was to ascertain the status of e-learning in universities in Saudi Arabia. The results indicated that e-learning was in a state of flux, without centralization, faculty understanding, or administrative support. The survey found:

- Different levels of e-learning and distance education application among universities due to the lack of infrastructure in most universities.
- E-learning centers had been established in some universities, while others only offer e-learning/distance education courses.
- No clear goal in adopting e-learning/distance education in most universities.
- Lack of a specific budget for adopting e-learning/distance education in most university.
- The use of different LMS (WebCt, Moodle, EMES and Jusur) in universities
- No connection between libraries, e-learning and distance education centers
- No strategic future plan for adopting e-learning/distance education.
- No coordinated research in Saudi Arabia due to the lack of a central database of dissertations, such as (UMI), and
- No research on e-learning/distance education.

These survey results indicated the need for a coordinated approach by the Ministry to address these problems, the need for a country-wide approach to research, training, pedagogical, and administrative support, as well as a great need for the professional development for this type of learning in Saudi universities.

Need for E-learning in Saudi Arabia

Saudi universities need to adopt e-learning for many reasons (NCELDL, 2008). First, there is a shortage of Saudi faculty. There is also an increasing number of students. Saudi Arabia is a young country, with 60% of the population under the age of 25 (El-Rashidi, 2007). There are not enough faculty to teach these students face-to-face. Because women cannot be seen by male faculty, separate colleges must be maintained for men and for women. The shortage of women faculty created by the growing number of female students taking classes, and the expense of closed circuit combine to make e-learning a cost-efficient and culturally acceptable way to have male faculty teach female students.

Other Saudi Plans to Improve Higher Education

To relieve these pressures, the Saudi government has established the National Plan for Communication and Information Technology to help universities, community colleges and institutions to achieve their goals to improve student's achievement by adopting new instructional strategies (Ministry Of Higher Education, 2007). The plan recommended the implementation of e-learning and distance learning in Saudi higher education institutions. For this reason, the National Center for E-learning and Distance Learning (NCELDL) was established in 2007 to:

1- "Deliver higher education to all in an effective way through e-learning,
2- Deliver quality higher education through e-learning,
3- Promote education via technology,
4- Ensure quality standards for e-learning, and
5- Bridge the gap of education and technology" (NCELDL, 2007, para 2).

Moreover, NCELDL designed Jusur - a learning management system in Arabic - to manage e-learning in Saudi Arabia. In addition, this center also established the award for e-learning excellence to accomplish the following objectives:

1- "Appreciate unique and excellent staff in the E-learning field.
2- Encourage all Higher Education institutions to develop their performance in E-learning.
3- Develop creativity in Higher Education Institution staff.
4- Raise the competitive spirit in the Higher Education institutions on for being unique in E-learning applications".

In response, the NCELDL (2007) sought to fulfill the following goals:

- Develop research and development agendas aimed at facilitating e-learning across higher education sectors.
- Work across all universities in e-learning infrastructure development, nationally and internationally.
- Develop at least three new e-learning programs by 2009.
- Provide complete e-learning solutions to at least three strategic partners by end of 2010.

As can be seen by this survey, much has been planned and much needs to be done in SA to institute e-learning in a systematic fashion.

E-Learning Research in Higher Education in Saudi Arabia

Online learning and web-based instruction are variants of e-learning, since each requires a learning management system. Research and dissertations on the use of online learning in SA indicated that, while online learning was seen to be important and useful (Almogbel, 2002; Al-Saif, 2005; Alsheri, 2005). Some inhibiting factors in its use were lack of knowledge and skills (Almogbel, 2002; Al-Saif, 2005; Alsheri, 2005).

Almogbel (2002), in a study of web-based instruction, found barriers to be the poor internet infrastructure, lack of support in any form, the lack of distance education training, and concerns about (WBI) course quality affected faculty use of (WBI). Almogbel (2002) conducted a study to understand the perceptions and attitudes of faculty, students, and administrators towards distance education at Abha Technical College (ATC). The study found that faculty, students, and administrators agreed that adopting distance education would be beneficial for (ATC). Therefore, due to the shortage of research in the areas of e-learning and online learning, and the fact that there was no study on BL in Saudi higher education, the Saudi Ministry of Higher Education established the Aafaq project in 2007 to support and develop the quality of higher education system in Saudi Arabia for the next 25 years.

Aafaq - A Future Plan for University Education in the Saudi Arabia (2007)

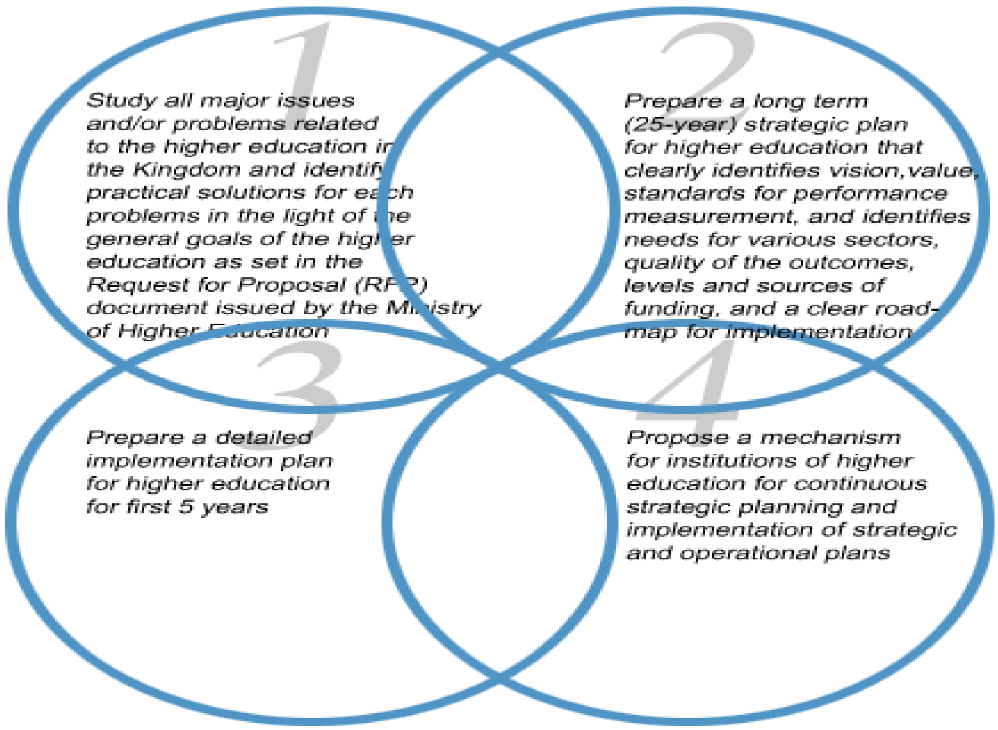
The Ministry assigned the research institute at King Fahd University of Petroleum and Minerals to design the future plan for Saudi higher education for the next twenty five years to be one of the best higher education systems in the world. The Aafaq project goal was to improve higher education in fields related to faculty, students, educational technologies and information technology. It also aimed to adopt different approaches to integrate technology learning and teaching.

Executing the Aafaq Project

The Project committee sent invitations to participate in the project through providing studies and, consultations (Aafaq, 2007). The project committee has also held workshops, seminars and training in main cities of the kingdom in order present the plan higher education institutions and to encourage open discussions about the project.

One of the Aafaq aims was to improve the use of educational technologies and information technology in higher education. Aafaq aimed at adopting different approaches that integrates technology in both the learning and teaching domains. Therefore, the four following goals were established (see Figure 2).

Figure 2. Aafaq Project Goals



Source: Aafaq: Future plan for Higher Education in Saudi Arabia (2007)
http://aafaq.kfupm.edu.sa/project/goals.asp

To avoid the disadvantages of e-learning and to benefits from face-to-face learning the need of new learning emerge which was Blended Learning.

Use of E-Learning in Saudi Arabia

Since there are so many definitions that can apply to different aspects of e-learning, the researcher undertook to find studies on e-learning, web-based instruction or similar studies that were subsumed under the accepted definition of e-learning for this dissertation. When using related terms, only one dissertation was found on the adoption of web-based instruction by English Language faculty in twenty higher education institutions in Saudi Arabia (Alnujaidi, 2008). The definition of "web-based instruction" was given as:

> …a hypermedia-based instructional program that utilizes the attributes and resources of the World Wide Web to create a meaningful learning environment where learning is fostered and supported (Khan, 1997, cited in Alnujaidi, 2008, p. 8).

This definition is imprecise, since "hypermedia" is a term that is no longer used, having been superseded by e-learning and "meaningful learning environment where learning is fostered and supported" is subjective. However, web-based instruction has many of the same elements as "e-learning". The study used descriptive statistics (frequency distribution, percentage, means, and standard deviation) and inferential statistics (multiple linear regressions) to analyze data from 320 participants in 18 universities and two private colleges in Saudi Arabia, based on surveys being sent to a sample of 500 faculty, or a 66% return rate. There was no indication of how many follow ups the researcher made to increase the survey return rate. While web-based instruction adopters tended to be younger, based on descriptive statistics, web-based instruction adoption did not significantly correlate with age (r=-.074, p=.186). However, age and academic rank were not studied together, so the mean age of faculty, associate faculty and assistant was not known. It is possible that age may be correlated with academic rank and that these factors may influence web-based instruction adoption. Also, gender, nationality and teaching experience also did not significantly correlate with web-based instruction adoption (p. 118). Correlations between web-based instruction adoption and academic rank (r=-.116, p=.038), major (r= -.127, p=.023) and country of graduation (r-.147, p=.008) were statistically significant.

The study concluded that the adoption and integration of web-based instruction among English language faculty members in the Saudi institutions of higher education was in its early stages. Moreover, Alnujaidi (2008) raised an important point that needs more research to help Saudi higher education to improve university faculty “instructional process, professional development, and technology integration” (p. 132). Alnujaidi (2008) stated that Saudi Arabia higher education has emphasized the building of university campuses with “little, if any, attention paid to the instructional process, professional development, and technology integration” (p. 132). Alnujaidi (2008) found that Saudi faculty needed the following elements in order to improve their instructional technology use in the teaching process:

- Technology integration professional development through workshops, seminars, and conferences.
- Training on how to best integrate WBI in their teaching process.

Though web-based instruction can be considered roughly equivalent to e-learning, depending on the circumstances, uses, and technologies used, no studies were found on the adoption and integration of “e-learning” by Saudi faculty in Saudi institutions of higher education.

Blended Learning

The term Blended Learning (BL) has undergone different definitions according to the methods and intended purposes of its application. According to Dzakiria, Mustafa, and Abu Bakar (2006) the term “blended learning” has many different, and sometimes contrasting, definitions. Therefore, there is no one definition that most researchers reference or use. However, despite this variety and contrast most BL definitions agree on the core aspect of “mix, blend, or hybrid” while each of them is distinguished through the kind of components that instructors blend together. The University of Wisconsin–Milwaukee defined a blended or a hybrid course as one that mainly combined two methods of instruction - face-to-face classroom instruction and online learning. Some elements of teaching activities took place online. Thus, such courses reduced the time spent in the classroom. As a result, the studies that defined BL fall in one of the four following groups (Driscoll, 2002):

(1) A blend between two or more modes of web-based technology.

(2) A blend between two pedagogical methods to produce optimal learning outcomes, with or without instructional technology.

(3) A blend between traditional face-to-face and online learning.

(4) A blend or mix instructional technology with actual job tasks.

Each of these groups are discussed below:

1- Blend Between Two or More Modes of Web-Based Technology: There are other studies that fall into Driscoll’s group that defined BL as a blend between two or more modes of web-based technology. For instance, Welker and Berardino (2006) defined BL as the use of electronic learning tools with face-to-face learning. In addition, Singh (2003) also stated that in BL several delivery media are used to enhance the learning process. Elsenheimer (2006) similarly stated that BL

> should not refer to just the mixing of training delivery methods (as it is often defined) but to the orchestrated application and integration of instruction, tools, performance support, collaboration, practice, and evaluation to create a unified learning and performance environment. (p. 26)

Due to the wide variety of Web-based educational software and online resources, instructors had the opportunity to use more than one approach in their classrooms. Using more than one Web-based technology motivated the students and enabled the instructors to overcome any limitations of both kinds used.

2- Blend Between Various Pedagogical Methods: There are also a number of studies that according to Driscoll (2002) defined BL as a blend between various pedagogical methods. The University of Wisconsin–Milwaukee explained that BL is integrating approaches that involve the deployment of diverse methods and resources to both the educational and learning processes. Howard, Remenyi and Pap (2006) also stated that BL "refers to the use of learning activities of differing kinds and venues to synergistically achieve overarching learning objectives" (p. 11). This type of BL does not require the integration of technology into instruction.

3-Blend Between Traditional Face-to-Face and Online Learning It is important to note that most of the educational research concerning BL tends to fall in Driscoll's group, which defined BL as a blend between traditional face-to-face and online learning (Davis & Fill, 2007; Duhaney, 2004; Motteram, 2006; Tang & Byrne, 2007; Yoon & Lim, 2007).

Singh (2003), Welker and Berardino (2006), and Beatty (2007) refer to BL as a mix, hybrid and a combination of traditional face-to-face teaching and activities with online learning activities.

> Yoon and Lim (2007) defined BL as a:
>
> Purposeful mix of delivery media (particularly face-to-face and various forms of technologies) to improve learning/performance solutions, which are derived from the goals and needs of an organization. This framework proposes five procedural, interrelated phases that create strategically

blended solutions for both instructional and non-instructional solutions. (p. 475)

Lynch and Dembo (2004) also defined blended education as a kind of distributed education, which includes both face-to-face and distance models of delivering education. Duhaney (2004) stated that BL is “the use of synchronous or asynchronous technologies and traditional face-to-face instruction, in different forms or combinations, so as to facilitate teaching and learning” (p. 35). Similarly, Davis and Fill (2007) defined BL as “the combination of traditional face-to-face teaching methods with authentic online learning activities [which] has the potential to transform student-learning experiences and outcomes” (p. 817).

According to these definitions, which are based on mixing face-to-face learning with the online one, BL gained advantages from both face-to-face and online learning. It facilitated both the learning and teaching processes. Mixing face-to-face learning with the online one reduced the number of on campus class meetings. It also reinforced student-centered learning; yet at the same time it maintained the chance for the instructors to both guide and evaluate the learning process during face-to-face sessions.

<u>4- Blend or Mix Instructional Technology with Actual Job Tasks:</u> In addition, there are other groups that fall into Driscoll’s (2002) category of defining BL as a blend or mix of instructional technology with actual job tasks. Rovai and Jordan (2004) identified the concept of BL to three areas, “thinking less about delivering instruction and more about producing learning, reaching out to students through distance education technologies, and promoting a strong sense of community among learners” (p. 11). This type of BL reinforces the demonstration of students’ practical knowledge, therefore learning process outcome is the most important element.

Benefits

Most of the studies related to the BL field included in their final report the advantages of adopting blended learning (Yoon and Lim, 2007). Singh (2003) provided three benefits of BL:

1. **Extending the Reach:**

   Presenting knowledge through one medium that is limited to one specific time and place limits the number of students acquiring this knowledge. For example, practical training sessions that take place in the lab are only accessible for a specific number of students, whereas a virtual classroom event is inclusive of remote audiences. It also would be more beneficial if the virtual classroom was preceded by recorded knowledge objects, such as a playback of a recorded live event. In this way, such knowledge will extend the reach to those who could not attend at a specific time and place.

2. **Optimizing Development Cost and Time:**

   Because BL combines different knowledge delivery methods (Singh, 2003), it is able to balance out and optimize the learning program development and deployment costs and time. Presenting training program content through a completely online Web-based medium could be too expensive to produce due to its demanding nature of requiring multiple resources and skills, whereas combining virtual collaborative and coaching sessions with simpler self-paced materials such as recorded e-learning events, text assignments, and PowerPoint presentations could produce the same effect of a Web-based session.

3. **Evidence that Blending Works:**

   Because BL is a new domain, there is a shortage in studies that cover different aspects such as the best procedures of constructing the most effective blended program designs. However, the available research on BL from institutions such as Stanford University and the University of Tennessee have optimistically shown that BL has proven to be better than both traditional methods and individual forms of e-learning technology preformed alone. Such research results make it possible to predict that blending not only offers the ability to be more efficient in delivering learning, but also more effective (Singh, 2003).

There are other benefits of BL. For instance, Dzakiria, Mustafa and Abu Bakar (2006) explained that BL, through mediums such asynchronous and synchronous chat or video conference, can lead to motivating environments where instructors and students can interact and discuss scholarly ideas. Dziuban, Hartman and Moskal (2004) mentioned that BL can be used by instructors who are not completely familiar with online environments as a first step to shift to a total online medium. BL provides them the opportunity to use some face-to-face teaching methods and at the same time the chance to expand the online component as their skill in the online environment starts to increase. In addition, the researchers also discussed different benefits that BL offers for the institutions presenting this kind of learning. BL can increase the efficiency of using the classroom, which leads to a positive increase in students' outcomes and a decrease in the instructional delivery cost. Mackay and Stockport (2006) also explained that BL was able to overcome some shortcomings found in some e-learning designed programs and at the same time reinforce aspects such as high quality instructor-led sessions.

Student Benefits: Vaughan (2007) found that BL provided students with time flexibility and improved student learning outcomes. Similarly, Pritchard (2006) after conducting a study to address why undergraduate students chose to enroll in hybrid courses at Wilmington College found that students had positive perceptions concerning the structure of BL. The study also showed that using the BL structure helps remedy the students' concerns in the area of course management because of the opportunity to receive face-to-face sessions during the course. Moreover, Futch (2005) conducted a study of BL at a Metropolitan university to provide the perspectives of both students and instructors of a BL course. The study concluded that students appreciate the mix of face-to-face sessions because it satisfies their socialization needs and the opportunity to complete other portions of the course online.

Faculty Benefits: faculty who taught a blended course had positive experiences (Vaughan, 2007). BL enhanced teacher and student interaction, increased student engagement in learning, enhanced students' continuous learning improvement due to the flexibility of the teaching environments. Although that BL takes more time to both deliver and develop, faculty explain that its quantity and quality of interactions improve in such environment (Futch, 2005).

Administrative Benefits: BL provided opportunities to enhance an institution's reputation through the expanded access to its educational offerings (Vaughn, 2007). BL also reduced the institution's operating costs. Wittmann (2006) conducted a study to explore the benefits of BL for administrators. The study showed that it is important for the administrators to recognize the importance of integrating the BL structure into their higher education institutions.

In the same vein, Fainholc and Scagnoli (2007) also suggested some benefits of adopting BL through pointing out that BL is an effective approach that could be used to improve the quality of learning processes, which leads towards creating new models within the knowledge society. He also pointed out that BL increased the opportunity of producing good technological and educational design.

Similarly, Howard, Remenyi and Pap (2006) anticipated that adoptive BL environments were of high benefit to instructors. In this environment instructors also became learners and reflective practitioners. Through learning about their students' achievement through different venues such as online exercises and other forms of technological methods, they were able to see their teaching as an evolving enterprise. According to the researchers, instructors' knowledge about learners gained from the different activities could be used adaptively by subsequent activities.

In the same vein, Garrison and Vaughan (2008) highlighted the importance of integrating campus and online educational activities in order to develop the quality of the learning and teaching experience. They considered that BL provides a chance to redesign effective teaching approaches that enable higher learning institutions to take advantage of the increased effectiveness, convenience, and efficiency found in BL. Through different activities, students will be able to engage in the critical discourse and reflection that will enable them to participate in creating an inquiry process that is beneficial for both teaching processes in higher education.

Rogers and Oder (2001) also stated that BL courses lead to positive cognitive change because learners are taught through different strategies. Thus, students were able to adjust their learning style according to their personal situations to reach their intended learning goals. Students were also able to adjust their course and job schedules because they had the chance to learn inside and outside of campus (Wild and Quinn, 1999 cited in Rogers and Oder, 2001).

Moreover, Howard, Remenyi and Pap (2006) stated that

> the prospect of adaptive blended learning environments promises richer sources of information about how learners can misunderstand and misapply knowledge as they progress through learning activities performed in multiple venues. The challenge is to turn this information into understanding and to use this understanding to guide more learners to achieving successful outcomes (p. 16).

The University of Wisconsin–Milwaukee and other universities asked students about their opinions of blended courses. The University of Wisconsin–Milwaukee students reported that they significantly preferred and enjoyed the blended course format for the following reasons:

- Students were able to have more time flexibility, freedom, and convenience by having online classes from home, which decreased commuting and parking problems.
- Students were likely to interact more with both the instructor and the other students both in class and online.
- Students had access to unlimited up-to-date resources on the internet.
- Students developed time management, critical thinking, and problem solving skills.
- Students had the chance to participate more in class discussions because they can choose the class session — online or face-to-face — in which they feel more comfortable.

- Students had more time to participate and refer to relevant course and other research materials in the online session than when responding in class.
- Students typically had unlimited access to online course materials.
- Students receive more frequent feedback from their instructors and other students.
- Students gained useful skills due to their frequent use of the Internet and computer technology.

Therefore, adopting BL provides students, faculty, and administrators with many benefits. Due to the flexible nature of the BL course, students have more time to think and participate in the online portion, have direct and immediate clarification from the instructors and interact with other students during the face-to-face sessions of the course. In BL courses, students are also able to access course materials without the restrictions of time and place. Some blended learning benefits are the decreased number of face-to-face meeting and instructors have more time to work on course materials for both the online and face-to-face sessions. They are also able to teach another BL course for another number of students. Therefore, adopting BL courses give higher education institutions the opportunity to increase their budgets through admitting larger numbers of students to its programs without the need to hire more instructors or build new classrooms Instructors who adopt BL are able to guide and clarify student's misconceptions that may have regarding online subject. BL also provides a chance to redesign effective teaching approaches that enable higher learning institutions to take advantage of the increased effectiveness, convenience, and efficiency found in BL. BL courses lead to positive cognitive change because learners are taught through different strategies.

Disadvantages

With all the advantage of BL, there also certain disadvantages for students, faculty, and administrators face when adopting BL. Vaughan (2007) reviewed the research literature for the challenges and disadvantages in using BL in higher education from the perspectives of students, faculty, and administrators:

1- Student Challenges:

Time management: some students have difficulty in finishing online activities that are usually between face-to-face sessions.

Responsibility for Learning: it is difficult for students to take the responsibility of their learning especially if they are mainly accustomed to face-to-face learning.

Technology: some students also suffer difficulties concerning accessing the course online or when dealing with different software.

2- Faculty challenges:

Time commitment: According to Dziuban and Moskal (cited in Vaughan, 2007) designing a BL course demands that instructors plan and develop a lot of online activities for each session, which are time-consuming to develop.

Professional Development Support: faculty needed to gain professional skills that helped them in taking the best technologies for the BL course. They also needed to learn new teaching skills that support a BL course.

Risk Factors: According to Dziuban and Moskal (cited in Vaughan, 2007) some faculty feared that they could lose control over the BL course. They were also worried about the process of evaluating their students.

3- Administration Challenges:

Alignment with institutional goals and priorities: According to Twigg (cited in Vaughan, 2007) adopting BL requires administrators of higher education to re-design their policies to increase the number of enrollment in BL courses.

Resistance to Organizational Change: Institutional bureaucracy can stand in the way of changes that should take place in the course structure, curriculum. So, without such changes BL cannot be successful.

Organizational Structure and Experience with Collaboration and partnerships: According to Twigg (cited in Vaughan, 2007) BL required effective communication among administration staff, faculty, and students to solve any difficulties that could occur in a BL course.

All the previous challenges show that adopting BL is not a matter of using it in place of face-to-face learning. Many steps have to be taken for this to be done. Everyone has a role to play in order to successfully adopt a BL course. Students, faculty, and administrators should work hand-in-hand to face the challenges of successfully adopting BL.

Pedagogy

There were several studies that classified teaching methods into several types. The two main types were learner-centered and teacher-centered methods. The teacher-centered methods included: lecture, explanation, talks, presentation, and demonstration. Several other studies demonstrated that BL was one of these learner-centered methods.

Abraham (2007) suggested that "a student-centered pedagogy must focus on providing increased access to learning and more flexibility in the learning environment" (p. 2). Therefore, the instructor had to change from teacher-centered methods to learner-centered methods when he/she wanted to adopt BL. A study was conducted by Dzakiria, Mustafa and Abu Bakar (2006) to investigate whether BL could be a suitable alternative pedagogical approach at the University of Utara Malaysia. Their study highly reinforced the importance of considering BL as a pedagogical approach that mingled the active technological learning possible in the online environment with the usefulness and the socialization opportunities of the classroom, and not just a set of delivery modalities. Thus, BL is an essential redesign of an instructional model that has the following characteristics:

- A change from teacher-centered method to learner- centered method that enables learners to be both active and interactive whether in face-to-face or online sessions.
- An increase in the amount of a learner's interaction with instructors, other learners, content, and outside resources.
- A combination of both formative and summative assessment for both students and instructors.

Thus, transformation should focus on giving students more responsibilities in the learning process.

Skibba (2007) conducted a study to trace how faculty roles transformed in hybrid courses. The study explained that due to the nature of BL as a learner-centered method, the instructor's role had to change from a presenter of content into a facilitator of student learning. Instructors must play the role of the guiders, supporters and encouragers for their students throughout different learning activities. As a result, instructors should work on developing skills that help them to successfully guide their students.

In a recent study conducted by Periera, Pleguezuelos, Meri, Molina-Ros, Molina-Tomas and Masdeu (2007) investigated the effectiveness of using BL strategies for teaching Human Anatomy course. Their study found that implementing BL is extremely demanding for instructors specifically in the area of course organization, since instructors need prior knowledge that takes into consideration the students' status as learners and the nature of the course content and objectives. Therefore, instructors must design activities and provide learning environments that enhance students' abilities to actively participate in the course.

Similarly, Kim and Bonk (2006) constructed a survey distributed among instructors and students to predict future trends of online education, pedagogical innovation, and projected technology use in online teaching. Their study explained that in the process of shifting to BL, the instructors needed to obtain necessary skills that enhanced adaptive pedagogical strategies and accomplished online learning objectives. The student-centered nature of online learning activities demanded that instructors enhance students' learning skills through providing intensive guidance and encouragement.

Bonk and Graham (2006) also claimed that the ways of moderating learning and developing the content of online courses would be the most important skills for instructors by 2010. They predicted that these skills would be more important than actual "teaching" or lecturing skills in the online learning environments. Based on their survey responses, they predicted that the most preferred instructional methods for online instructors would be online collaboration, case-based learning, and problem-based learning. All theses kinds of learning encourage institutions to prepare instructors in order to provide online courses in the future.

Duhaney (2004) also said that knowing what to blend and how affects learning:

> For a successful teaching and learning experience, careful thought must be given to the correct blend of technology, face-to-face instruction and strategies/techniques. It is vital to ensure that the different learning media are employed appropriately and in the right mix (p. 36).

So, it is highly important for instructors to identify what portions of the course will be presented online and in the face-to-face sessions of the BL course. Yelon (2006) also stated that

> to produce effective blended learning instruction, first and foremost, be sure to design instructional methods well. Without attention to effective instructional methods, the adaptation of technology as part or all of the teaching process will only be a media gimmick (p. 26).

Therefore, instructors should not focus on presenting technology by itself, but rather focus on how to use it successfully through designing appropriate instructional methods.

Moreover, according to The University of Wisconsin–Milwaukee, “the blended learning format may challenge instructors’ way of teaching for the following reasons:

> - Learning to teach a successful blended course gives instructors the chance to use more student-centered learning activities.
> - Teaching a blended course makes the teacher-student relationship to be more centered on student learning.
> - Learning to change the instructor’s role from being the center of the teaching process to become more facilitative and learner-centered” (para5).

So, instructors should care about producing a learning environment in which students play a primary role in the learning process.

According to all of the previous studies, higher education institutions should provide professional development sessions for instructors who will teach BL courses in order for the instructors to be able to:

- Identify what course contents should be introduced online and in face-to-face sessions which should be based on the nature of the BL course and its objectives.

- Build skills that are necessary to shift from teacher-centered courses to learner-centered ones.
- Design an instructional method that balances between online and face-to-face sessions.

Integrating Procedures

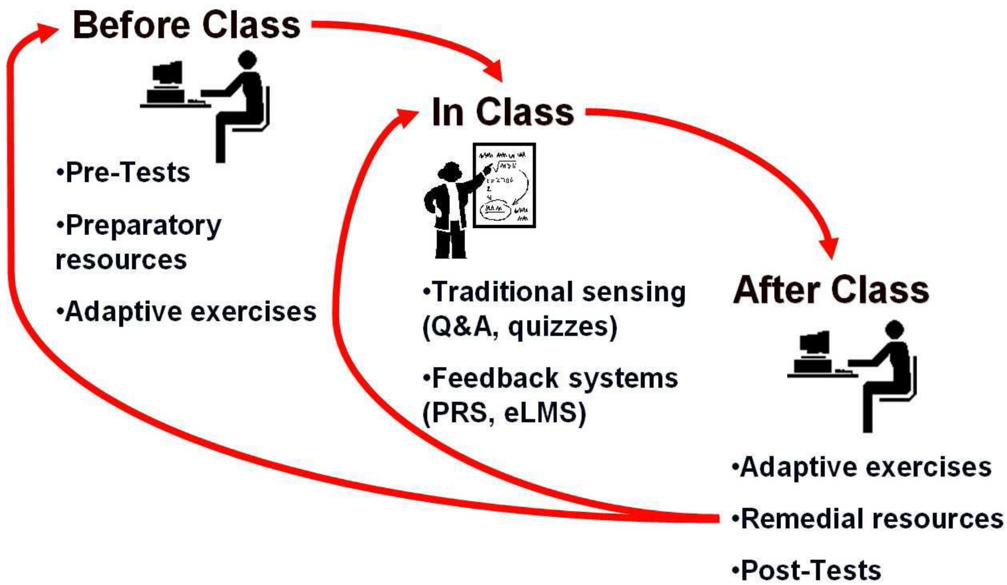
Many studies listed different stages for integrating BL in teaching environments. According to Howard, Remenyi and Pap (2006) there were three steps in BL; before class, in the class, and after class.

Before Class: The instructor prepares an online pretest and post-adaptive exercises for students to answer before the in-class session. Based on the students' answers, the instructor could know the students prior knowledge and accordingly could prepare the course material for the in-class session.

In the Class: in this face-to-face session of the course, students and the instructor meet in class, where the instructor could emphasize explaining what the students had difficulty in answering during the online pretest.

After Class: Online, the instructor posts a post-test, which the students answer after in the class session. Students' answers will help the instructor in assessing any development in students' understanding of the course material presented in the in class session. The instructor could also post appropriate resource materials to further aid the students in the learning process.

Figure 3. Blended Learning Integrating Procedures



Source: Howard, L., Remenyi, Z. & Pap, G. (2006). *Adaptive Blended Learning Environments*. Paper presented at the 9th International Conference on Engineering Education. Retrieved July 14th , 2008, from http://www.isis.vanderbilt.edu/projects/VaNTH/papers/icee_2006_p1.pdf p. 15.

On the other hand, Garrison and Vaughan (2008) identified the BL process as four steps:

1. Before face-to-face session.
2. Face-to-face session.
3. After a face-to-face sessions.
4. Preparation for the next face-to-face session.

The first three steps are similar to Howard, Remenyi and Pap's (2006) previously discussed steps. The fourth added step includes the different activities that the instructor prepares for the future class that is based on students' post-test answers. Integrating BL in steps helps the instructor to design a course in a way that fulfils its outcomes. For instance, students' answers to the online pretest helps the instructor to chose what portions of the course that would be better be online and what is far more better to teach during the face-to-face in class session. So, the instructor could post video and audio clips in the before class session in order to motivate students and to save time of the in class session for more activities. Moreover, the in-class session opens the opportunity for interaction among the instructor and students and helps the instructor to determine what to include online and in class in the- future.

Research and Dissertations on Blended Learning in the United States

While there have been a number of studies and dissertations on faculty use of online learning, web-based instruction, web-enhanced instruction, and the like at the community college, K-12, and business environments, only three dissertations have been done on faculty use of blended learning in institutions of higher education in the United States (Robison, 2004; Gray, 2007; O'Laughlin, 2007).

Robison (2004) designed a study to understand the faculty experience in designing and teaching blended learning (hybrid) courses at Brigham Young University (BYU). The data was collected from interviews with 10 instructors who developed and taught blended learning in BYU through a multiple case study methodology. A mail survey was sent to 1600 faculty members; the returned responses were 569, and only 189 faculty members used BL. The faculties were from different departments. Findings and conclusions from this study indicate that most faculty (77%) believed that they students learn effectively through blended learning, most (80%) believed that blended learning could help faculty be instructionally effective, and while 70% of faculty believed that that administrative support helped their blended learning efforts, a smaller number (59%) felt supported by their colleagues. This finding could be the result of the small overall number that actually taught using blended learning, technological or other barriers, or other concerns. While there were eight reasons to support the use of blended learning by faculty, such as engaged students, increased flexibility, saved time and resources, etc., there were also barriers, such as faculty incentives and student evaluation scores dropping. Robison (2004) also found that that the following factors tended to make faculty experience with blended learning successful:

- Assignment of a design team by the Center for Instructional Design
- The faculty 's aptitude for technology
- Administrative support for the students
- A training course for faculty in which successful practices were demonstrated (pp. 136-137)

Gray (2007) studied the uses and perceptions of online learning components in hybrid courses in 10 universities in Oklahoma. This descriptive study utilized literature synthesis, online survey methodology, and quantitative data techniques to describe best practices in using online learning components in hybrid business courses. The study also found that the technology skill level and age of business faculty members were the dominant demographic variables relating to both their perceived importance and their reported use of online learning components in hybrid courses. Also, as faculty members' experience with hybrid courses increased, so did their use of online learning components. The critical point in increased perceived importance and use of online components appeared to occur after teaching three hybrid courses. While age was an indicator of perceived importance and use of online learning components, tenure and academic rank were not, indicating that age, rank, and tenure do not measure the same concept in relation to perception and use of online learning components in hybrid business courses.

Based on these findings, it appears that in order to effectively institute blended learning there must be administrative support and professional development for faculty. Even then, there must be other compelling reasons to institute it in order to overcome the drop in student course evaluations, such as flexibility and time savings, or a shortage of faculty in a discipline, for example. Also, it is likely that faculty who did not have a high level of concern would be more able to institute BL in their own classes and possibly help their colleagues in designing and delivering BL courses, as well, as part of the team building effort. Both instructors and students had the advantages of a flexible teaching environment. O'Laughlin (2007) studied at the University of Delaware, in which the "utilization of new instructional technologies" was an academic priority (Affirming Academic Priorities, 2003).

Science Teaching

Many studies have been conducted to measure the effect of teaching Science through BL strategies. Since Science courses such as chemistry and physics deal with 3-dimensional objects, the ability to visualize and mentally construct shapes is important in students' online learning. Through the use of computer-based technology in a Science course, Trindade, Fiolhais, and Almeida (2002) created a three-dimensional virtual environment (Virtual Water) for studying the phases of matter, phase transitions and atomic orbitals at the final year of high school and the first year of university level. They claim that "3-D virtual environments (of physical and chemical processes) help students with high spatial aptitude to acquire better conceptual understandings" (p. 477). Their study concluded that after viewing the 3-dimensional animations, students showed accurate and comprehensive understanding of the topic. They also claimed that the main strength of virtual reality programs was not only giving the students the ability to visualize abstract situations that could not be seen otherwise, but more importantly gave the students the chance to immerse themselves in those programs.

In the same vein, Hilbelink (2007) presented an online human anatomy course through the use of 3-dimensional images. The results of her study showed that 3D images presented in the online human anatomy and physiology labs could be “effective in assisting the students to learn and understand important relationships that exist between and among complex structures of human anatomy” (p. 3)

Periera, Pleguezuelos, Meri, Molina-Ros, Molina-Tomas and Masdeu (2007) also conducted a study to investigate the effectiveness of using BL in teaching a human anatomy course. They suggested some benefits of using blended learning in the teaching of human anatomy:

- It makes use of the potential of the subject to render it more attractive.
- It modernizes teaching methods that have traditionally been used in the teaching of human anatomy.
- It develops transversal competencies.
- It provides students with solid, reliable, continuously accessible and updateable materials.
- It helps to maintain a suitable level of knowledge for the profession
- It improves academic performance
- It increases lecturer? -pupil, pupil-? pupil and lecturer-)?lecturer communication flow.
- It facilitates adaptation to the Bologna Declaration directives (in the European framework) (p. 190).

They also suggested that teaching human anatomy through BL could develop student’s ability to learn anatomy with computer-based tools that they are familiar with and enjoy more than classroom traditional teaching.

McNall and Osborn (2007) designed an online virtual temperature and heat course to improve the rural district teachers’ Science content knowledge, which can positively impact student learning and achievement. They found that the course offered a positive alternative to face-to-face professional development for Science teachers in rural school districts. The course brought the Science to the course participants.

In the same vein, Dusek and Steckbauer (2007) discussed the possible ways of maintaining rigorous standards while teaching online Science labs. They provided the following possible ways to create practical lab sessions:

1. The instructors could utilize publisher sponsored labs and supplement those with the home based activities.
2. The instructors could integrate home experiments in which they ask students to discuss their observations online.

Through applying lab sessions in these two ways, the researchers claimed that the students would be able to link the new concepts they have learned with their real life.

Using BL in Science teaching could provide benefits for both instructors and students as following: the use of 3-dimensional virtual environments helped students to gain in-depth understanding of abstract scientific topics. BL also gave Science instructors the chance to create practical lab sessions through utilizing publisher sponsored labs and supplementing them with students' home based activities. All of the previous benefits of adopting BL in Science teaching help both the instructors and students to relate Science with real life.

Summary

Presenting innovative teaching strategies in the educational field is not an easy task nor is its reception by individuals simply a matter of acceptance or rejection. Following CBAM's theoretical framework, change is not an easy process since some instructors have concerns about adopting new teaching strategies. Hord, Rutherford, Austin and Hall (1987) further clarified the concerns into seven stages which formed the first dimension of the CBAM theory. The seven stages aided administrators in planning workshops that eliminated the instructors' concerns about a new innovation. Studies of CBAM and selected contextual and technographic characteristics were also presented.

Instructors who are used to face-to-face learning may have concerns regarding integrating technology in teaching. E-learning is one of the new tasks which require instructors to integrate technology in teaching. The Ministry of Higher Education in Saudi Arabia encourages universities to adopt E-learning, however the current status of its adoption is not at fully successful. Many disadvantages occurred, therefore there is a need to adopt another kind of learning that avoids the disadvantages of E-learning and maintains the benefits of the face-to-face learning.

BL has been defined differently according to the amount of focus put on one of elements that had been integrated in the teaching strategy. Many studies referred to Driscoll's four concepts of defining BL. The adoption of BL benefited teachers, students, and administrators. Several studies considered BL as a pedagogy specially suited to the field of higher education. Integrating BL can be carried out in a variety of procedures. Many studies on BL in Science suggested effective teaching strategies to insure effective outcomes that enabled the students to link the new concepts of knowledge to their real lives. Moreover, blended learning environments assisted the students in understanding abstract knowledge, such as in physics and chemistry.

Chapter 3-REASEARCH DESIGN AND METHODOLOGY

Chapter Overview

The purpose of this study was to investigate the concerns in adopting blended learning by Science faculty in the three departments (Biology, Chemistry and Physics) of Taibah University in Saudi Arabia. This chapter is organized into the following sections: Research questions, research design, research setting, data collection methods, data analysis methods, including quantitative and qualitative measures, and reliability and validity.

Research Questions

This study investigated the concerns of Science faculty at Taibah University in adopting blended learning and how these concerns related to faculty professional development needs. There were two primary research questions:

1. What are Science faculty concerns in adopting blended learning at Taibah University?

2. What are Science faculty professional development needs in order to adopt blended learning at Taibah University?

Research Question #1: Is there a significant relationship between Science faculty's contextual characteristics (gender, age, academic rank, area of content, country of graduation, and years of teaching experience) and their concerns in adopting BL?

Ho 1.1. There are no statistically significant differences between Science faculty's gender and their concerns in adopting BL.

Ho 1.2. There are no statistically significant differences between Science faculty's age and their concerns in adopting BL.

Ho 1.3. There are no statistically significant differences between Science faculty's academic rank and their concerns in adopting BL.

Ho 1.4. There are no statistically significant differences between Science faculty's nationality and their concerns in adopting BL.

Ho 1.5. There are no statistically significant differences between Science faculty's content area and their concerns in adopting BL.

Ho 1.6. There are no statistically significant differences between Science faculty's country of graduation and their concerns in adopting BL.

Ho 1.7. There are no statistically significant differences between Science faculty's years of teaching experience and their concerns in adopting BL.

Research Question #2: Is there a significant relationship between Science faculty's technogrphic characteristics (attitudes towards technology integration in the Science curriculum, perceptions of the effects of BL use on pedagogy, and perceptions of technology professional development needs) and faculty's use of technology in teaching by department?

Ho 2.1. There are no statistically significant differences between Science faculty's attitudes towards technology integration into the Science curriculum and faculty's use of technology in teaching by department.

Ho 2.2. There are no statistically significant differences between Science faculty's perceptions of the effects of faculty instructional technology use on pedagogy and faculty's use of technology in teaching by department.

Ho 2.3. There are no statistically significant differences between Science faculty's perceptions of technology professional development needs and faculty's use of technology in teaching by department.

Research Design

In conducting this research a mixed methods design was used. According to Tashakkori and Teddlie (1998), mixed method studies are "those that combine the qualitative and quantitative approaches into the research methodology of a single study or multi-phased study" (p. 17-18), since the study used both quantitative and qualitative methods to collect and analyze data. According to Creswell and Clark (2007), mixed methods design is both a methodology and method.

> The methodology involves collecting, analyzing, and mixing qualitative and quantitative approaches at many phases in the research process from the initial philosophical assumption to the drawing of a conclusion. As a method it focuses on collecting, analyzing, and mixing qualitative and quantitative data in a single study or series of studies (p. 18).

Mixed methods research is superior to single approach designs in the following ways (Tashakkori & Teddlie 2003). It can provide:

- Research questions that the other methodologies cannot.
- Better (stronger) inferences.
- The opportunity to present "a greater diversity of divergent views" (Tashakkori & Teddlie 2003, pp. 14-15).

This study collected quantitative data through a close-ended survey and qualitative data through open-ended questions on the survey.

Descriptive statistics were used to analyze quantitative data, using a series of one-way multivariate analysis of variance (MANOVA) to identify values of significance.

When statistically significant differences were found from the MANOVA results (Wilks' Lambda), then Analysis of Variance (ANOVA) tests were conducted to identify values of significance.

Qualitative measures through open-ended questions on the survey were included to gather more in-depth perspectives on Science faculty's concerns and professional development needs to adopt BL at Taibah University. According to Lindlof and Taylor (2002), qualitative analysis is the "process of labeling and breaking down raw data and constituting them into patterns, themes, concepts and propositions" (p. 210). Themes derived from the three open-ended survey answers were identified, classified and coded by the researcher and the researcher's major advisor. This approach was consonant with that of Miles and Huberman (1994), in which patterns and themes are identified and their frequency notated.

Research Setting

The Ministry of Higher Education in Saudi Arabia was established in 1975 to supervise higher education institutions Alsalloom (1995 cited in Alnujaidi, 2008). The Ministry designs, plans, and coordinates the Kingdom's institutions of higher education. Its main task is to fulfill the country's educational needs. Most importantly, the Ministry gives priority to research, which is illustrated by the financial support it provides to universities regarding their research budget. The Ministry is also continuously working to expand the spread of higher education institutions among Saudi cities and urban areas. Therefore, the number of universities jumped from seven universities to twenty one universities in the last five years. All of these universities are under the Ministry of Higher Education's umbrella.

Taibah University is one of these universities. It was established in 2003 to participate in educating the people of the city of Madinah (Taibah University guide, 2008). Before the establishment of Taibah University, Madinah had two university branches; the first was a branch of King Abdul-Aziz University and the other branch was of Imam Mohammad bin Saud University. These two branches became Taibah University in 2003. The university now has ten colleges and two separate campuses; one for men and another campus for women (Taibah University guide, 2008).

Taibah University established its Deanship of University Development in 2005 in order to improve faculty teaching and research skills by integrating technology in both learning and teaching processes. In addition, the Deanship aims to evaluate the teaching quality among university faculty. In general, it aimed to accomplish the following goals:

- Spread professional development throughout the university.
- Participate in designing a strategic plan for both e-administration and e-learning.
- Encourage the use of educational technology and provide virtual environment.
- Evaluate and develop the university faculty teaching performance.
- Work with different colleges to provide conferences and workshops.

The deanship had three units (Taibah University Guide, 2008);

1. Teaching unit.
2. Evaluation and developing administration performance unit.
3. Self evaluation and academic approval unit.

Taibah University works to improve online learning among its colleges. Therefore, it established the Deanship of Distance Learning. This deanship works on designing the infrastructure of online learning in the university. The mission of this deanship is to create an educational technology environment to use distance learning in a perfect way. The distance learning deanship aims to accomplish the following goals:

- Use educational technology for both learning and teaching processes.
- Participate in continuing education through distance learning.
- Design virtual environment to provide distance learning.
- Help faculty to improve their abilities in virtual teaching environments.

Protection of Human Subjects

The researcher filed the necessary Institutional Research Board (IRB) form and received permission to complete the study (see Appendix H).

Data Collection Methods

This study utilized a cross-sectional, closed and open-ended response mailed paper-and-pencil survey questionnaire as the means for data collection. Fink (2006) defined the survey method as "a system for collecting information to describe, compare, or explain knowledge, attitudes, and behavior" (p. 1). In addition, Weisberg, Krosnick and Bowen (1996) stated that "in fact, many researchers believe that the best way to find out what people like and believe is to ask them" (p. 16). So, the survey was an appropriate method to collect data for this study to obtain deep understanding regarding faculty concerns to adopt BL. Due to the difficulty in getting correct e-mail addresses, the fact that not all Taibah Science faculties are in the e-mail directory, and due to the lack of a university-based e-mail address system list for all faculties, a paper-and-pencil mail survey was used to collect data for this study.

Survey Preparation

Data was collected using a revised survey compiled from three surveys “the *Measuring implementation in schools: The stages of concern questionnaire for innovation* (George, Hall and Stiegelbauer, 2006) from the SEDL (Southwest Educational Development Laboratory) validated instrument in Arabic. This part of the survey on technology adoption levels of faculty is to assess faculty members’ concerns with the using of BL and technology innovation by Taibah University Science faculty. The second part of the survey was revised from Yidana (2007) for faculty perceptions and attitudes toward technology use in teaching. The third section of the survey was revised from that of Petherbridge (2007) on professional development needs. The researcher signed an agreement to license the survey from SEDL (Southwest Educational Development Laboratory) for survey questions 1 to 35 (see Appendix B). SEDL allowed the researcher to use the survey free of charge. An agreement was sent to the researcher to be signed and returned, and a request was made by SEDL to reprint the copyright information. The researcher received written permission from both Petherbridge and Yidana to use parts of their surveys (see Appendices C and D). The instrument in this study contains 82 questions divided among 6 sections: Stages of Concern, Faculty Attitudes towards Technology Integration in the Science Curriculum, Faculty Perceptions of the Effects of Faculty Instructional Technology use on pedagogy, Professional Development Needs for Science faculty’s Instruction and Demographic Information. After a series of revisions, the survey included the following six sections:

- Section I: The Stages of Concern (questions 1 – 35), contains the SoCQ.

  Presently, the copyright for the SOC questionnaire (1- 35) is maintained by the

Southwest Educational Development Laboratory (SEDL) in Austin, Texas, and permission must be granted from the (SEDL) to reprint and distribute the questionnaire (Appendix B) and question 36 from Petherbridge (2007) (Appendix D). This section attempts to get a whole picture of faculty's concerns about adopting BL in their teaching.

- Section II: the second section of the survey measured faculty's technology use for teaching (questions 37 - 39) which is revised from Yadana (2007) (Appendix D) – this section attempts to determine to what extent Science faculty use technology in their teaching.
- Section III: the third section measured faculty's attitudes towards technology Integration into the Science curriculum (questions 40-51), which is revised from Yadana (2007) and it attempts to determine Science faculty's attitudes towards integrating technology into the Science curriculum.
- Section IV: the fourth section measured faculty's perceptions of the effects of faculty's instructional technology use on pedagogy (question 52-56) that is revised from Yadana (2007).
- Section V: the professional development needs of Science faculty for instruction (questions 57-77), questions from 57 to 70, are revised from Yadana (2007), while the last two questions (71, 77) are revised from Petherbridge (2007). These questions attempt to determine the perceived professional development needs of Science faculty to adopt BL in their teaching.
- Section VI: demographic information (questions 78 – 82) was developed by the researcher based on reviewed literature to include age, gender, nationality, years

of teaching experience, content area and country of graduation, and academic rank to gain demographic information from the participants.

Stages of Concern Questionnaire (SoCQ)

According to George, Hall and Stiegelbauer (2006) assessing the concerns of individuals associated with introducing any specified innovation was first attempted in December 1973 by the Research and Development Center for Teacher Education (RDCTE). The (RDCTE) members had to write statements that indicated a certain concern an individual might have regarding the innovation. They came up with 544 potential statements. The group then worked on categorizing these statements according to the 7 stages of concerns based on the original CBAM version. This categorization resulted in reducing the number of statements into 195 which were finally included in the pilot study.

In 1974, the pilot study (George, Hall and Stiegelbauer, 2006) was distributed among a sample of teachers and college faculty stratified according to years of experience with a certain innovation. In the process two innovations were identified: teaming in elementary schools and the use of instructional modules in colleges. 363 questionnaires were returned and subscales were designed. Item correlation and factor analysis indicated that more than 60% of the common variance among the 195 items explained by seven factors (awareness, informational, personal, management, consequence, collaboration, and refocusing). After that, the (RDCTE) members further reduced the 195 items into 35 by selecting the most relevant items to each of the seven stages of concerns (George, Hall and Stiegelbauer, 2006).

Validity:

According to George, Hall and Stiegelbauer (2006), a series of studies were conducted to investigate the validity of the questions through mainly testing how the scores of the seven stages relate to each other on one hand and to other variables on the other. The validity was also examined through intercorrelational materials, confirmation of expected group differences and changes overtime, and judgments of concerns based on interview data.

A study conducted on a faculty of single school that was part of a longitudinal study of team teaching. Within two years, those school teachers shifted from not teaming through establishing teaming as a routine. As a result, the study showed that their concerns shifted from being high on the lower (0,1,2) stages, to high on management concerns (3), and to low intensity on all the concerns stages (4,5,6). This study not only reveals the validity of the questions but also validates the overall CBAM theory (George, Hall and Stiegelbauer, 2006).

Reliability

To insure the reliability of the SoCQ, the creators (George, Hall and Stiegelbauer, 2006) conducted a study in 1974 on 830 teachers and faculty. The study found coefficients of internal reliability for the seven stages of concerns from the low (.64) to the high of (.83) table 6.

Table 6

The reliability coefficients of SoCQ

Stage	Unconcerned	Informational	Personal	Management	Consequence	Collaboration	Refocusing
	0	1	2	3	4	5	6
Alpha	0.64	0.78	0.83	0.75	0.76	0.82	0.71

Source: George, A. A., Hall, G. E., Stiegelbauer, S. M., & Southwest Educational Development Laboratory. (2006). *Measuring implementation in schools: The stages of concern questionnaire*. Austin, TX: Southwest Educational Development Laboratory, p. 20.

Because the participants in this study were Arabs, the Arabic version of SoC was used which was translated by Alshammari (2000). He translated the SoCQ (see Appendix F) to Arabic by an official translator in the Embassy of Kuwait in Washington, D.C. His translation of SoCQ is the first Arabic version. In terms of the reliability of the SoCQ Arabic version, a pilot study was conducted on twenty Arab students at the University of North Texas in Denton. The reliability of the Arabic version of SoCQ's alpha coefficient = .91, N=20 (Alshammari, 2000). In terms of the validity of the SoCQ Arabic version, the Arabic version was translated back to English and then the contents in the two English versions were compared to test the validity of the Arabic version of SoC. They were found compatible. Therefore, no changes in the Arabic version survey were made (Alshammari, 2000).

Field Study

Because the participants in this study were Arabic faculty, the survey instrument was first tested by conducting a field study. The researcher sent the Arabic version of the survey to three Saudi faculty members who were studying in the United States and had a scientific background. Two have since returned to teach at Taibah University in Saudi Arabia. One was still working on his doctoral degree at the time of the defense and the two others had already obtained it. The faculty read the Arabic version and responded to the questions. They also provided feedback on the survey and its questions. The faculty was asked to fill out the survey before data was collected from Saudi Arabian faculty at Taibah University. They commented on item correctness in Arabic, accuracy and readability. These tests were returned to the researcher with corrections. The researcher compiled all suggestions and changed 7 items on the survey. None of the respondents suggested any changes in the open-ended questions. After the researcher received all returned questionnaires and comments, the researcher re-examined the survey for translation issues, item clarity, and redundancy.

Selecting and Contacting the Population

The population of this study was both male and female Science professors, associate, assistant, lecturers and teaching assistants of Taibah University in Saudi Arabia. Ninety- two male faculty and fifty-six female faculty. In Saudi Arabian universities, faculty structure is different than in the United States. Lecturers and Teaching Assistants have full-time positions and are accorded status as faculty should they obtain a doctorate. To move from Teaching Assistant or Lecturer to Assistant Faculty, one must obtain a Ph.D. In essence, teaching duties are quite similar, except that Teaching Assistant and Lecturer teach more classes and generally do not do research. There are three separate colleges of Science; one is on the male campus and the other two are on the female campus. Each college has three departments: Biology, Chemistry, and Physics. All 148 Science faculty in these three colleges were included in the study (Table 7).

Table 7

Number of Faculty in Science Colleges in Taibah University

Academic Rank	Biology		Chemistry		Physics	
	M	**F**	**M**	**F**	**M**	**F**
Professor	9	3	4	0	1	3
Associate professor	9	1	6	1	10	1
Assistant professor	10	7	20	6	10	8
Lecturer	1	1	0	6	1	3
Teaching assistant	8	2	1	8	1	7
Total	51		52		45	

Survey Administration

The pencil-and-paper survey was distributed among Science faculty in May 2009. The researcher wrote a letter to an administrator at Taibah University with a copy of the survey, who then sent this copy of the survey to all Science Colleges in Taibah University to obtain the approval of each college dean to conduct this study (Appendix F). Each dean sent the survey to the department heads of the three majors (Biology, Chemistry and Physics). Participants were given two weeks to respond before the first followup was conducted. Each dean was notified by letter to resend the survey. The researcher sent the participants two follow-up letters reminding participants about the research study.

The survey included a statement confirming the anonymity of the participants and the confidentiality of their answers for research purposes only. In addition, the second follow-up letter of data collection of this study informed participants that the results of this study and a final copy will be available in Taibah University's main library. All surveys were returned from Saudi Arabia in June, 2009.

Data Analysis Methods

Quantitative Measures

Paper and pencil survey quantitative results were then entered by hand into an Excel program by the researcher for ease of transfer for analytic purposes to the educational service statistical consultant at the Kansas State University Department of Statistics Statistical Consulting Lab. The consultant used the SAS statistical software program for this purpose in November 20009. Responses to closed-ended questions were analyzed using descriptive statistics. A series of one-way multivariate analysis of variance (MANOVA) were utilized to determine statistically significant differences for responses based on participants' contextual and technographic characteristics. The ANOVA test was conducted after the MANOVA results to find where the significances occurred.

Independent Variables

Independent variables refer to the treatment of variable that is "manipulated by the experimenter and so its value does not depend on any other variables (just the experimenter)" (Field, 2005, p. 734). Independent variables in this study were:

- Demographic variables (gender, age, years teaching, content area, academic rank, nationality and degree institution).
- Faculty attitudes towards technology integration in the Science curriculum.
- Faculty perceptions of the effects of faculty instructional technology use on pedagogy.
- Faculty perceptions of technology professional development needs.

Dependent Variables

Dependent, or outcome, variables are ones that are “not manipulated by the experimenter and so its value depends on the variables that have been manipulated” (Field, 2005, p. 728).

Dependent variables in this study were:

- Stages of concern.
- Faculty use of instructional technology by departments.

A summary of independent and dependent variables investigated in this study and the data scales are listed in table below:

Table 8

Summary of Independent Variables and Dependent Variables

Independent Variables	**Data Scale**	**dependent Variables**	**Data Scale**
Faculty attitudes towards technology integration in the science curriculum	Interval	Faculty use of instructional technology in teaching and learning • Comp. Based Tech. • App. Soft. For Instr. • Instruc. Tech Use	Interval
Faculty perceptions of the effects of faculty instructional technology use on pedagogy	Interval	Stages of concern • 0 – 6	Interval
Professional development needs	Interval		
Age	Interval		
Gender	Nominal		
Academic Rank	Ordinal		
Nationality	Nominal		
Degree institution	Nominal		
Area of content	Nominal		
Teaching Experience	Interval		

Descriptive Statistics

Demographic data were retrieved from questions 78 – 82, which included gender, age, academic rank, area of content, country of graduation, nationality, and years of teaching experience. This data provided information as to the contextual characteristics of the respondents. In addition to reporting frequency of responses, the researcher worked with the statistical consultant, who coded responses into SAS in order to obtain the mean scores, mode scores and standard deviation for the measures of central tendency. Descriptive findings are reported in chapter four of this study.

Inferential Statistics

Gay, Mills and Airasian (2003) explain that inferential statistics are "data analysis techniques for determining how likely it is that results obtained from sample or samples are the same results that would have been obtained for entire population" (p. 337).

A series of one-way multivariate analyses of variance (MANOVA) tests were performed to determine if significant differences existed among variables. According to Field (2005) "the more dependent variables that have to be measured, the more ANOVAs would be needed to be conducted and the greater the chance of making a Type I error" (p. 572). Therefore, conducting MANOVA tests were better than conducting ANOVAs to avoid Type I error. If the study conducts a series of ANOVA tests instead of a MANOVA then "the relationship between dependent variables is ignored. As such, we lose information about any correlations that might exist between the dependent variables" (Field, 2005, p. 572). In addition, using ANOVAs would inflate the familywise error rate (FER). The FER is the probability that one or more of the ANOVAs would result in a Type I error, thus increasing the error rate. To avoid Type I error inflations, a series of

MANOVA tests were used to analyze each question.

When statistically significant differences were found from MANOVA results, then a series of analyses of variance (ANOVA) tests were conducted to identify values of significance. Field (2005) regarded ANOVA as a quantitative measure for interval data to gain differences among two or more measures. Moreover, ANOVA "avoids the inflation-of-probabilities problems and keeps the Type I error at 5 percent by, in essence, making a single simultaneous test of all means" (Krathwohl, 1998, p. 490).

The assumptions of MANOVA (Field, 2005) include normal distribution (dependent variable is normally distributed within groups) and homogeneity of variance (the dependent variable maintain equal levels of variance across the independent variable).

Reliability

According to Krathwohl (1998) reliability "refers to the consistency of an instrument in measuring whatever it measures." (p. 435). The researcher performed reliability tests from the responses to the closed-ended questions of the study. The reliability of the survey instrument was tested using Cronbach's alpha level. According to Cronk (2008), reliability coefficients close to 1.00 "are very good, but numbers close to 0.00 represent poor internal consistency" (p.101). The Cronbach's alpha value of this survey instrument used in this study was $\alpha = 0.85$.

Validity

According to Gay, Mills and Airasian (2006) validity is "the degree to which a test measures what it is supposed to measure and, consequently permits appropriate interpretation of scores. When we test, we test for a purpose" (p. 134). There are many threats that may impact external validity in this study (Gay, Mills and Airasian, 2006), such as:

- Selection: younger faculty with adequate technology background could be more willing than older faculty to answer the survey due to their higher interest in professional development opportunities and technology used in teaching.
- Mortality: when participants drop out of this study it may prevent an equal distribution in the teaching experience, age or other variables studied.

According to Gay, Mills and Airasian (2006) another possible threat to the internal validity is selection- treatment interaction. Science faculty may collaborate together to fill out the survey in the departments. Also, science faculty is conscious of the importance of using technology in the university.

Qualitative Measures

According to Creswell and Clark (2007) using mix methods help "researcher provides a better understanding of the problem than if either dataset had been used alone" (p. 7). Therefore, qualitative measures were also applied to analyze data collected from open-ended questions to provide more detailed about the science faculty concern and professional development needs to adopt BL in Taibah University. Patton (1980) defines a qualitative method as "provide depth and detail. Depth and detail emerge through direct quotation and carful description" (p. 22). Although most of the data for this study were collected through quantitative methods, data were also collected through responses to three open-ended questions. While according to Creswell and Clark (2007) the qualitative measures used in the questionnaire to provide in-depth understanding to support the quantitative findings. "The purpose of gathering responses to open-ended question is to enable the researcher to understand and capture the point of view of other people without predetermining those points of view through prior selection of questionnaire categories" (Patton, 1980, p. 24). In this study, the survey instrument had enough space for respondents to answer the three open-ended questions. There was one question for the Section 1 of the survey, the concerns section. There were also two questions for Section 5 of the survey, on professional development.

Miles and Huberman (1994) defined qualitative data analysis, "as consisting of three concurrent flows of activity: (1) Data reduction, (2) Data display, and (3) Conclusion drawing/verification" (p. 10). They (1994) stated that "the focus on data in the form of words – that is language in the form of extended text" (p. 9). Therefore, the qualitative data in this study were analyzed using Miles and Huberman's (1994) data analysis process.

Data Reduction

According to Miles and Huberman (1994) data reduction is the continuous process of selecting, condensing, simplifying, abstracting, and transforming data that are in field notes or transcriptions. The early stages of the reduction process actually take place before the data collection; the anticipatory data reduction occurs while the researcher decides which conceptual framework, cases, research questions, and data collection approaches to select. Throughout the data collection process other data reduction processes take place, such as writing summaries, coding, and making theme clusters. The reduction of data also continues after field work, and until the completion of the final report of the study.

In this study, the qualitative data of open-ended comments were recorded in

Microsoft Office Word and then were analyzed based on categories and the themes that emerged from the respondents' answers. The researcher composed an inductive classification of responses that pertained to specific aspects of faculty concerns and professional development needs. The number of times a particular word or phrase repeated in the responses to the three open-ended questions was recorded for the coding purposes to recognize relationships of additional professional development needs or concern regarding adopting BL.

Data Display

According to Miles and Huberman (1994) the display of data is the second part of analysis. The researcher displays an organized, compressed, and condensed piece of information that enables conclusion drawing and action. The information is displayed in charts and tables that enable immediate access and reading of the information.

Conclusion Drawing and Verification

Throughout the data collection process (Miles & Huberman, 1994) the researcher draws the patterns, and makes explanations. During data collection, the researcher begins the process of observing certain conclusions that are not yet finalized.

For the qualitative data, the researcher went through the responses to the three open-ended questions and analyzed them by using a coding system to identify the major themes from the responses. According to Lindlof and Taylor (2002) category is "a covering term for an array of general phenomena: concepts, constructs, themes, and other types of "bins" in which to put items that are similar" (p.214). Thus, "it is through the process of open coding that categories are built, are named, and have attributes ascribed to them" (Lindlof & Taylor, 2002, p. 219). Additionally, the researcher checked answers of the three open-ended questions against those of the closed-ended for understanding, triangulation, conclusion-drawing and verification purposes.

Reliability

Reliability was triangulated by comparing open-ended questions and closed-ended questions in the survey instrument, when open-ended and closed-ended questions had similar concepts and content .

CHAPTER 4 - DATA ANALYSIS AND FINDINGS

Chapter Overview

The purpose of this study was to obtain in-depth understanding about the needs of Science faculty in Taibah University for professional development to help them adopt BL. The study's survey was distributed among 148 Science faculty in three departments - Biology, Chemistry and Physics. The returned survey number was 100, with a response rate of 67.6 %. Eighty-seven surveys were considered usable, with a response rate 58.8 %. The survey had close-ended and open-ended questions to collect both qualitative and quantitative data.

This chapter presented data through three sections. The first section provided frequency for participants' general characteristics; contextual variables (gender, age, academic rank, nationality, area of content, country of graduation, and years of teaching experience) and technographic variables (attitudes toward technology integration in the Science curriculum, perceptions the effects of BL use on pedagogy, and perceptions of technology professional development needs).

The second section presented the quantitative measures. It displayed the data from MANOVAs for the two research questions in tables and charts. The ANOVA test was conducted after MANOVA results to find where the significances occurred. Research question one tested the relationship between the stages of concern and participants' general characteristics to adopt BL through null hypotheses. Research question two examined the relationship between faculty use of instructional technology and their attitudes toward technology integration into the Science curriculum, perceptions of the effects of instructional technology use on pedagogy, and perceptions of technology professional development needs through null hypotheses.

The third section reported the qualitative measures. The qualitative data were obtained units and from the three open-ended questions. It was demonstrated in tables and charts for the major themes that emerged for each question. Then, the units and overall themes were reported in tables and charts. The first open-ended question addressed Science faculty concerns towards adopting BL. The second open-ended question addressed Science faculty professional development activity needs in order for them to use BL to support their teaching. The third open-ended question addressed the most important professional development activity, incentive, support, etc., needed by Science faculty to adopt BL.

Research Questions and Null Hypotheses

This study investigated the concerns of Science faculty at Taibah University in adopting blended learning and how these concerns related to faculty professional development needs. There were two primary research questions:

Research Question #1: Is there a significant relationship between Science faculty's contextual characteristics (gender, age, academic rank, nationality, area of content, country of graduation, and years of teaching experience) and their concerns in adopting BL?

Ho 1.1. There are no statistically significant differences between science faculty's gender and their concerns in adopting BL.

Ho 1.2. There are no statistically significant differences between Science faculty's age and their concerns in adopting BL.

Ho 1.3. There are no statistically significant differences between Science faculty's academic rank and their concerns in adopting BL.

Ho 1.4. There are no statistically significant differences between Science faculty's nationality and their concerns in adopting BL.

Ho 1.5. There are no statistically significant differences between Science faculty's content area and their concerns in adopting BL.

Ho 1.6. There are no statistically significant differences between Science faculty's country of graduation and their concerns in adopting BL.

Ho 1.7. There are no statistically significant differences between Science faculty's years of teaching experience and their concerns in adopting BL.

<u>Research Question #2</u>: Is there a significant relationship between Science faculty's technographic characteristics (attitudes toward technology integration in the Science curriculum, perceptions the effects of instructional technology use on pedagogy, and perceptions of technology professional development needs) and faculty use of technology in teaching by department?

Ho 2.1. There are no statistically significant differences between science faculty's attitudes towards technology integration in the Science curriculum and faculty's use of technology in teaching by department.

Ho 2.2. There are no statistically significant differences between science faculty's perceptions of the effects of faculty IT use on pedagogy and faculty's use of technology in teaching by department.

Ho 2.3. There are no statistically significant differences between Science faculty's perceptions of technology professional development needs and faculty's use of technology in teaching by department.

Charactaristics of the Respondents

Contextual Characteristics

The contextual characteristics of the respondents in this study were age, gender, content area, academic rank, teaching experience, nationality, and country of graduation. Each of the characteristics was demonstrated via tables and charts for the number and percentage of the participants**.**

Gender

Table 9 and figure 4 show that 35.3 % of the participants were female and 64.7 % were male.

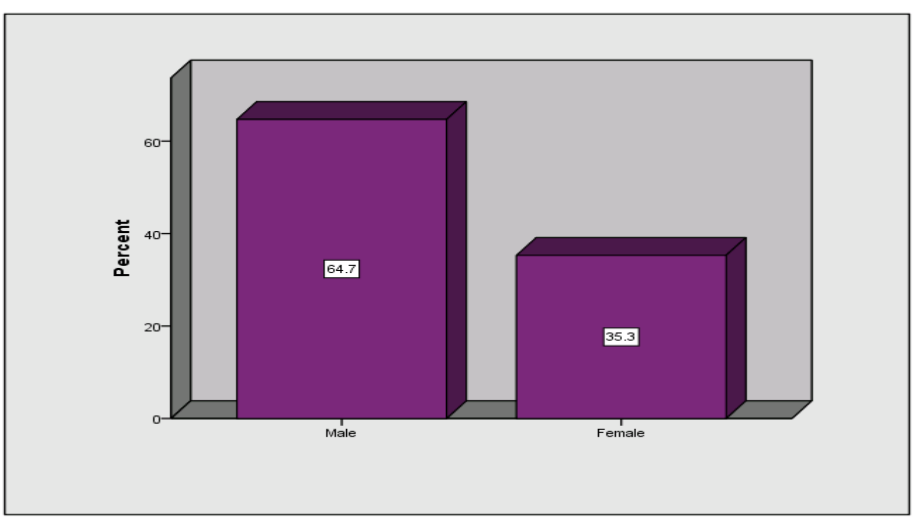
Table 9

Participants Gender

Independent Variables	**N**	**Percentage**
Female	30	35.3
Male	55	64.7
Total	85	100

Figure 4

Gender of the Participants



Age Range

Table 10 and figure 5 show that 8.6 % of the participants were in the age range of 20-30, 41.4 % were in the age range of 31-40. 32.8 % of the participants were in the age range of 41-50 while 17.2 % were in the age range of 51-60.

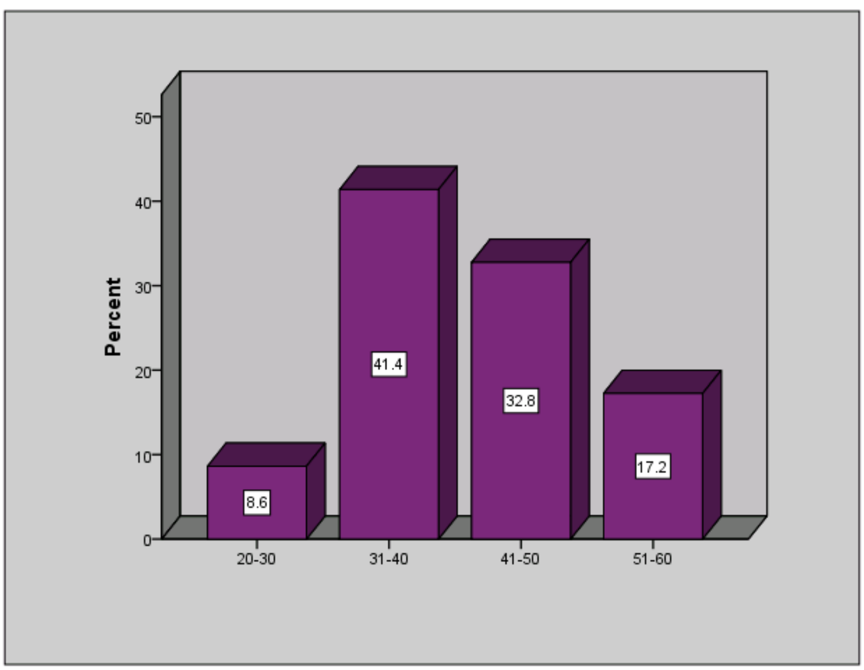
Table 10

Age Range of the Participants

Independent Variables	N	Percentage
20-30	5	8.6
31-40	24	41.4
41-50	19	32.8
51-60	10	17.2
Total	58	100

Figure 5

Age Range of the Participants



Academic Rank

Table 11 and figure 6 show that among the 87 participants who completed the survey, the largest number of participants, 37.6 % was the Assistant Professors. Associate Professors were the next largest group, with 25.9 %. The Professors were 21.2 %. The participants with Master's degrees were the smallest group, with 5.9 percent, while 9.4 % were Teaching Assistants.

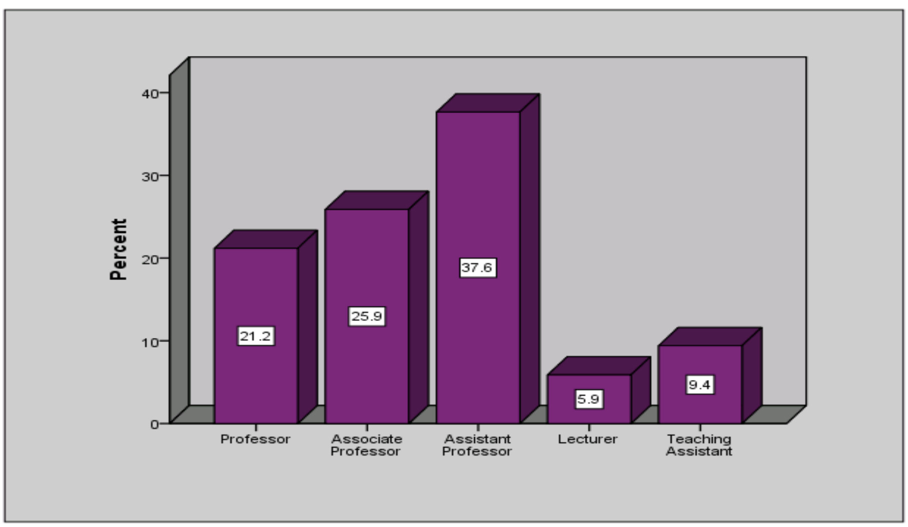
Table 11

Academic Rank of the Participants

Independent Variables	**N**	**Percentage**
Professor	18	21.2
Associate Professor	22	25.9
Assistant Professor	32	37.6
Lecturer	5	5.9
Teaching Assistant	8	9.4
Total	85	100

Figure 6

Academic Rank of the Participants



Nationality of the Respondents

Table 12 and figure 7 show that the largest number of faculty were non-Saudi, with 63.1 %. The Saudi faculty represented 36.9 % of the participants in this study.

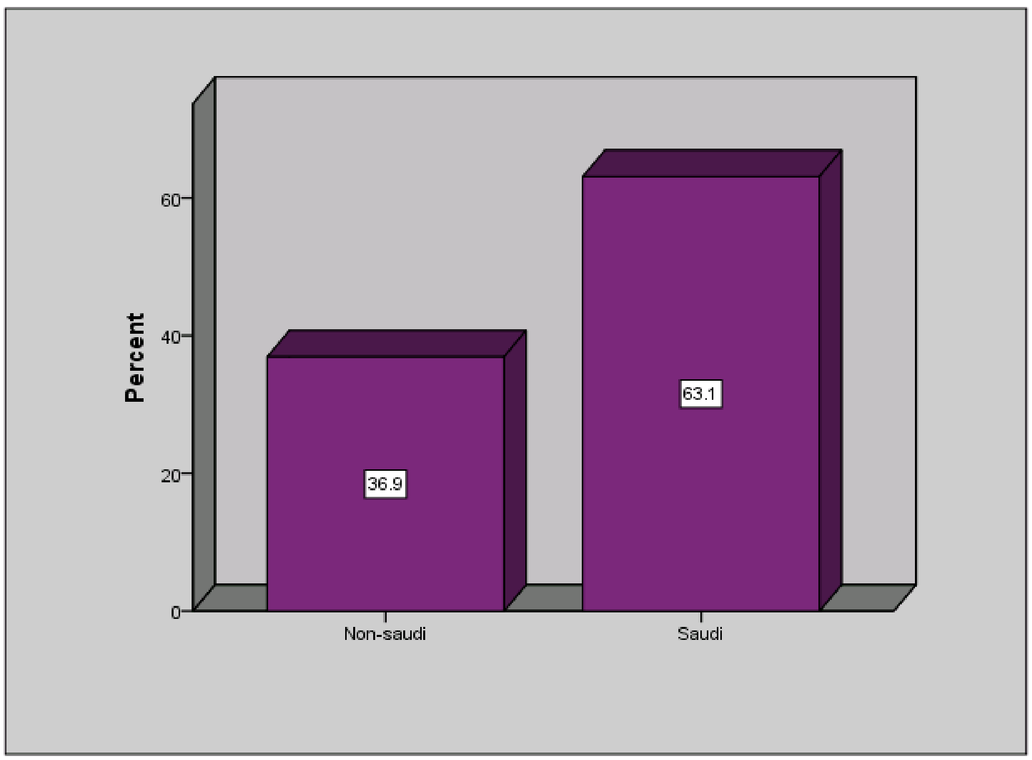
Table 12

Nationality of the Participants

Independent Variables	**N**	**Percentage**
Saudi	31	36.9
Non-Saudi	53	63.1
Total	84	100

Figure 7

Nationality of the Participants



Countries from which Last Degree was Obtained

Table 13 and figure 8 display that the faculty who obtained the last degree from Arab institutions were 54.22 %. An "Arab Institution" is one in which Arabic is the language in which classes are given, such as Saudi Arabia, Egypt, Jordan, Syria, Algeria, and Tunisia. The percentage of faculty who obtained the last degree from Non-Arab institutions was 45.78 %. These were institutions in which other languages were used for teaching, such as the United States, the United Kingdom, Australia, France, and Germany.

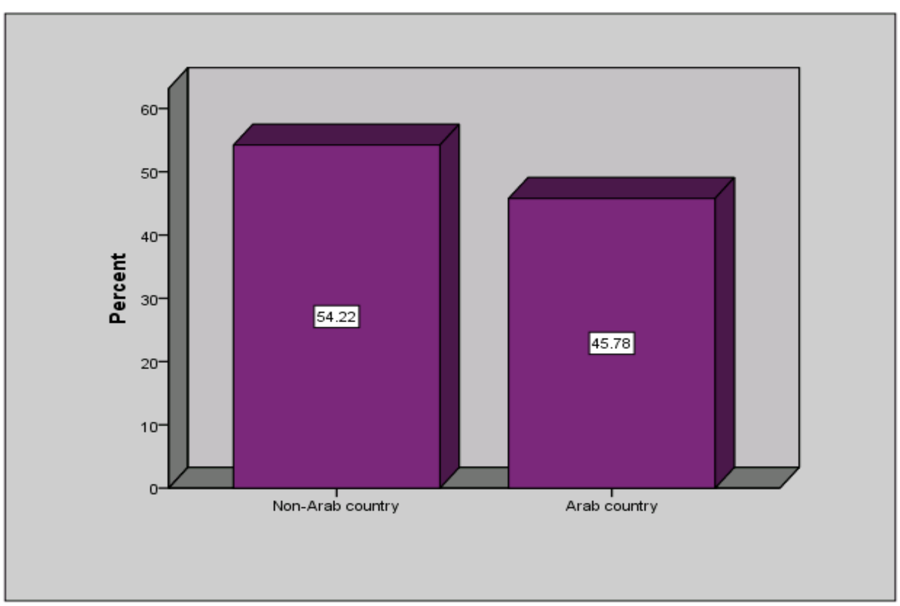
Table 13

Countries From Which Last Degree Was Obtained

Independent Variables	**N**	**Percentage**
Arab Institution	45	54.22
Non-Arab Institution	38	45.78
Total	87	100

Figure 8

Countries from which Last Degree Was Obtained



Content Area

Table 14 and figure 9 display that the content area of the participants. The largest number of participants was in the Chemistry Department with 52.3 %. Biology faculty was the next largest group, with 27.9 % while Physics faculty was 19.8 %. In terms of the number of faculty at Taibah University in the Sciences, there were 52 Chemistry faculty, 45 of whom responded to the questionnaire. There were 51 Biology faculty, of whom 24 responded. There were 45 Physics faculty, 17 of whom responded.

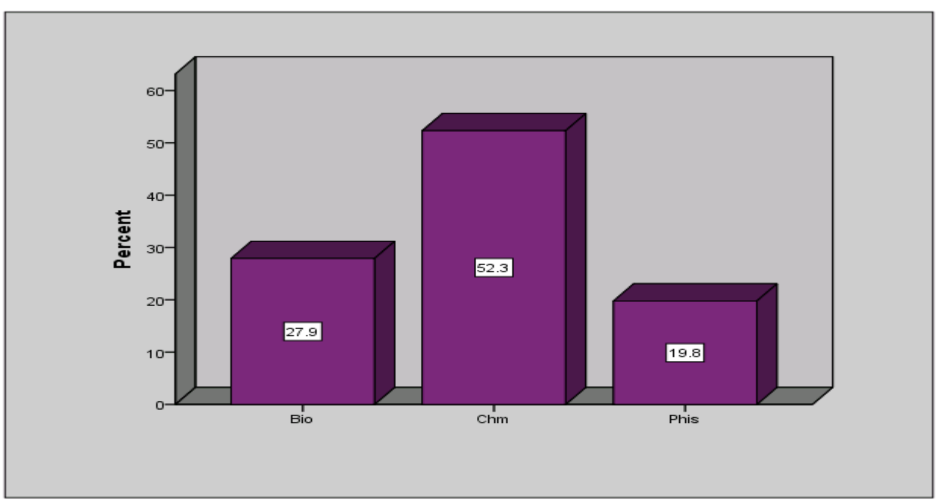
Table 14

Content Area of the Participants

Independent Variables	**N**	**Percentage**
Chemistry	45	52.3
Biology	24	27.9
Physics	17	19.8
Total	86	100

Figure 9

Content Area of the Participants



Teaching Experience

Table 15 and figure 10 displays that the group of faculty who had taught from one to ten years was the largest in this study, with 40.2 %. The second largest group in this study was the faculty who had taught from 11 to 20 years with, 35.4 %. The faculty who had taught from 21 to 30 was the third group, with 20.7 %, and the smallest group in this study was the faculty who had taught from 31 to 40 years, with 3.7 %.

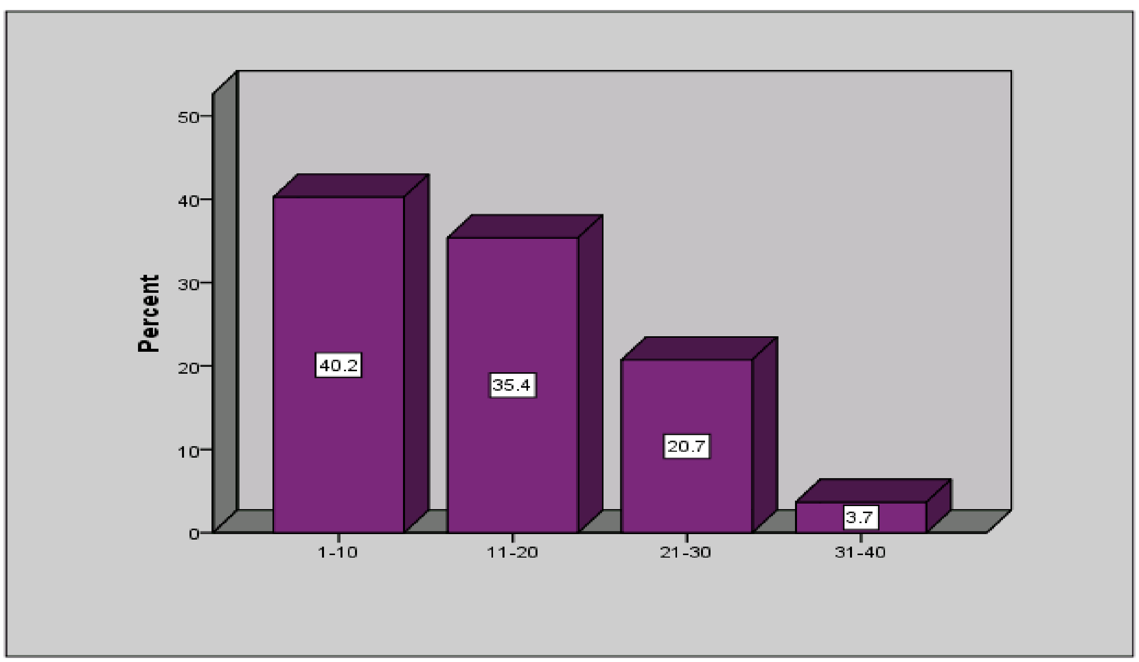
Table 15

Teaching Experience of the Participants

Independent Variables	**N**	**Percentage**
1-10	34	40.2
11-20	28	35.4
21-30	16	20.7
31-40	4	3.7
Total	82	100

Figure 10

Teaching Experience of the Participants



Stages of Concern (SoC)

The Stages of Concern (SoC) data were provided from the first 35 questions. It was used to test if there is a relationship between participants' contextual characteristics and the SoC. George, Hall and Stiegelbauer (2008) recommended using the raw data from the questioner instead of using percentage of statistical analyses of SoC stages. Therefore, the raw data were used to examine Science faculty concerns to adopt BL. Therefore, table 16 showed the mean and stander deviation for stages of concern from the raw data.

Table 16 and figure 11 show that the Personal stage was the highest stage of concern for participants, with a mean score of 23.71. The Informational SoC was the second highest concern with a mean score of 23.29. Collaboration SoC had a mean score of 22.9. Consequence had a mean score of 22.08, and was the third highest SoC. The Refocusing SoC had a mean score of 19.17% and the Awareness SoC had a mean score of 19.1%. They were the fourth and fifth highest stages of concern. The Management SoC had a mean score of 16.11, and was the lowest stage of concern, in terms of .

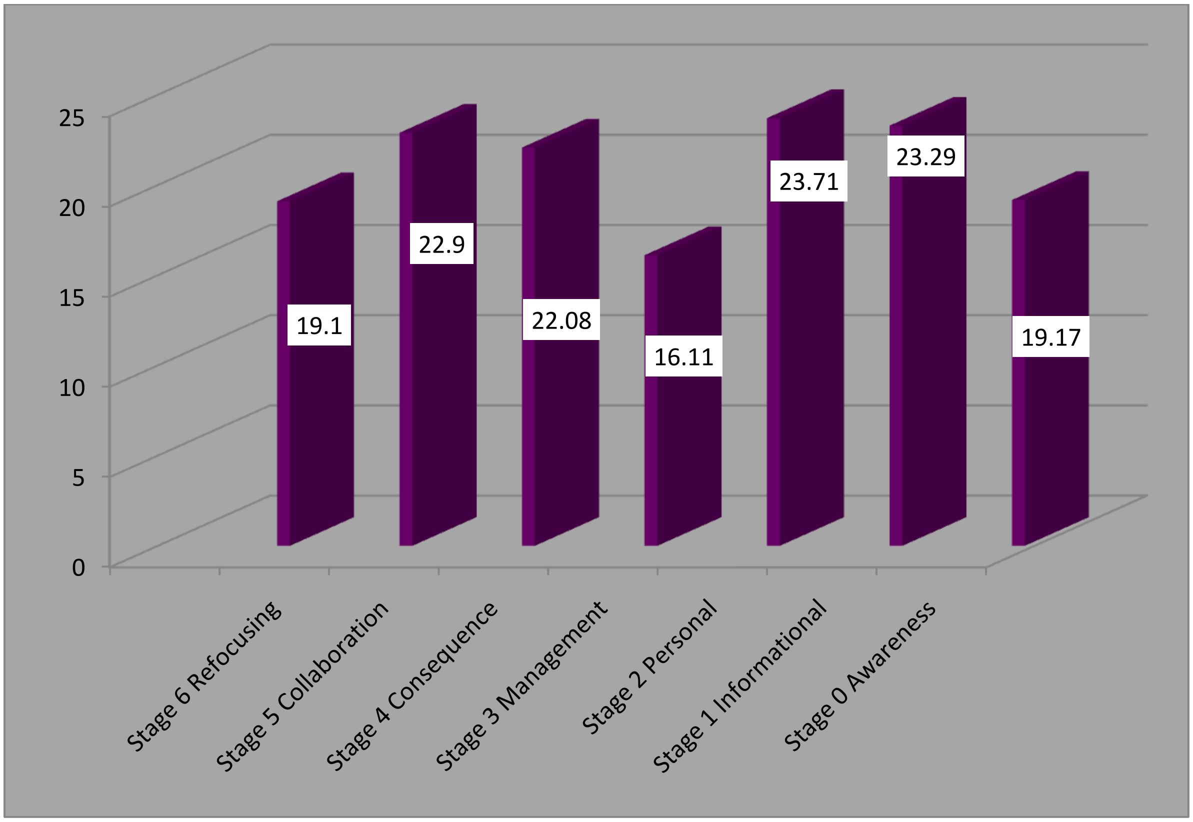
Table 16

Mean percentile stage score for Participants

Stage of concerns	N	Mean	Std. Deviation
Stage 6 Refocusing	87	19.1	6.783
Stage 5 Collaboration	87	22.9	7.455
Stage 4 Consequence	87	22.08	7.064
Stage 3 Management	87	16.11	7.411
Stage 2 Personal	87	23.71	7.962
Stage 1 Informational	87	23.29	6.356
Stage 0 Awareness	87	19.17	6.176

Figure 11

Mean Percentile Stage Score for Participants



Technographic Characteristics

There was a section for faculty technology use and three sections for technographic characteristics (faculty attitudes towards technology integration into teacher education curriculum, perceptions of the effects of faculty use of instructional technology on pedagogy, and faculty perceptions of their technology professional development). Descriptive statistics were conducted on these questions using SPSS. Tables were developed using SPSS and charts were developed using Excel. Each question has a bar chart and a frequency table.

Faculty Technology Use for Teaching

There were 3 multi-part, open-ended questions, numbers 37 (4 sub-questions), 38 (4 sub-questions), and 39 (10 sub-questions). Descriptive statistics were conducted on these 3 questions using SPSS. Tables were developed using SPSS and charts were developed using Excel. Each question has a bar chart and a frequency table.

Question #37- "How often do you use computer-based technology in the following areas?" Please rate your frequency of use as follows: Almost always (AA=5), Frequently (F=4), Sometimes (S=3), Rarely (R=2), Never (N=1).

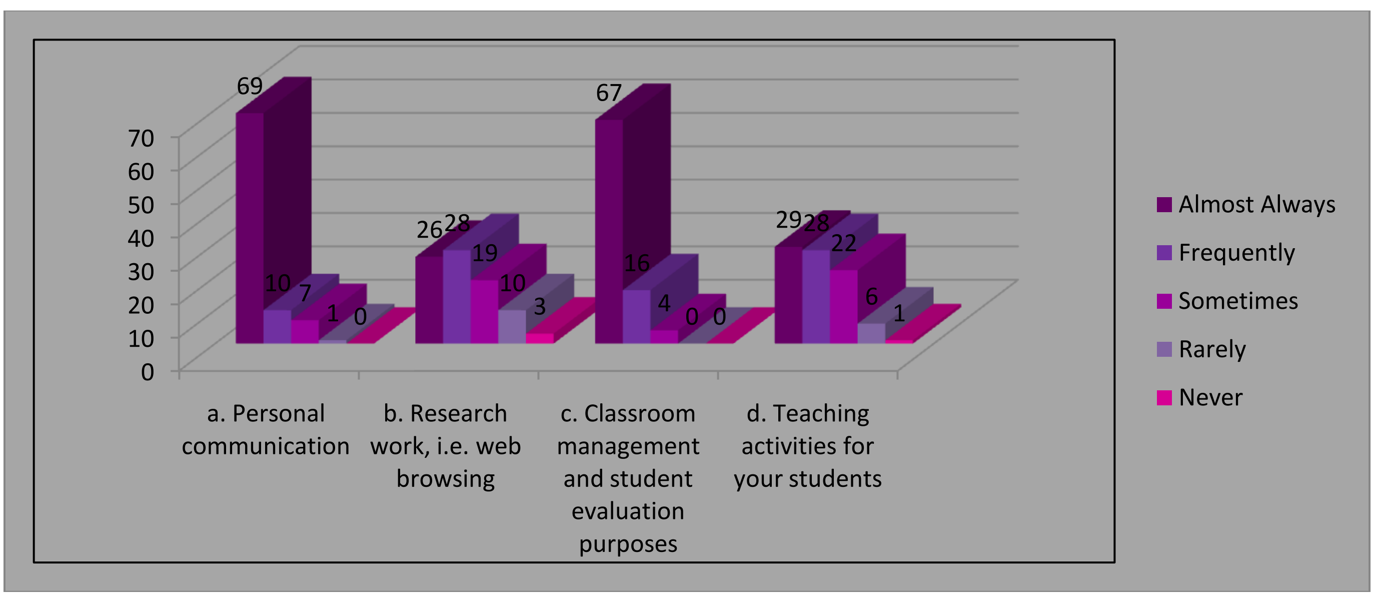
Table 17

The Use of Computer-Based Technology

Statement	**Frequency**				
	AA	**F**	**S**	**R**	**N**
a. Personal communication and document preparation, i.e. email and word processing	69	10	7	1	0
b. Research work, i.e. web browsing	67	16	4	0	0
c. Classroom management and student evaluation purposes	26	28	19	10	3
d. Teaching and learning activities for your students	29	28	22	6	1

Figure 12

The Use of Computer-Based Technology



Question #38- How often do you use the following application software for instruction? Please rate your frequency of use as follows: Almost always (AA=5), Frequently (F=4), Sometimes (S=3), Rarely (R=2), Never (N=1).

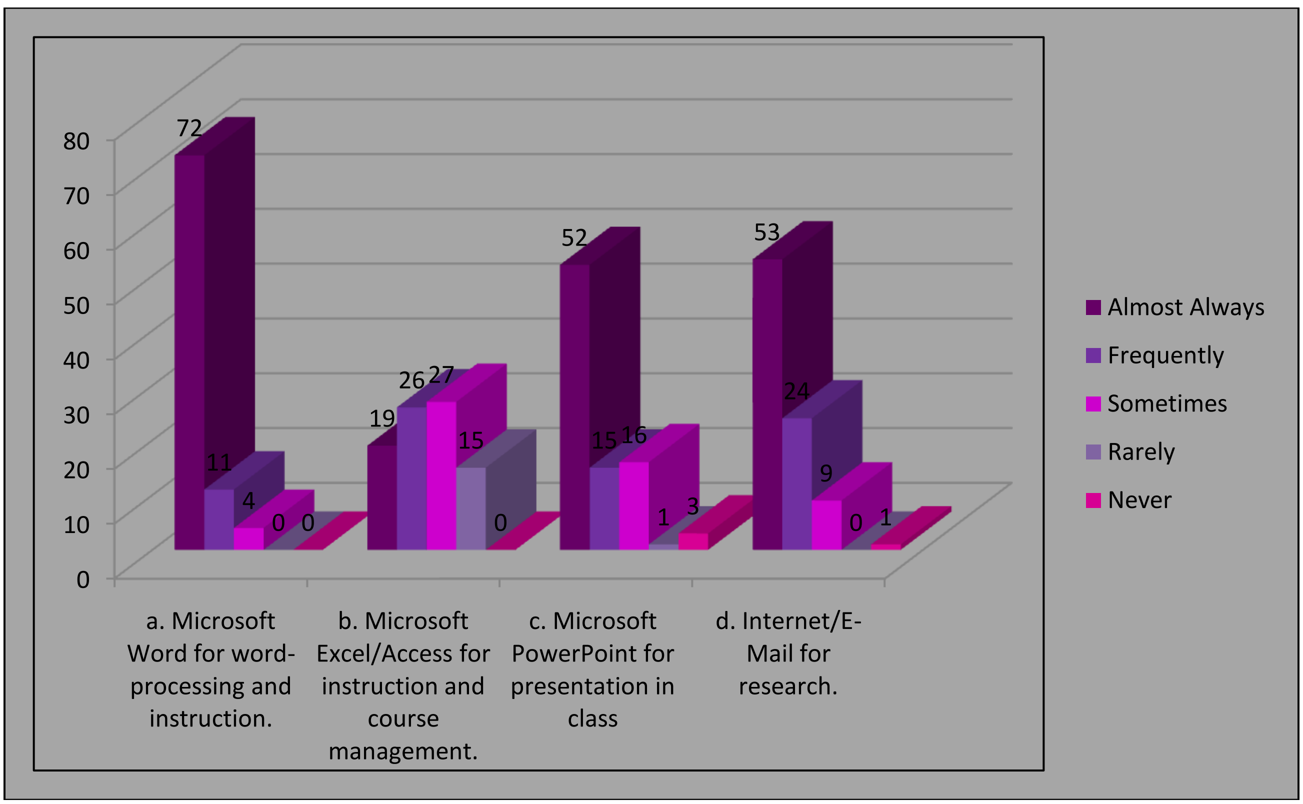
Table 18

Application Software for Instruction

Statement	**Frequency**				
	AA	**F**	**S**	**R**	**N**
a. Microsoft Word for word-processing and instruction.	72	11	4	0	0
b. Microsoft Excel/Access for instruction and course management.	19	26	27	15	0
c. Microsoft PowerPoint for presentation in class	52	15	16	1	3
d. Internet/E-Mail for research.	53	24	9	0	1

Figure 13

Application Software for Instruction



Question #39- Please, circle the option that best reflects how you feel about each of the following statements. Rating Scale: Strongly Agree (SA = 5), Agree (A = 4), Neutral (N = 3), Disagree (D = 2), Strongly Disagree (SD = 1)

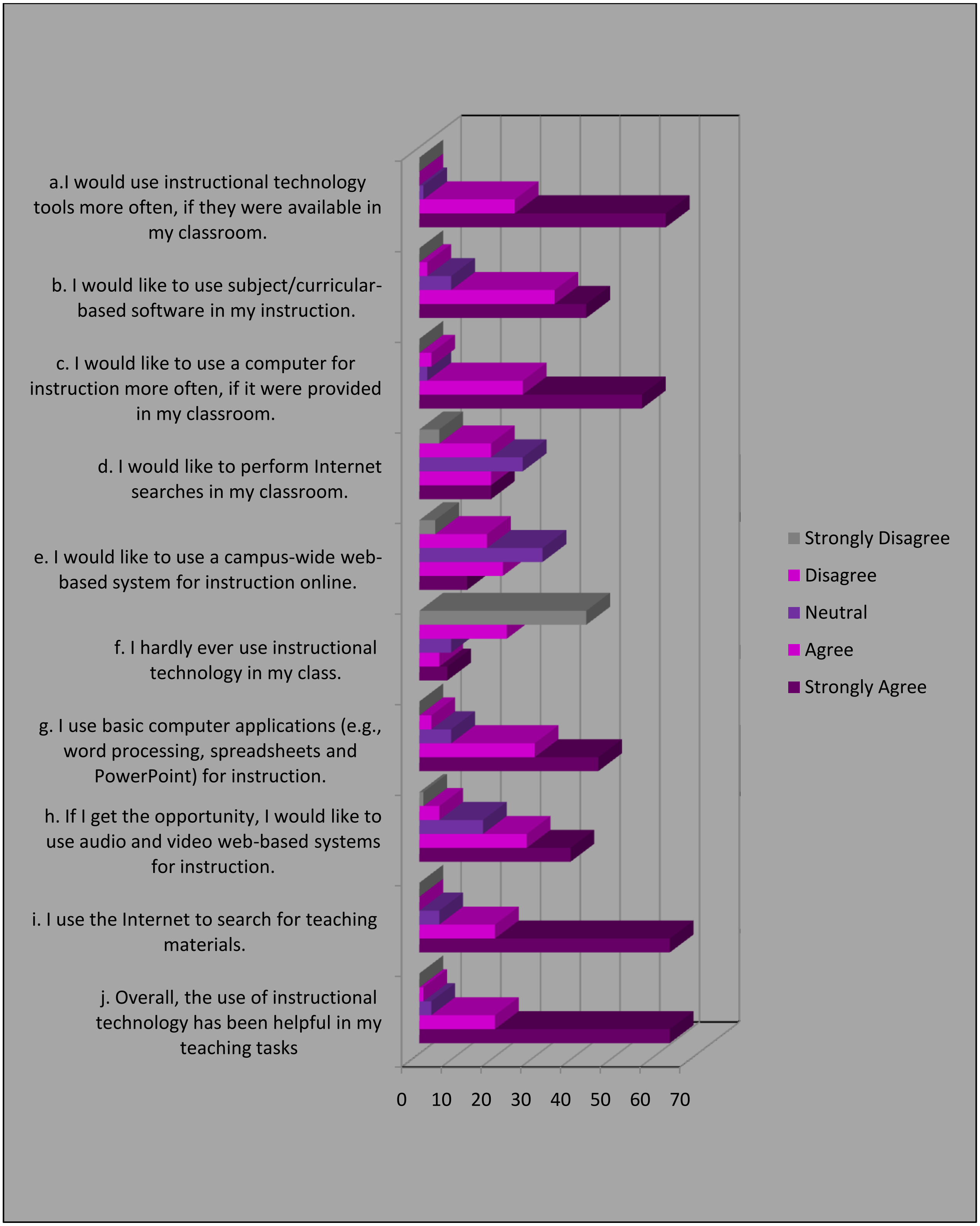
Table 19

Instructional Technology Use

Statement	**Frequency**				
	SA	**A**	**N**	**D**	**SD**
a. I would use instructional technology tools more often, if they were available in my classroom.	62	24	1	0	0
b. I would like to use subject/curricular-based software in my instruction.	42	34	8	2	0
c. I would like to use a computer for instruction more often, if it were provided in my classroom.	56	26	2	3	0
d. I would like to perform Internet searches in my classroom.	18	18	26	18	5
e. I would like to use a campus-wide web-based system for instruction online.	12	21	31	17	4
f. I hardly ever use instructional technology in my class.	7	5	8	22	42
g. I use basic computer applications (e.g., word processing, spreadsheets and PowerPoint) for instruction.	45	29	8	3	0
h. If I get the opportunity, I would like to use audio and video web-based systems for instruction.	38	27	16	5	1
i. I use the Internet to search for teaching materials.	63	19	5	0	0
j. Overall, the use of instructional technology has been helpful in my teaching tasks.	63	19	3	1	0

Figure 14

Instructional Technology Use



Faculty Attitudes towards Technology Integration into Science Education Curriculum:

There were ten statements for faculty attitudes towards technology integration into Science education curriculum. The following table and chart demonstrated the frequency data for these statements. Each statement had five options; “strongly agree”, “agree”, “neutral”, “disagree”, and “strongly disagree”.

The section on integrating technology into teaching (questions 40-49) found that there was a significant relationship between faculty use of instructional technology and attitudes in most cases:

- The results of question 41 indicated that 85 % agreed or strongly agreed that using a computer with technology equipment and subject-based software in instruction would make them better instructors.
- The results of question 42 indicated that 85 % agreed or strongly agreed that the use of instructional technology required unnecessary curriculum reforms.
- The results of question 44 indicated that 96 % agreed or strongly agreed that all faculty members should know how to use instructional technology.
- The results of question 48 indicated that 87 % agreed or strongly agreed that it was important that Taibah University’s information and communications technology plan include the use of instructional technology.
- The results of question 49 indicated that 81% agreed or strongly agreed that integrating technology into the curriculum enriched the teaching environment.

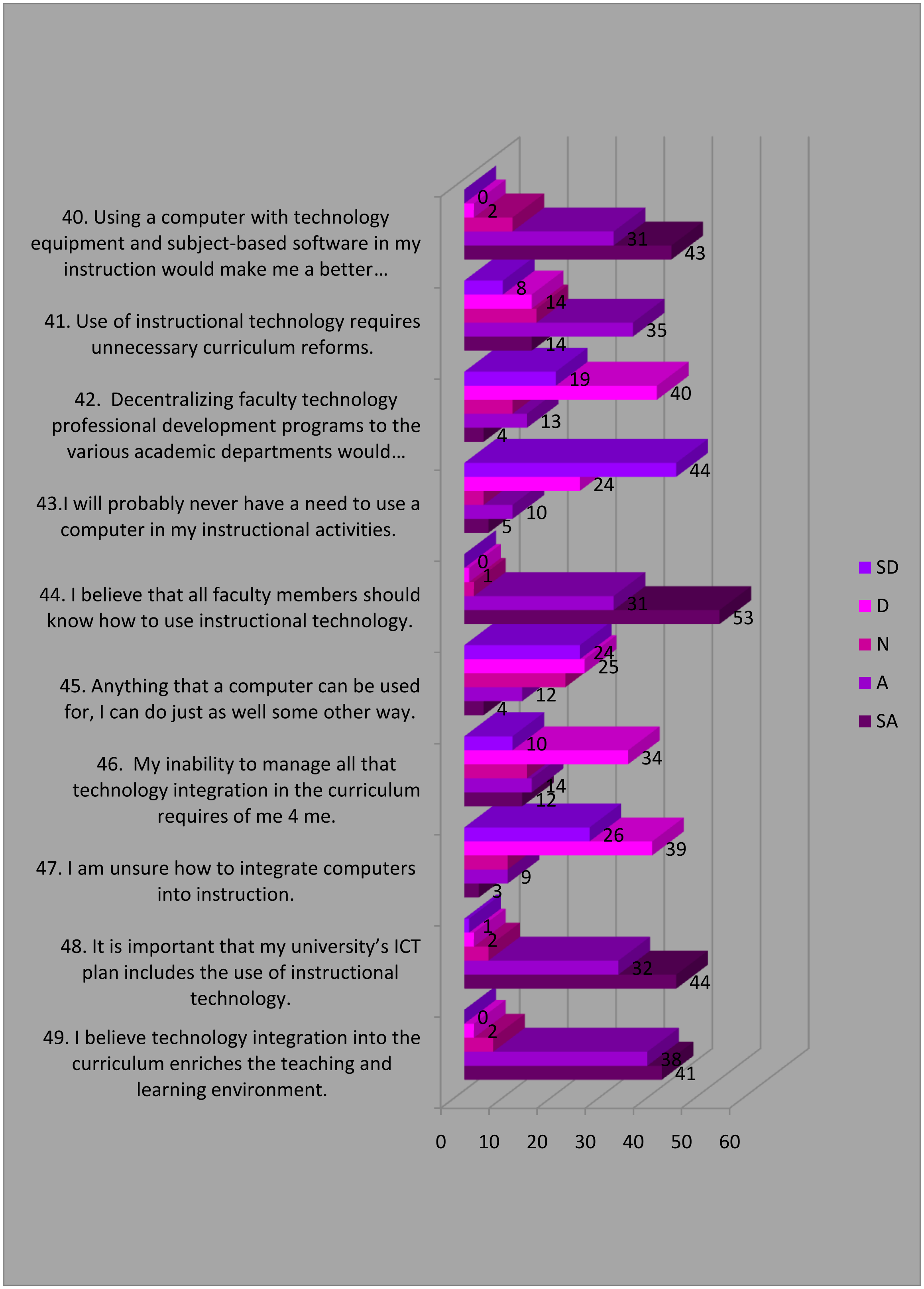
Table 20

Faculty Attitudes towards Technology Integration into Science Curriculum

Statement	**Frequency**				
	SA	A	N	D	SD
40. Using a computer with technology equipment and subject-based software in my instruction would make me a better instructor.	43	31	10	2	0
41. Use of instructional technology requires unnecessary curriculum reforms.	14	35	15	14	8
42. Decentralizing faculty technology professional development programs to the various academic departments would make them more relevant.	4	13	10	40	19
43. I will probably never have a need to use a computer in my instructional activities.	5	10	4	24	44
44. I believe that all faculty members should know how to use instructional technology.	53	31	2	1	0
45. Anything that a computer can be used for, I can do just as well some other way.	4	12	21	25	24
46. My inability to manage all that technology integration in the curriculum requires of me discourages me.	12	14	13	34	10
47. I am unsure how to integrate computers into instruction.	3	9	9	39	26
48. It is important that my university's ICT plan includes the use of instructional technology.	44	32	5	2	1
49. I believe technology integration into the curriculum enriches the teaching and learning environment.	41	38	6	2	0

Figure 15

Faculty Attitudes towards Technology Integration into Science Curriculum



Perceptions of the Effects of Faculty use of Instructional Technology on Pedagogy:

There were ten statements for faculty perceptions of the effects of faculty use of instructional technology on pedagogy (questions 50-54). Table 21 and figure 16 demonstrated the frequency data for these statements. Each statement had five options; strongly agree, agree, neutral, disagree, and strongly disagree.

Answers to question 53 indicated that 90 % agreed or strongly agreed that integrating technology into teaching was very important. Also, the answers to question 54 indicated that 80 % agreed or strongly agreed that the use of technology for instruction affected their teaching methods in a positive way.

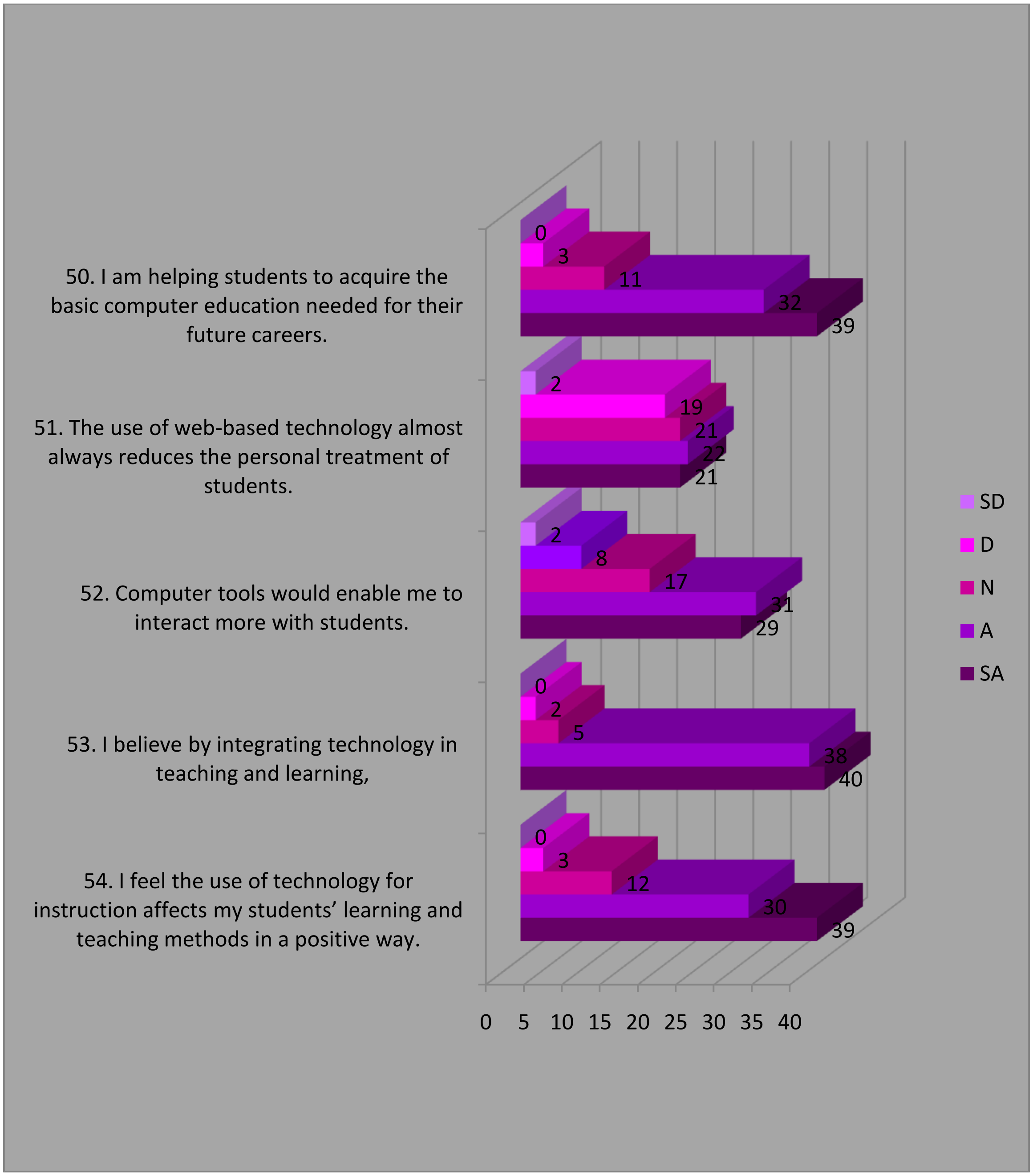
Table 21

Perceptions of the Effects of Faculty Use of IT on Pedagogy

Statement	**Frequency**				
	SA	A	N	D	SD
50. I am helping students to acquire the basic computer education needed for their future careers.	39	32	11	3	0
51. The use of web-based technology almost always reduces the personal treatment of students.	21	22	21	19	2
52. Computer tools would enable me to interact more with students.	29	31	17	8	2
53. I believe by integrating technology in teaching and learning,	40	38	5	2	0
54. I feel the use of technology for instruction affects my students' learning and teaching methods in a positive way.	39	30	12	3	0

Figure 16

Perceptions of the Effects of Faculty Use of IT on Pedagogy



Faculty Perceptions of their Technology Professional Development Needs:

There were ten statements for Science faculty perceptions of their technology professional development needs. Table 22 and figures 17, 18 and 19 demonstrated the frequency data for these statements. Each statement had five options; strongly agree, agree, natural, disagree, and strongly disagree. The data from questions 55 -73 demonstrated that there was a great need for professional development:

- Question number sixty results indicated that 93% needed more resources on how to integrate technology into the curriculum.
- The results of question sixty-one were that 86% agreed or strongly agreed that they needed more training in teaching strategies that integrate technology.
- 98 % of Science faculty who answered question 64 believed that they must have a strong voice in the technology professional development program.
- The results of question sixty-six indicated that 82 % of the faculty need more regular instructional technology workshops.
- The results of question 67 indicated that 95 % of the respondents wanted to collaborate with their colleagues on instructional technology issues.
- The results of question 71 indicated that 61% of the respondents didn't have any formal training in using a web-based learning management system.
- The results of question 72 indicated that 98% of faculty had not received any grant that supported web-based learning management systems.

- The results of question seventy-three indicated that 90% of faculty did not use a learning management system (LMS).

Table 22

Faculty Perceptions of their Technology Professional Development Needs

Statement	**Frequency**				
	SA	A	N	D	SD
55. I have an immediate need for more training with curriculum that integrates technology.	20	48	11	6	2
56. I need convenient access to more computers for my students.	24	48	12	2	0
57. I need more reliable access to the Internet.	45	35	5	1	0
58. I would need more technical support to keep the computers working during instruction.	43	39	5	0	0
59. I need more software that is subject/curricular-based.	35	44	6	0	0
60. I need more resources that illustrate how to integrate technology into the curriculum.	36	46	4	1	0
61. I need more training opportunities with teaching strategies that integrate technology.	35	40	8	2	0
62. I need more compelling reasons why I should incorporate technology into teaching.	14	28	20	18	5
63. I need more time to change the curriculum to incorporate technology.	19	44	15	6	2
64. I believe faculty members must have a stronger voice in the technology professional development program.	30	50	5	1	0
65. Attending a few technology workshops and seminars is enough for me to start using instructional technology.	20	41	20	3	2
66. I need more regular instructional technology seminars/workshops.	22	49	12	3	1
67. I would like to collaborate with my colleagues on instructional technology issues.	29	53	4	0	0
68. My effort is primarily directed towards mastering tasks required to use instructional technology.	16	44	16	9	0
69. My university's faculty technology professional development plan meets my technology needs.	15	24	28	15	3

70. Sixty one of science faculty did not use LMS while 15 used Jusur 7, used Moodl, and one used Dokeos. The total who used LMS was 23.

Figure 17

LMS users (question Seventy)

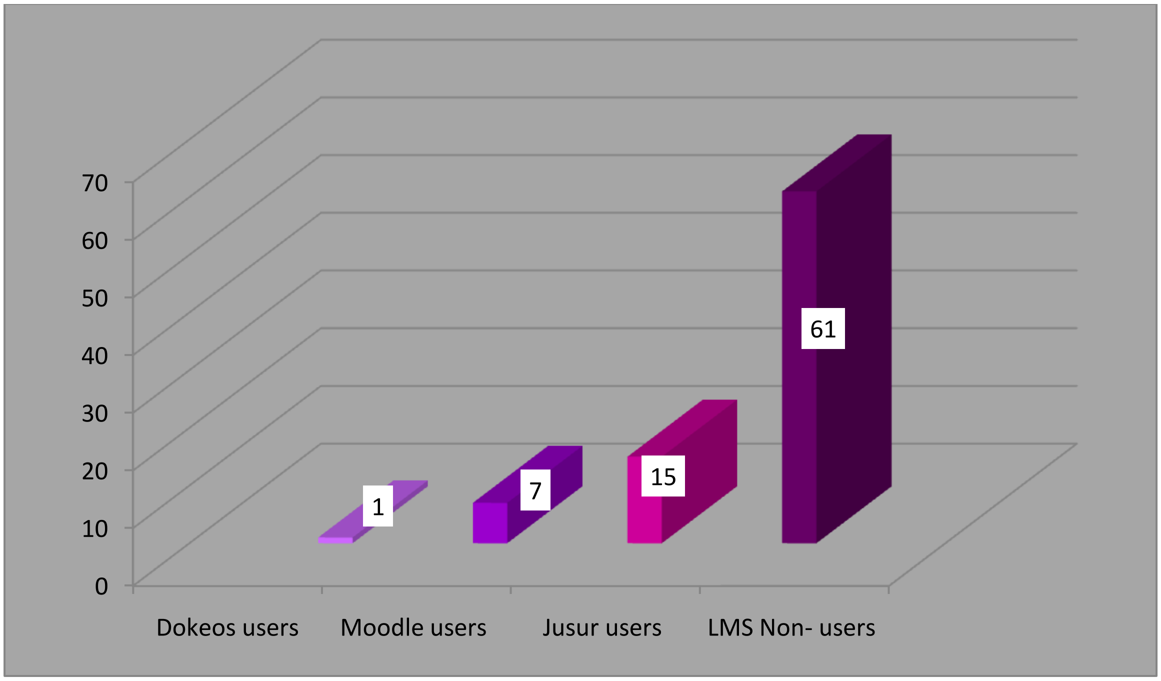
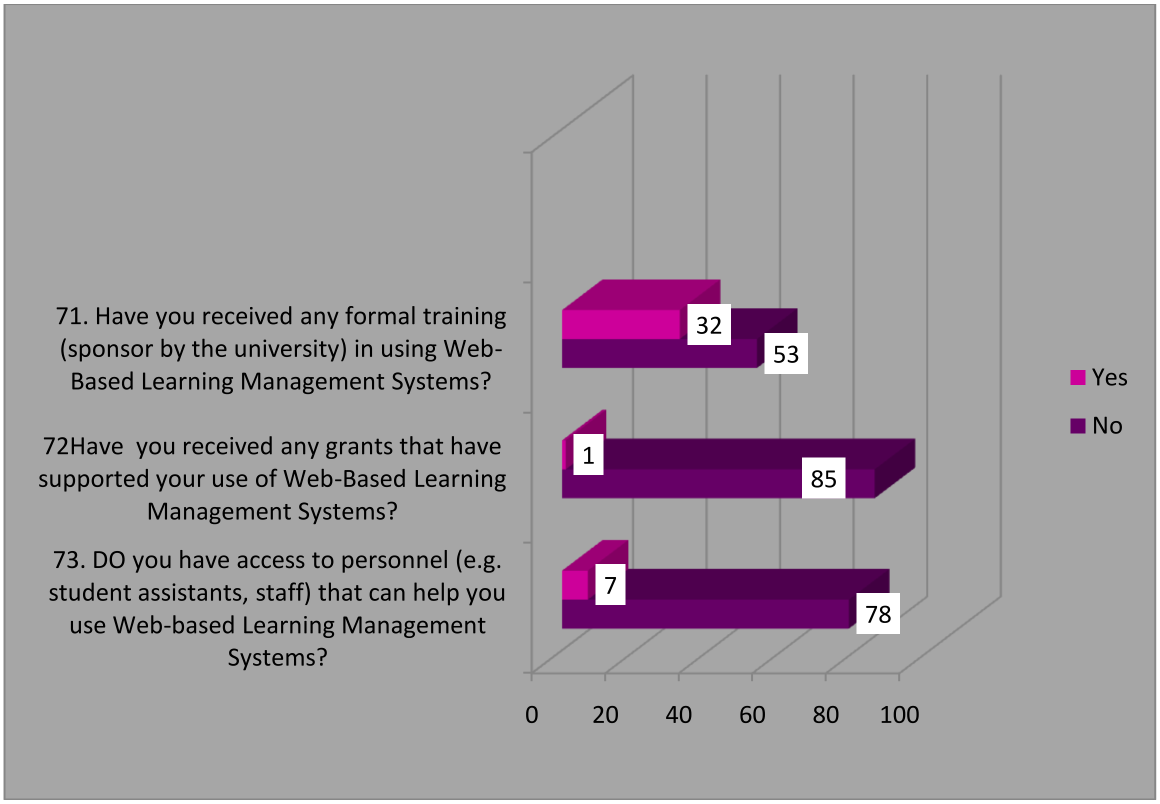


Figure 18

Faculty Perceptions of their Technology Professional Development Needs (questions 55-69)

Figure 19

Faculty Perceptions of their Technology Professional Development Needs (Questions 71-73)



Quantitative Measures

One-way Multivariate Analysis of Variance (MANOVA) Tests

A series of one-way multivariate analyses of variance (MANOVA) tests were performed to determine if significant differences existed between science faculty concerns, technology use, contextual characteristics (gender, age, academic rank, nationality area of content, country of graduation, and years of teaching experience) and technographic characteristics (attitudes toward technology integration in the Science curriculum, perceptions the effects of BL use on pedagogy, and perceptions of technology professional development needs). After that, the Wilks' Lambda test results were provided in tables 23 and 26 for the two main research questions. When statistically significant differences were found from MANOVA results, then a series of analysis of variance (ANOVA) tests were conducted to identify values of significance. For gender, which had only one degree of freedom, the mean was used to determine significance.

Research Question 1

One-way Multivariate Analysis of Variance (MANOVA) Tests for research question one:

Research Question #1: "Is there a significant relationship between Science faculty contextual characteristics (gender, age, academic rank, nationality area of content, country of graduation, and years of teaching experience) and their concerns in adopting BL?"

In order to determine if there were statistically significant differences in the stages of concerns on the contextual characteristics, gender, age, academic rank, nationality, country of graduation, content area, and teaching experience, a series of MANOVA tests were conducted. Table 23 provides a summary of the Wilks' Lambda test results of MANOVA on science faculty's contextual characteristics (gender, age, academic rank, nationality, area of content, country of graduation, and years of teaching experience) and their concerns in adopting BL.

Table 23

Lambda Test Results of MANOVA on Stage of Concerns

Independent Variables	Value	F	df	Error df	Sig.	Partial Eta Square
Gender	0.745	3.77	7	77	0.0015	0.955
Age	0.615	1.22	21	138	0.2470	
Academic rank	0.680	1.09	28	268	0.3561	
Nationality	0.884	1.43	7	76	0.258	
Content area	0.793	1.36	14	154	0.1811	
Country of graduation	0.903	1.15	7	75	0.3447	
Teaching experience	0.679	1.42	21	207	0.1101	

Test Results of Null Hypothesis

Ho 1.1. There are no statistically significant differences between science faculty's gender and their concerns in adopting BL.

Finding

One-way MANOVA on the Lambda test results Lambda was statistically significant at the <.05 level (7,77) = .745) showed a statistically significant difference. Thus, the participants' concerns in adopting BL were influenced by their gender. The significant value of the Lambda MANOVA test was .0015 at the alpha = .05 level in Table 23. Therefore, the null hypothesis *Ho 1.1* was rejected. When the significant value of the Lambda MANOVA test was smaller than .05, follow-up ANOVA test results were reported for the values of significance of stages of concern. Table 21 gives the significance values for concerns in adopting BL on gender.

Table 24

ANOVA Significance Values for Concerns in Adopting BL by Gender

DV (Stage)	DF	Type III SS	Mean Square	F	Sig
Stage 6 Refocusing	1	44.74	44.74	1.19	0.279
Stage 5 Collaboration	1	468	468	13.29	0.000
Stage 4 Consequence	1	155	155	2.52	0.116
Stage 3 Management	1	110	110	2.06	0.155
Stage 2 Personal	1	25.3	25.33	0.49	0.484
Stage 1 Informational	1	420	420	8.04	0.006
Stage 0 Awareness	1	0.171	0.17	0.00	0.952

According to the ANOVA result, the significances were found in stage one (sig 0.0005) and stage five (sig 0.006). According to the KSU statistical consultant, there was no need to conduct the Scheffe Post Hoc test, because the degree of freedom for gender was one. Therefore, comparing means between genders was conducted to determine where the concerns of the participants on adopting BL statistically differed (table 25).

Table 25

Gender Means for Stages 1 and 5

Gender	Stage 1	Stage 5
Male	21	21
Female	25	26

The results of comparing means showed that females had statistically significant differences in both stage one, with mean= 25, and stage five, with mean= 26, of concerns in adopting BL.

Ho 1.2. There are no statistically significant differences between Science faculty's age and their concerns in adopting BL.

Finding:

One-way MANOVA on the Lambda test results (Lambda (21, 138) = .615, $p > .05$) did not show a statistically significant difference. Thus, the participants' concerns in adopting BL were not influenced by their age. The null hypothesis *Ho 1.2* was accepted.

Ho 1.3. There are no statistically significant differences between Science faculty's academic rank and their concerns in adopting BL.

Finding:

One-way MANOVA on the Lambda test results (Lambda (28, 268) = .680, $p > .05$) did not show a statistically significant difference. Thus, the participants' concerns in adopting BL were not influenced by their academic rank. The null hypothesis *Ho 1.3* was accepted.

Ho 1.4. There are no statistically significant differences between Science faculty's nationality and their concerns in adopting BL.

Finding:

One-way MANOVA on the Lambda test results (Lambda (7, 77) = .745, $p > .05$) did not show a statistically significant difference. Thus, the participants' concerns in adopting BL were not influenced by their nationality. The null hypothesis *Ho 1.4* was accepted.

Ho 1.5. There are no statistically significant differences between Science faculty's content area and their concerns in adopting BL.

Finding:

One-way MANOVA on the Lambda test results (Lambda (7, 77) = .745, $p > .05$) did not show a statistically significant difference. Thus, the participants' concerns in adopting BL were not influenced by their content area. The null hypothesis *Ho 1.5* was accepted.

Ho 1.6. There are no statistically significant differences between Science faculty's country of graduation and their concerns in adopting BL.

Finding:

One-way MANOVA on the Lambda test results (Lambda (14, 154) = .793, $p > .05$) did not show a statistically significant difference. Thus, the participants' concerns in adopting BL were not influenced by their country of graduation. The null hypothesis *Ho 1.6* was accepted.

Ho 1.7. There are no statistically significant differences between Science faculty's years of teaching experience and their concerns in adopting BL.

Finding:

One-way MANOVA on the Lambda test results (Lambda (21, 207) = .679, $p > .05$) did not show a statistically significant difference. Thus, the participants' concerns in adopting BL were not influenced by their teaching experiences. The null hypothesis *Ho 1.7* was accepted.

Research Question 2

Research Question #2: "Is there a significant relationship between Science faculty's technographic characteristics (attitudes towards technology integration in the Science curriculum, perceptions of the effects of instructional technology use on pedagogy, and perceptions of technology professional development needs) and faculty's use of technology in teaching by department?"

Ho 2.1. There are no statistically significant differences between science faculty's attitudes towards technology integration in the science curriculum and faculty use of technology in teaching by department.

Ho 2.2. There are no statistically significant differences between science faculty's perceptions of the effects of faculty instructional technology use on pedagogy and faculty use of technology in teaching by department.

Ho 2.3. There are no statistically significant differences between Science faculty's perceptions of technology professional development needs and faculty's use of technology in teaching by department.

In order to determine if there were statistically significant differences in Science faculty's technographic characteristics (attitudes towards technology integration in the Science curriculum, perceptions of the effects of instructional technology use on pedagogy, and perceptions of technology professional development needs) and faculty's use of technology in teaching by department, a series of MANOVA tests were conducted first. Table 26 provides a summary of the Wilks' Lambda test results of MANOVA on technographic characteristics. When statistically significant differences were found in any of the technographic characteristics, a series of analysis of variance (ANOVA) tests were conducted to identify values of significance.

Table 26

Lambda Test Results of MANOVA

Independent Variables	Value	F	df	Error df	Sig.	Partial Eta Square
Faculty attitudes towards technology integration in the science curriculum	.008	1.822	60	45	0.019	0.989
Faculty perceptions of the effects of faculty instructional technology use on pedagogy	0.047	1.34	40	43	0.170	
Professional development needs	0.003	1.97	80	45.8	0.007	0.994

Test results of null hypotheses

Ho 2.1. There are no statistically significant differences between science faculty's attitudes towards technology integration in the science curriculum and faculty's use of technology in teaching by department.

Finding:

One-way MANOVA on the Lambda test results Lambda was statistically significant at the <.05 level (60,45) = .008) showed a statistically significant difference. Thus, the participants' use of technology in teaching was influenced by their attitudes towards technology integration in the science curriculum. The significant value of the Lambda MANOVA test was .019 at the alpha = .05 level in Table 26. The null hypothesis *Ho 2.1* was rejected. When the significant value of the Lambda MANOVA test was smaller than .05, follow-up ANOVA test results were reported for the values of significance of technology use in teaching. Table 27 gives the significance values for use of technology in teaching on science faculty's attitude towards technology integration in the Science curriculum.

Table 27

Science faculty Attitudes towards Technology Integration in the Science Curriculum

Dependent Variable		**Df**	**Type III SS**	**Mean Square**	**F**	**Sig**
Biology	Computer-based technology use	9	50.856	5.651	0.547	.814
	Application Software for Instruction	9	55.235	6.137	0.836	.598
	Instructional technology use	9	74.484	0.8276	0.430	.888
Chemistry	Computer-based technology use	17	123.497	7.265	2.061	.049
	Application Software for Instruction	17	90.532	5.325	1.025	.467
	Instructional technology use	15	478.875	31.925	2.205	.041
Physics	Computer-based technology use	8	29.233	3.654	2.088	.193
	Application Software for Instruction	8	46.333	5.792	1.829	.239
	Instructional technology use	8	85.808	10.726	.388	.881

The ANOVA result showed that the value of significance of Science faculty's attitudes towards technology integration in the science curriculum was smaller than.05 in the Chemistry department with (Sig =.049) in computer-based technology use and (Sig =.041) in Instructional technology use.

Ho 2.2. There are no statistically significant differences between Science faculty's perceptions of the effects of faculty's instructional technology use on pedagogy and faculty's use of technology in teaching by department.

Finding:

One-way MANOVA on the Lambda test results (Lambda (60, 45) = .008, 0.170 > .05) did not show a statistically significant difference. Thus, the participants' technology integration in the Science curriculum and faculty's use of technology in teaching by departments was not influenced by their pedagogy. Therefore, the null hypothesis Ho 2.2 was accepted.

Ho 2.3. There are no statistically significant differences between Science faculty perceptions of technology professional development needs and faculty use of technology in teaching by department.

Finding:

One-way MANOVA on the Lambda test results Lambda was statistically significant at the <.05 level (80,45.8) = .003, 0.0077 > .05) showed a statistically significant difference. Thus, the participants' use of technology in teaching was influenced by their perceptions of technology professional development needs. The null hypothesis *Ho 2.3* was rejected. The significant value of the Lambda MANOVA test was .007 at the alpha = .05 level in Table 26. When the significant value of the Lambda MANOVA test was smaller than .05, follow-up ANOVA test results were reported for the values of significance of technology use in teaching. Table 28 gives the significance values for use of technology in teaching on Science faculty's perceptions of technology professional development needs.

Table 28

Science faculty Perceptions of Technology Professional Development Needs

DV		**df**	**Type III SS**	**M Sq**	**F**	**Sig**
Biology	Computer-based technology use	12	104.333	8.694	1.661	.300
	Application Software for Instruction	12	84.278	7.023	3.292	.099
	Instructional technology use	11	189.767	17.252	2.234	.276
Chemistry	Computer-based technology use	20	119.319	5.966	1.268	.279
	Application Software for Instruction	20	105.860	5.293	.888	.603
	Instructional technology use	18	638.642	35.480	4.149	.001

Physics	Computer-based technology use	7	20.233	2.890	8.671	.107
	Application Software for Instruction	7	35.733	5.105	15.314	.063
	Instructional technology use	7	131.733	18.819	2.258	.341

The ANOVA results showed that the value of significance of Science faculty's perceptions of technology professional development needs was smaller than .05 in the Chemistry department with (Sig =.001) in instructional technology use.

Qualitative Measures

The qualitative data in this study was obtained from the three open-ended questions. Each question was analyzed based on themes, categories and units. These three questions provided 75 units, with 23 categories and 8 themes. Qualitative themes, categories and units in the three questions are displayed in tables (30, 31, and 32) and charts (21, 22 and 23). The first open-ended question gave more information regarding Science faculty's concerns towards adopting BL. It provided ten units and three themes. The second open-ended question obtained professional development activities, incentives, and support responses that Science faculty needed to have in order for them to use BL to support their instruction. Answers on this question included twenty-eight units, eight categories and two themes. In addition, the third open-ended question collected data regarding Science faculty professional development activity, incentive and support needed at this time in order for them to use BL to support their instruction. It provided 37 units, with 15 categories and 3 themes.

In qualitative data, the main themes were "Professional development" and "Workshops". For example, one of the participants stated, "Increase the workshops and professional developments about BL". Another participant mentioned, "We need professional developments and workshops to adopt BL". In some cases, the respondents made distinctions between "professional development" and "workshops" and in others stated that they needed to be combined "professional development and workshops". Professional development can include presentations, conferences, virtual training, individual training, tutorials, and a wide range of activities. A workshop is a specific sub-category of professional development activities. It usually refers to a face-to-face meeting held for training purposes. While some professors may not have understood the difference, the researcher decided that because these distinctions were made by the faculty themselves, that these should be separate categories.

Because gender differences were found in the quantitative date, gender differences were also tabulated for qualitative questions, as well. Table 29 and Figure 20 illustrate the gender differences in answers to qualitative questions.

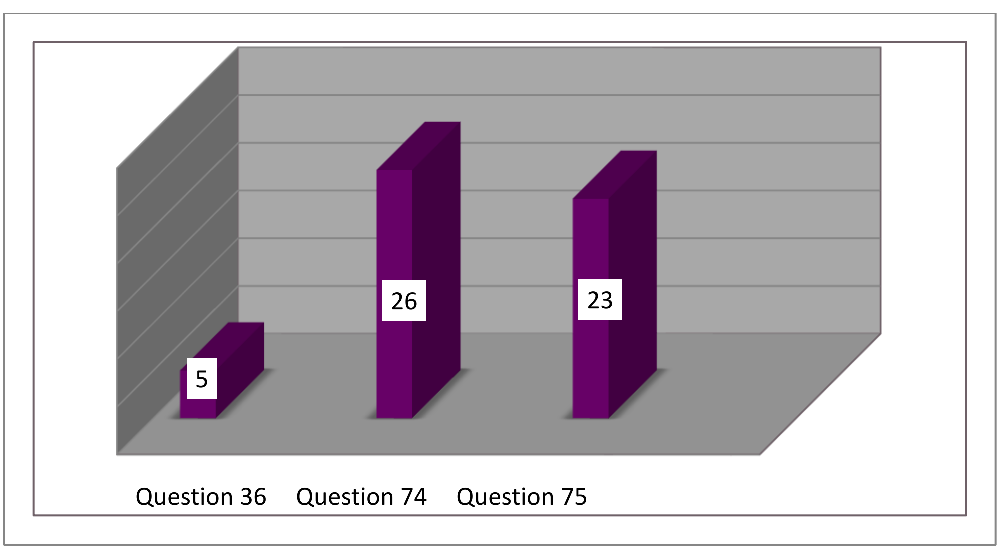
Table29

Gender Differences in Qualitative Question Responses

	Participants	**Male**	**Female**
36	5	1	4
74	26	16	10
75	23	13	10

Figure 20.

Gender Differences in Qualitative Question Responses



Research Question Thirty-Six: *Provide your comments and/or concerns about Blended Learning in the space below. If there is not enough space for your comments, then write on the back, as well.*

There were five respondents to this question. The respondents offered only 10 total units of information on this question, from which three themes emerged. They offered 5 total units on the first theme "Blended learning concerns"; in other words, these units focused on the various aspects of concern about the introduction and possible negative impacts of BL into the Science curriculum. One respondent saw BL as being very problematic, with others expressing a range of concerns over its introduction and effects on student learning. One respondent wrote: "Does BL achieve its goals when applied in labs that significantly depend on students' hands-on experiments?" Another respondent wrote: "The application of BL is a disadvantage for students and could negatively affect the amount of what they learn." The three other units were that BL would "slow interaction" with the students, since they "barely receive students' homework via e-mail". One respondent asked to what extent BL might improve students' ability to "think logically" and "develop a desire for learning, since students only want to gain their B.A. degrees for future job employment and not for the sake of learning".

The second theme was "Technical and curriculum support", with 3 units. Responders stated that "shortage of technical support", "lack of facilities", and "workshops that help me in applying BL" as being of importance.

The third theme was that of "Positive attitudes toward BL", with 2 units. One respondent wrote: "Using BL is beneficial", but did not give reasons why. The second respondent stated: "…BL is an important step toward the application of electronic learning." A possible reason for the few responses to question thirty-six could have been due to the sequence of the question in the survey, since respondents could have felt that it was redundant. For instance, one of the participants did not answer the question and said "what I answered above was enough".

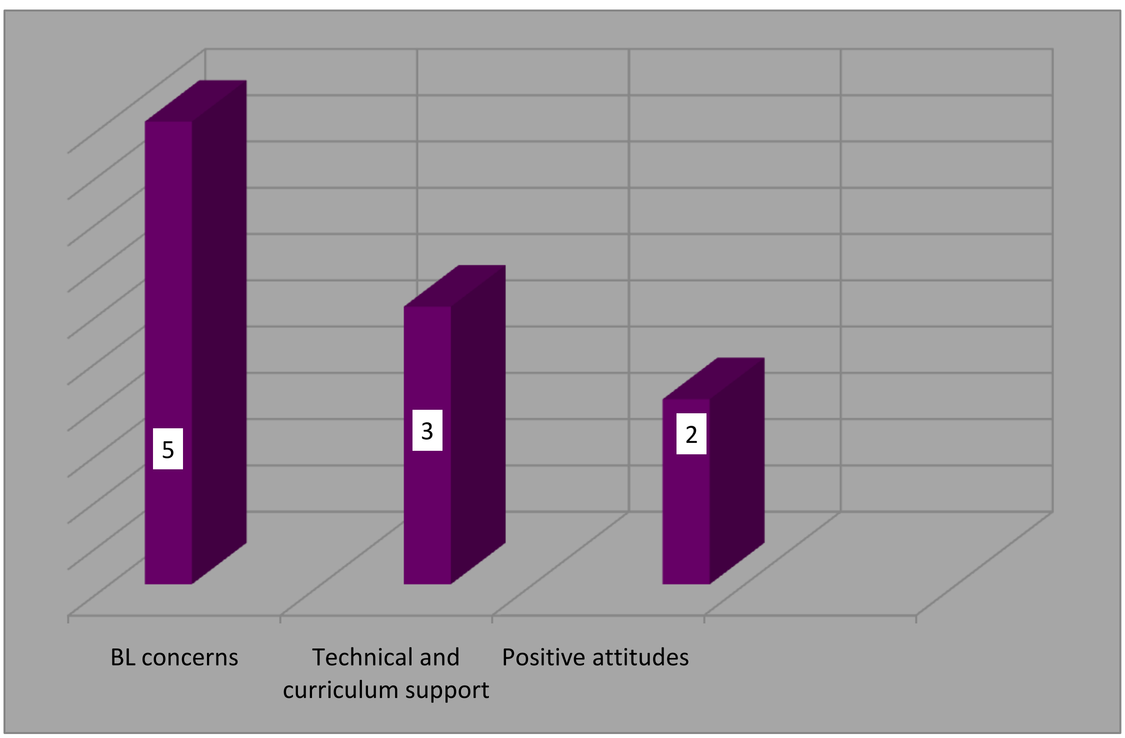
Table 30

Concerns about Blended Learning

Themes	**Units**
Blended learning concerns	5
Technical and curriculum support	3
Positive attitudes toward BL	2

Figure 21

Concerns about Blended Learning



-Research Question Seventy-Four: Provide professional development activities, incentives, support, etc., you need to have in order for you to use blended learning to support your instruction. Use the space below. If there is not enough space, then write on the back, as well.

There were twenty-six responders to this question. The respondents offered 28 total units of information on this question, with 8 categories and two themes. The first theme was “Professional development”, with three categories and 18 units. Ten units total were on the category Professional development and workshops. This was the largest category to the respondents, with 4 respondents specifically mentioning BL and 2 stating that they must be “intensive”. The other 6 responses, 4 simply stated the need for the two with no explanation, 1 stated the need to “reduce credit hour teaching loads in order for faculty to attend professional development”, and 1 stated the need for it to be during “free time”.

There were 5 units on the category Professional development. Two units simply stated that the need for professional development. Two units dealt with specific applications: Improve use of learning management system, and Explain new BL programs. One was on the need for Financial support for professional development.

There were 3 units total on the need for Workshops category. One specifically stated the need for a workshop on Moodle and Jusur (learning management systems, with Jusur being in Arabic), 1 on BL and 1 simply stating the need for workshops.

The second theme was “Technology needs”, with ten units and five categories. There were 3 units on the Facilities category, though where the facilities being located varied, with 2 simply stating the need for facilities, 1 stating the need for a computer lab for BL, and 1 stating the need for Facilities in classrooms so that students can learn BL correctly. Two units were on the category of Software applications to support BL. Two units were on the need to establish a Technical center category. Two units were on the need for Internet connections in the classroom category. One specifically mentioned this need for the women's college, stating "How can we adopt BL without internet in the women's college?" The respondent went on to state that this was needed to "learn what is going on the world."

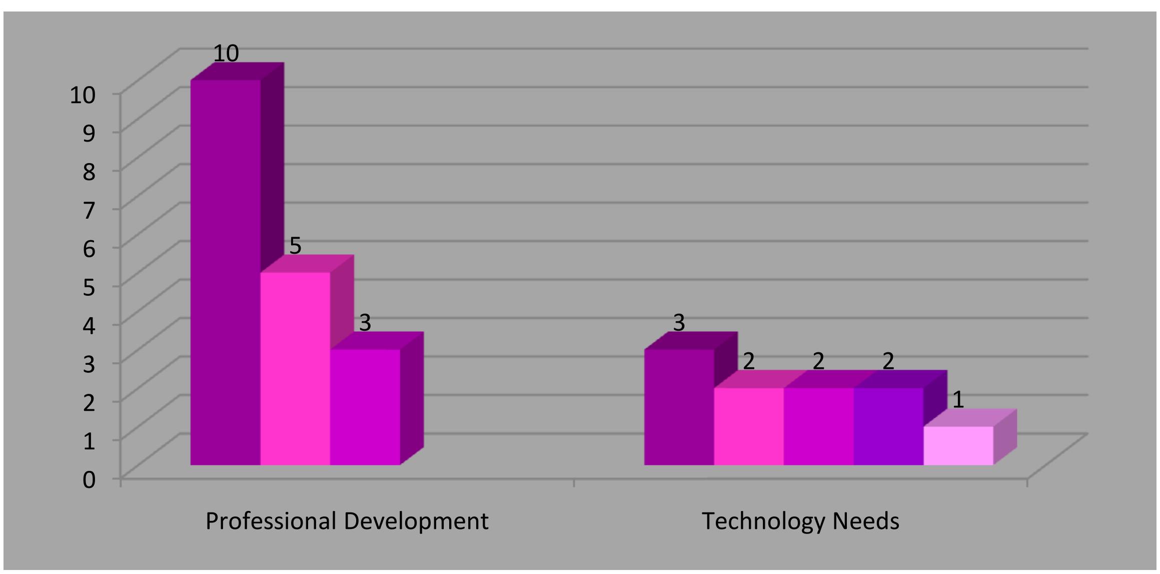
Table 31

Professional Development Activities, the Participants Need to Use BL

Themes	**Categories**	**Units**
Professional Development	Professional development and workshops	10
	Professional development	5
	Workshops	3
Technology Needs	Facilities	3
	Supporting programs (software applications)	2
	Technical center	2
	Internet	2
	Computer labs	1
	Total	28

Figure 22

Professional Development Activities, the Participants' Need to Use BL



Research Question Seventy-Five: Provide the most important professional development activity, incentive, support, etc. that you need at this time in order for you to use blended learning to support your instruction. Use the space below. If there is not enough space, then write on the back, as well.

There were twenty-six responders to this question. The respondents offered 37 total units of information on this question, with fifteen categories and three themes.

The first theme was “Technology tools”, with 6 categories and 16 units. Two categories, with 4 responses each, tied for next in importance- Internet connections and Computer labs and facilities to support teaching with BL. It appears that faculty would need basic technology to introduce BL. Learning management systems also had 3 responses each, indicating a basic need to learn how to use them, and, specifically, the use of Jusur and Moodle. Two categories had 2 responses each – Applications software and Internet connection and computers, including one stating the need for both and one stating the need for using them correctly. One of the respondents mentioned his need for Antiviral programs.

The second theme was “University support”, with 19 units and 7 categories. The most important category for this question was the Workshops, with 10 units of information. Five respondents simply stated the need for workshops. Two stated the need for “intensive” workshops, one of whom said it should be “one-day”. Other responses had qualifiers for the workshops, such as “practical”, “during appropriate times for faculty”. One respondent stated the need to teach students about BL: “Hold workshops for students and introduce the importance of BL and their participation in it to achieve BL objectives.” Professional development had 3 responses; including applying what has been learned at these sessions. Technical support included establishing a technical support center to help faculty and technical support staff. The last responses, of 1 each, stated the need for, Manuals, a Deanship, Encourages BL, and Financial support (unspecified).

The third theme was “Student needs”, with 2 units and 2 categories, which were Increasing student visits to the lab and Linking learning process to daily life.

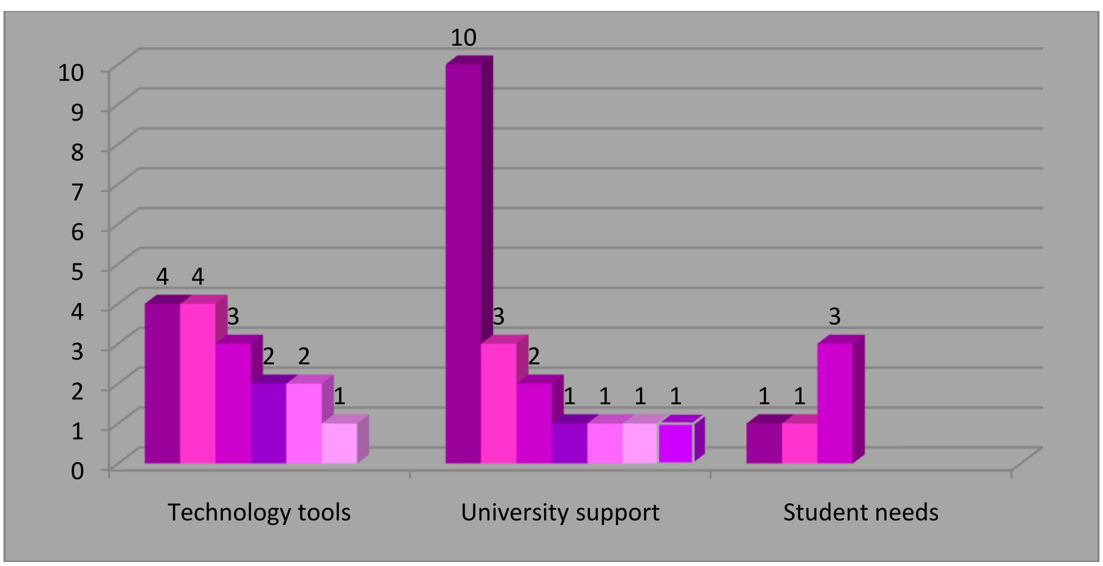
Table 32

Professional Development Activities, Participants Currently Need to Use BL

Themes	**Categories**	**Units**
Technology tools	Internet connection	4
	Computer labs and facilities	4
	LMS	3
	Internet connection and computer	2
	Application software	2
	Anti-viral programs	1
University support	Workshops	10
	Professional development	3
	Technical support	2
	Manuals	1
	Deanship	1
	Encourage BL	1
	Financial support	1
Student needs	Increase students visit to the lab	1
	Link learning process to daily life	1
	Total	37

Figure 23

Professional Development Activities, Participants Currently Need to Use BL



Overall Themes

Table 33 shows 33 units, five categories, and two overall themes of the responders' answers to all of the qualitative questions of the study. The overall themes were identified as the category that had four units and above. The first overall theme was "Professional development and workshops", with twenty-five units and three categories. Ten units total were on the category Professional development and workshops while other ten units specific focus on Workshops, alone. A total of five units concentrated on the need for Professional development. While these three categories could be considered as a group, professional development can include workshops, but can also include presentations, virtual training, conferences, and other activities. Workshops were understood to be face-to-face meetings for training purposes, so these categories were left as the respondents answered. The second overall theme was "Technical support", with eight units and two categories. The need for Internet connection scored a total of four units, while the last four units indicated the need for Computer labs, technical support, and facilities.

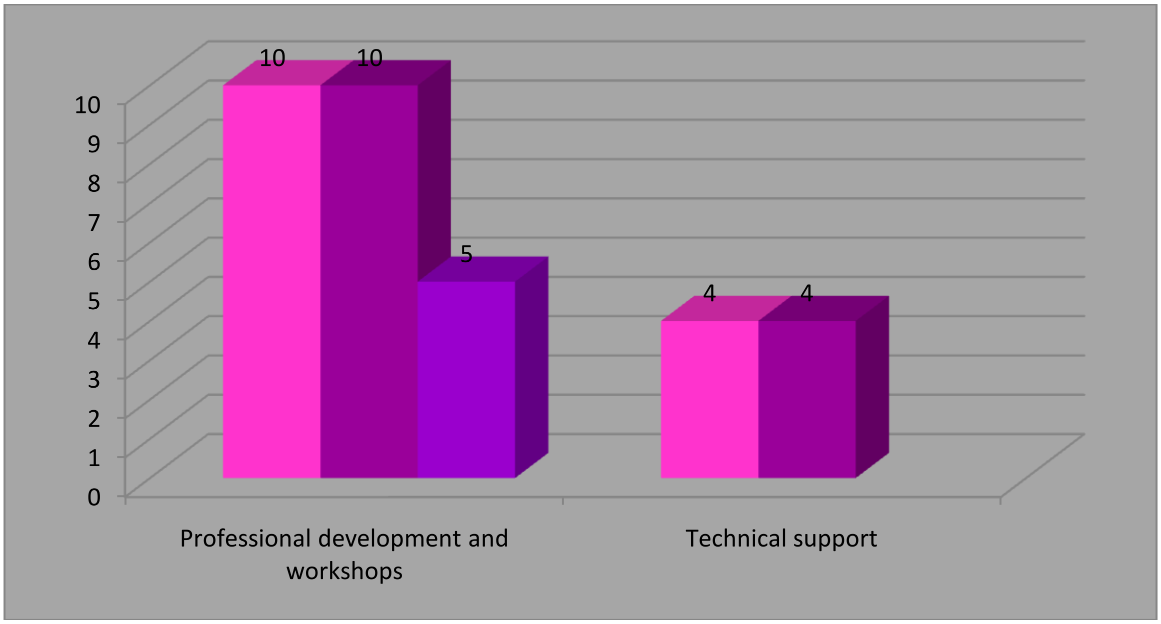
Table 33

Computer labs, Technical Support, and Facilities

Themes	**Categories**	**Units**
Professional development and workshops	Professional development and workshops	10
	Workshops	10
	Professional development	5
Technical support	Internet connection	4
	Computer labs, technical support and facilities	4
	Total	33

Figure 24

Computer labs, Technical Support, and Facilities



Chapter Summary

The data in this study were obtained from 87 Science faculty at Taibah University. The data were analyzed by using quantitative (descriptive data analysis and inferential analysis) and qualitative measures. *The contextual characteristics* indicated that 35.3% of the participants were female and 64.7% were male. Most of the participants were in age range of 31-40 (41.4%) and then 41-50 (32.8%). Most of the participants were assistant professors (37.6%) and associate professors (25.9%). The data indicated that most of the participants were non-Saudi faculty, 63.1%, while Saudi faculty were 36.9%. Most, 54.22% of the participants, graduated from Arab institutions, while 45.7 % obtained their degree from non-Arab institutions. Most of the participants were Chemistry faculty with 52.3% while Biology faculty presented 27.9% of the participants and the least group of participants was the Physics faculty with 19.8%.

The *technographic characteristics* were measured using inferential analysis. *Inferential analysis: Research question one:* One-way MANOVA test results of the contextual characteristics indicated that the participants' concerns in adopting BL were not influenced by their age, academic rank, nationality, country of graduation and years of teaching experience. A statistically significant difference was found in the participants' concerns in adopting BL by gender, sig = .0015. The significances were found in stages one (sig = .000) and five (sig = .006) for female faculty. Therefore, Null Hypothesis 1.1 was rejected. Null hypotheses 1.2-7 were accepted.

Inferential analysis: Research question two: One-way MANOVA test results of the technographic characteristics indicated that the participants' use of technology in teaching was not influenced by their perceptions of the effects of instructional technology use on pedagogy. A statistically significant difference was found in the participants' use of technology in teaching by department by their attitudes towards technology integration in the Science curriculum and perceptions of technology professional development needs. Null hypotheses *2.1* and *2.3* were rejected. Null hypothesis *2.2* was accepted.

Qualitative analysis: the qualitative data in this study were obtained to give in-depth understanding regarding Taibah University Science faculty's concerns and professional development needs in adopting BL. Through the qualitative data, 75 units, 26 categories and eight themes emerged (question 36: 10 units and 3 themes, question 74: 28 units, 8 categories and two themes, and question 75: 37 units, 15 categories and three themes).

Five participants answered the first open-ended question about their concerns in adopting BL. Four participants were female and one participant was male. This question presented 10 units and 3 themes "BL concerns", Technical and curriculum support" and "Positive attitudes toward BL."

In the second open-ended question, twenty-six answered the question about their professional development needs in adopting BL. Sixteen of the participants were male and ten were female. It provided 28 units, 8 categories and two themes. The first theme was "Professional development" with three categories and eighteen units: Professional development and workshops (10 units), Professional development (5 units), and Workshops (3 units). The second theme was "Technology needs", with five categories and ten units: Facilities (3 units), Supporting programs (software applications) (2 units), Technical center (2 units) and Internet and Computer labs (1 unit).

Twenty-three participants, thirteen male and ten female, answered the third open-ended research question. It provided three themes with 15 categories and 37 units. The first theme was "Technology tools" ,with 6 categories and 16 units: Internet connection (4 units), Computer labs and facilities (4 units), LMS (3 units), Application software (2 units), Internet connection (2 units), and Anti-viral programs (1 unit). The second theme was "University support", with 7 categories and 19 units: Workshops (10 units), Professional development (3 units), Technical support (2 units), Manuals (1 unit), Deanship (1 unit), Encouraging BL (1 unit), and Financial support (1 unit). The third theme was “Student needs”, with two categories and two units: Increasing students visit to the lab and Linking learning process to daily life one unit each.

The major themes among the three open ended questions were: 1) “Professional development”, with three categories; Professional development and workshops (10 units), Professional development (10 units), Workshops (five units), and Computer labs. 2) “Technical support”, with two categories: Facilities (4 units), and Internet connection (4 units).

Chapter 5

Summary, Conclusions and Recommendation for Future Studies

Chapter Overview

The purpose of the study was to identify Science faculty concerns and professional development needs in adopting BL at Taibah University in Saudi Arabia in three departments. The study had two research questions:

- Is there a significant relationship between Science faculty's contextual characteristics (gender, age, academic rank, nationality, content area, country of graduation, and years of teaching experience) and their concerns in adopting BL?
- Is there a significant relationship between Science faculty's technographic characteristics (attitudes toward technology integration in the Science curriculum, perceptions the effects of BL use on pedagogy, and perceptions of technology professional development needs) and faculty use of technology in teaching by department?

To answer these two research questions a survey instrument was designed to collect quantitative and qualitative data from close-ended and open-ended questions. A summary of the quantitative and qualitative data findings is presented. Conclusions from these findings are presented. Finally, recommendations for Taibah University and for future studies are presented in this chapter.

Summary

General Characteristics of the Respondents

The respondents' general characteristics in this study were gender, age, academic rank, nationality, country of graduation, area of content and teaching experience.

Gender

34.29 % of the participants were females and 64.71 % were males.

Age range

The 8.62 % of the participants were in the age range of 20-30, 41.38 % were in the age range of 31-40. 32.76 % of the participants were in the age range of 41-50 while 17.24 % were in the age range of 51-60.

Academic Rank

The 87 participants who completed the survey, the largest number of the participants 34.65 % was Assistant Faculty. The Associate Faculty were the next largest group, with 25.88 %. The Faculty were 21.18 %. The participants with Master's degrees were the smallest group with 5.88 percent while 9.41 % were Teaching Assistants.

Nationality

The largest number of faculty was non-Saudi, with 63.10 % . The Saudi faculty represented 36.90 % of the participants in this study.

Countries of Graduation

The faculty who obtained the last degree from Arab institutions were 54.22 %. The faculty who obtained the last degree from Non-Arab institutions were 45.78 %.

Content Area

The largest number of participants was in the Chemistry faculty, with 52 %. Biology faculty was the next largest group, with 28 %, while Physics faculty was 20 %.

Teaching Experience

The faculty who taught from one to ten years was the largest group in this study, with 41.46 %. The second largest group in this study was the faculty, who taught from 11 to 20 years, with 34.15 %. The faculty who taught from 21 to 30 years was the third largest group, with19.51 %. The smallest group in this study was the faculty who taught from 31 to 40 years, with 4.88 %.

Quantitative Measures

Research Question One:

Is there a significant relationship between Science faculty general characteristics (gender, age, academic rank, nationality area of content, country of graduation, and years of teaching experience) and their concerns in adopting BL?

One-way MANOVA test results indicated that the participants' concerns in adopting BL were not influenced by their age, academic rank, nationality, country of graduation, and years of teaching experience. Therefore, null hypotheses *Ho 1.2, Ho 1.3, Ho 1.4, Ho 1.5, Ho 1.6 and Ho 1.7.* were accepted. A statistically significant difference was found in the participants' concerns in adopting BL by gender. Thus, null hypothesis *Ho 1.1* was rejected.

Research Question Two:

Is there a significant relationship between Science faculty's technographic characteristics (attitudes towards technology integration in the Science curriculum, perceptions of the effects of instructional technology use on pedagogy, and perceptions of technology professional development needs) and faculty use of technology in teaching by department?

One-way MANOVA test results indicated that the participants' faculty use of technology in teaching was not influenced by their perceptions of the effects of instructional technology use on pedagogy. Therefore, the null hypothesis *Ho 2.2* was accepted. A statistically significant difference was found in the participants' use of technology in teaching by department by their attitudes towards technology integration in the Science curriculum and perceptions of technology professional development needs. Therefore, the null hypotheses of *Ho 2.1and Ho 2.3* were rejected.

Qualitative Measures

The data from open-ended questions were first transferred to Microsoft Office Word and then analyzed based on the themes that emerged from Science faculty answers. The researcher collected and classified answers that were relevant to aspects of faculty concerns and professional development needs. The number of times a particular word or phrase were repeated in the responses to the three open-ended questions was recorded and presented in the table and chart.

There were five respondents to the first open-ended question (number 36) with one male and four females. There were twenty-six respondents to the second open-ended question (number 74), with sixteen males and ten females. The third open-ended question (number 75) was answered by twenty-three respondents, with 13 males and 10 females.

The data analysis presented 85 united, 26 categories and eight themes for the three open-ended questions.

Question Thirty-six: Provide your comments and/or concerns about Blended Learning in the space below.

Data analysis showed 10 units and 3 themes that emerged from Science faculty responses about their concerns to adopt BL. The first theme was "Blended learning concerns". This theme had five units. One of the responders said "Does BL achieve its goals when applied in labs that significantly depend on students' hands-on experiments?"

The second theme was “Technical and curriculum support.” It had three units. One of the responders stated that there was a “shortage of technical support.”

The third theme was “Positive attitudes toward BL.” It contained two units. One respondent wrote: “Using BL is beneficial”, but did not give reasons why. The second respondent stated: “…BL is an important step toward the application of electronic learning”.

Research Question seventy-four: Provide professional development activities, incentives, support, etc., you need to have in order for you to use blended learning to support your instruction.

For question seventy-four there was a total of 28 units. These units then were classified into eight categories. From these categories two themes emerged. The first theme was “Professional development”. This theme contained 18 units and three categories. The first category was Professional development and workshops, with 10 units. It was the largest category for Science faculty, with 4 respondents specifically mentioning BL. The second category was Professional development, with five units. Two of the responders mentioned their need for professional development to help them in using LMS. The third category was Workshops, with three units.

The second theme was “Technology needs”, with five categories and ten units. The first category was Facilities, with 3 units. Supporting programs (software applications) was the second category, with two units. Technical center and Internet were the third and fourth categories, with two units each. The final category was Computer labs, with one unit.

Research Question Seventy-Five: Provide the most important professional development activity, incentive, support, etc. that you need at this time in order for you to use blended learning to support your instruction.

The respondents offered three themes, with 37 total units and 15 categories on this question. The first theme was “Technology tools”, with 16 units and 6 categories. The categories Internet connection and Computer labs had 4 units each, while LMS had three units. Application software and Internet connection categories had 2 units each. In addition, Anti-viral programs had 1 unit.

The second theme was “University support”, with 19 units and 7 categories. The largest category for this theme was Workshops, with 10 units of information. The category, Professional development, had 3 units, while Technical support had 2 units. In addition, the categories of Manuals, Deanship, Encouraging BL and Financial support had 1 unit each.

The third theme was “Student needs” with 2 units and 2 categories. Increase student visits to the lab, and Linking learning process to daily life had 1 unit each.

Finally, there were 2 overall themes. The first overall theme was “Professional development and workshops” with 10 units and 3 categories (Professional development and workshops, Professional development, and Workshops, with 5 units) and a total of 25 units. The second overall theme was “Technical support”, with 2 categories (Computer labs, Technical support, and Facilities, with 4 units, and Internet connection, with 4 units) with 8 units total.

Conclusions

The following are conclusions based on descriptive statistics, quantitative, and qualitative data:

<u>Research Question #1</u> – Is there a significant relationship between Science faculty contextual characteristics (gender, age, academic rank, nationality, area of content,

country of graduation and years of teaching experience) and their concerns in adapting blended learning?

In a review of descriptive statistics, these conclusions emerge on the SoC (questions 1-35).

1) The findings from Research Question one, in which a significant relationship was found between gender and stages of concern (sig = 0.0015), with females expressing a higher degree of concern than males at stages 1 (informational) and 5 (collaboration) in adopting blended learning in Saudi Arabia supports the findings of Alshammari (2000) in Kuwait, in that he also found a significant relationship between gender and the stages of concerns. In his study females had a higher stage 3 level of concerns (management). Though these concerns were at different stages, the fact that in this study only gender was found to be significant gives pause for reflection, particularly since Hall and Hord (2006) found that there were no gender differences in the United States.

The reasons for these differences could be diverse. It is possible that women could be more willing to collaborate or that they may be less willing to adopt BL for a variety of reasons. Women university professors in Saudi Arabia could be more concerned about the need for professional development or the inequity in the technical facilities in the women's and men's colleges. Most of the women that answered open-ended questions stated that they didn't have basic technology tools. For example, "How can we adopt BL without internet in the women's college?"

The number of women (30 of 56) and the number of men (55 of 92) that answered questions indicates that roughly the same percentage of women and men answered the survey, though the number of female faculty is roughly half that of men. This is due in part to the shortage of women in higher education, particularly in the Sciences. It may be due in part to other factors, as well, though that is a matter of conjecture and further study.

Research Question #2- Is there a significant relationship between Science faculty's technographic characteristics (attitudes toward technology integration in the Science curriculum, perceptions of the effects of instructional technology use on pedagogy, and perceptions of technology professional development needs) and faculty use of technology in teaching by department?

2) The findings from Research Question Two, in which a significant relationship was found (Sig= 0.019) between attitudes toward technology integration into the Science curriculum and faculty's use of technology in teaching by department. There was a significant relationship between the Chemistry department faculty's attitudes toward technology integration into the Science curriculum and faculty use of technology in teaching. The Chemistry faculty represented 52 % of this study population. This finding was consistent with the finding of Petherbridge (2007), who found that faculty with positive attitudes toward teaching with technology had lower unrelated and task concerns scores, while faculty with negative attitudes toward technology had increased unrelated concerns scores. Similarly, Alsaif's (2005) study found that faculty who had technology experience and professional development demonstrated positive attitudes toward using technology in their teaching.

The data in this study showed that 95 % of the faculty used computer-based technology almost always, and frequently used it in personal communication and document preparation for their teaching. Moreover, 77 % of Science faculty used computer-based technology for classroom management and student evaluation purposes. So, the data indicated that faculty had positive attitudes toward integrated technology in their teaching. This finding was not surprising, since 50 % of the participants were in the age range between 20 to 40, which is considered a young age in SA.   This finding supported Alsaif's (2005) study, in which "faculty members were willing to use technology, in general, and participate in WBI activities, in particular" (p. 69).

The findings from Research Question two were that there was a significant relationship was found (Sig= 0.007) between perceptions of technology professional development needs and faculty's use of technology in teaching by department. A significant relationship was found between the Chemistry department faculty's perceptions of technology professional development needs and faculty use of technology in teaching. The data from technographic characteristics indicated that 86% either agreed or strongly agreed that they needed more training in teaching strategies that integrated technology. The results indicated that 61% of Science faculty didn't have any formal training in using web-based learning management system. This finding demonstrated the need for professional development, in general, and professional development in LMS in order of Science faculty to adopt BL.

This finding agreed with Petherbridge (2007), which found that faculty impact-consequence concerns scores increased due to their participation in technology-related training. In addition, Petherbridge (2007) also mentioned that "faculty members will need a variety of professional development activities in order to move beyond intrinsic concerns associated with using a new innovation, achieving the 'ideal' concerns area of impact-consequence and impact-collaboration (p.246)". Similarly, Adams (2002) found that there was a correlation between faculty's attendance in technology integration professional development sessions and increased levels of technology use in their teaching. The finding in this study was also consistent with Alsaif's (2005) study, which found that the main reason that faculty members did not integrate the innovation into their teaching was due to the lack of training.

The contradiction between the responses for questions 41(85% agreed or strongly agreed that the use of instructional technology required unnecessary curriculum reforms) and 53 (90% agreed or strongly agree that integrating technology in teaching was very important) may have indicated that the participants had inadequate knowledge regarding the possibilities for integrating technology in their teaching. Faculty used technology, already, though not more advanced ones necessary for the transition to BL. The data showed that 67 faculty used Microsoft PowerPoint for presentations in the classroom. In addition, 77 Science faculty almost always or frequently used internet for research. Thus, most of their understanding of technology use was limited to using of Microsoft office, which they already know how to use. They did not know, and likely feared, any new technologies of which they were unaware. Therefore, this contradiction likely appeared.

The data from qualitative measures indicated that the main themes focused on professional development and workshops. Therefore, these findings indicated the lack of the professional development in Taibah University's annual plan. It also indicated that the integration of technology into Science faculty teaching, especially online teaching, was still in its early stage.

The quantitative and qualitative data in this study demonstrated a great need for professional development in order for Science faculty to adopt BL. One of the participants said "We need professional development and workshops often, but it has to be in our free time". This statement was also supported by another participant, who said "We need professional developments and workshops to adopt BL". That gives indication that the university asks faculty to integrate technology into their teaching and adopt BL while there is lack of professional development and workshops that build their skills in how to do it. The reason behind this result may be because the professional development that is currently provided is either not enough or is designed based on the university development deanship perspective. In addition, the data indicated that 98 % of science faculty who answered question 64 believed that they must have a strong voice in the technology professional development program. Moreover, the data from qualitative supported that since one of the participants said “I need to know more about Moodle, and Jusur, because the previous workshop was not enough”.

Moreover, the data showed that 90% of faculty did not use a learning management system (LMS), which was surprising, since there were three LMS’s available for faculty to use-Jusur, Moodle, and Dokeos. This result was supported by qualitative result, one of the participants said “provide professional developments to improve using LMS”.

The qualitative data showed that there was a need for internet connections. One of the participants said, “Provide internet connection for learning what is going on in the world”. Another participant said “Provide computers for each professor and internet connection in offices”. This result was not surprising, because faculty lack essential technology tools.

The results also indicated that there was a lack of technical support in order to adopt new technology. Thus, one of the participants said “the university has to establish a technical center that helps professors apply BL”. While another participant said “Provide the essential tools in the classrooms. I need technical support”. This result indicated that BL is relatively new to the SA higher educational culture.

SA universities are looking for quality in higher education that is correlated with the integration of technology in teaching. The quantitative and qualitative data showed a great need for professional development in order for Science faculty to adopt BL. Though there is some hesitance, mostly due to a lack of knowledge of this technology, most faculty are willing to improve their technology skills if they receive proper professional development and technical support. In addition, most SA universities plan to adopt BL in the next five years to accomplish the Afaq project. Finally, the data in this study agreed with most of the studies that found that professional development increased faculty use of technology and enhanced attitudes toward integrating technology into instruction.

Recommendations for Taibah University

The data from this study demonstrated that Taibah University needs to help Science faculty to adopt BL in their teaching. The following are some specific recommendations that may help Taibah University to accomplish this objective:

1. *Teaching methods:* Teaching online courses demands from instructors to shift from teacher-centered methods to learner-centered ones. Thus, Science faculty, at the first point, need to know more about learner-centered teaching methods to be able to teach online courses. Much professional development in learner-centered methods need to be done in order to prepare faculty to adopt BL in teaching. Collaborative learning and problem-based learning are examples of the learner-centered approach that Science faculty need training on in order to be able to use it in teaching.
2. *Professional development*: The data revealed that there was lack of professional development, which is critical in helping the faculty to integrate technology into teaching. Therefore, to improve Science faculty skills to adopt BL, the university has to take the initiative to train them on how to design blended learning courses. Most faculty who were not familiar with online courses thought that the online course was just an electronic version of a face-to-face one, based on their responses to the open-ended questions. Therefore, there is a need for professional

developments in instructional design for Science faculty in order for them to be able to design their courses or at least be ready for teaching online courses.

3. *LMS professional development and workshops*: the data showed there was lack of LMS professional development. Many steps have to be taken in order to provide LMS in the university. First, information must be provided about the LMS and its use in online learning via general presentations for the three Science departments. Second, Science faculty need to learn the purposes and uses of the three LMS that are used in the university. The Distance Dean needs to survey Science faculty to obtain their professional development needs in order to adopt one of the LMS. Proper technical support staff needs to be assigned to solve hardware, software, technical support, and access for faculty.

4. *Internet connections:* According to the participants, there is a need for internet connections in both faculty offices and classrooms. Therefore, if Taibah University wants Science faculty to adopt BL in their teaching, it has to provide internet connection in both the classrooms and the faculty offices.

5. *Technical support:* the qualitative data in this study demonstrated the lack of technical support. So, without technical support that is available 24/7, Science faculty cannot be able to go further in the process of adopting BL. Consequently, Taibah University should retain specialists whom Science faculty could refer to when they need course development assistance.

6. *BL support for cultural and religious practices*: Using BL in the university will solve one of the most difficult challenges facing the university, which is the shortage in female Science faculty. Science faculty will be able to teach classes for male and female students at the same time; they can use face to face in the male section and deliver it synchronously to the female section. In addition, female students will be

able to share their ideas and questions in class discussion. This delivery method will save faculty time and expense.

7. *Instructional design:* the data presented that 49 of the participants believed that the use of instructional technology required unnecessary curriculum reforms. Therefore, it is recommended to establish an instructional design unit in the distance education deanship in both male and female sections. The instructional design specialists could help Science faculty to transfer entire courses to online ones or to transfer parts of these courses for BL purposes. Thus, the instructional design unit could help Science faculty to overcome this problem of not knowing how to develop BL courses. Ideally, the instructional design unit should be accessible for the Science faculty 24/7 via email, phone call or chatting online.
8. *Single LMS adoption:* Taibah University should choose one LMS, instead of three different ones. It is counter-productive to maintain three LMS, in terms of faculty training and system expense.
9. *Strategic plan:* the results of this study indicated that Taibah University should develop a strategic technology plan to help faculty to adopt online or BL courses. The first step in this plan would be to identify the concerns that faculty might have toward adopting online or BL courses. This plan should require an introductory professional development session for faculty to show them the differences between face-to-face, blended, and online courses. If implementation is successful, then this strategic plan and its implementation should then be forwarded to the Ministry of Higher Education in Saudi Arabia for consideration and adoption by other Saudi universities.

Recommendations for Future Studies

The results of this study indicated the need for studies to be conducted about adopting BL, not only in Taibah University, but also in other Saudi Universities. Although online learning in Saudi Arabia is in the beginning stages, there are many Ministry demands to adopt this kind of learning to accomplish the growing enrollment and technology needs facing higher education. Therefore, further studies could be conducted to give the ministry of higher education a clearer picture of using BL in Saudi universities. So, the following studies would be:

1. This study was conducted to know the stages of concerns that Science faulty had to adopt BL. Therefore, it is recommended to conduct a study to identify Science faculty's Level of Use (Hall and Hord, 2006) of the concerns regarding technology use in their teaching and learning in Taibah University to gain a clearer picture of specific needs.
2. This study was limited to the Science faculty in Taibah University. It is recommended to conduct a comparative study to find if there are any differences between Science faculty and faculty in Liberal Arts at Taibah University regarding adopting BL in their teaching, as there may be differences in needs, attitudes, and possible uses.
3. This study was limited to the Science faculty at Taibah University. Thus, it is recommended to conduct studies at other Saudi universities to determine their levels of concerns and professional development needs.
4. The data showed that most of the faculty thought that transferring a face-to-face course to a BL one did not require reforming the curriculum. Therefore, it is recommended that a study by done on the extent to which Taibah faculty understand instructional design concepts. Such a study

would enable the Saudi Ministry of Higher Education and university administrators to accomplish their training objectives regarding adopting either BL or online learning.

5. This study, and other studies, conducted on Saudi faculty had low response rates. Therefore, it is recommended to study the reasons behind Saudi faculty lack of interest in participating in studies that may help them to improve their skills and the quality of higher education, in general.

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Appendix A – The Survey

Invitation to Survey Participants

Dear Colleague,

My name is Nauaf Al-Sarrani, a PhD candidate in the Department of Curriculum and Instruction, College of Education, Kansas State University. I am seeking your help in a survey of Concerns and Professional Development Needs of Science Faculty at Taibah University in Adopting Blended Learning. This study is being conducted as part of a research project for my dissertation. This study will investigate the concerns of Science Faculty in Taibah University, Saudi Arabia, in adopting blended learning. This study will also investigate Taibah faculty professional development needs in adopting and implementing Blended Learning. I believe the findings will help give direction to adopt blended learning in the Science College, particularly in addressing the professional development needs of faculty members in technology integration in teaching in the university.

Your response to this survey will be appreciated. It will take you approximately 20 minutes to complete the survey. Your participation is voluntary, and therefore you may discontinue participation at any time without penalty. By agreeing to complete the survey, I will assume your agreement to participate in this study.

The confidentiality of your responses is an ethical issue I will respect in this study. Your professional and personal information is required in anonymous form to protect your individual identity and privacy.

If you have any questions regarding this study or the survey, please contact the researcher, Nauaf Al-Sarrani at alsarran@ksu.edu Cell: 1-724-541-3150 Home phone: 1-316-313-4159 or Dr. Talab, the researcher major advisor at talab@ksu.edu.

Thank you for taking time to complete this task and assistance,
Sincerely,
Nauaf Al-Sarrani
PhD candidate
Curriculum and Instruction
Kansas State University

<u>Concerns about the Innovation</u>

Questions 1 – 36, reprinted with permission of the Southwest Educational Developmental Laboratory**)**

The purpose of this questionnaire is to determine what people who are using or thinking about using various innovations are concerned about at various times during the innovation adoption process. The items were developed from typical responses of school and college teachers, who ranged from no knowledge at all about various innovations to many years of experience in using them. *Therefore, some 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 is 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 or potential involvement with **Blended Learning**. Blended Learning is the planning integration of online and face to face instructional approaches.

Since the *first* part of this questionnaire is used for a variety of innovations, the name "**Blended Learning**" does not appear. However, phrases such as "the innovation," "this approach," and "the new system" all refer to **Blended Learning**.

Remember to respond to each item in terms of your present concerns about your involvement or potential involvement with **Blended Learning**.

Thank you for taking time to complete this task

1.	I am concerned about students’ attitudes toward this 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 don’t even know what the innovation is.	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 about 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 this innovation.	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 this innovation.	0 1 2 3 4 5 6 7
16.	I am concerned about my inability to manage all 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.1	0 1 2 3 4 5 6 7
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 instructional approach.	0 1 2 3 4 5 6 7
21.	I am completely occupied with other things.	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.	Although I don’t know about this innovation, I am concerned about things in the area.	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 this time spent working with nonacademic problems related to this 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 effort with others to maximize	0 1 2 3 4 5 6 7

the innovation’s effects.

28.	I would like to have more information on time and energy commitments required by this 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.	At this time, I am not interested in learning about this 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 this innovation is better than what we have now.1	0 1 2 3 4 5 6 7

36. Provide your comments and/or concerns about Blended Learning in the space below. If there is not enough space for your comments, then write on the back, as well:

Faculty Technology Use for Teaching

37. How often do you use computer-based technology in the following areas?

Please, rate your frequency of use as follows: Almost Always (AA = 5), Frequently (F = 4), Sometimes (S = 3), Rarely (R = 2), Never (N = 1)

Statement	**AA**	**F**	**S**	**R**	**N**
a. Personal communication.	5	4	3	2	1
b. Research work, i.e. web browsing	5	4	3	2	1
c. Classroom management	5	4	3	2	1
d. Teaching activities for your students	5	4	3	2	1

38. How often do you use the following application software for instruction?

Please, rate your frequency of use as follows: Almost Always (AA = 5), Frequently (F = 4), Sometimes (S = 3), Rarely (R = 2), Never (N = 1)

Item	**AA**	**F**	**S**	**R**	**N**
a. Microsoft Word for word-processing.	5	4	3	2	1

b. Microsoft Excel/Access for instruction	5	4	3	2	1
c. Microsoft PowerPoint for presentation in class	5	4	3	2	1
d. Internet/E-Mail for research.	5	4	3	2	1

39. Please, circle the option that best reflects how you feel about each of the following statements.

Rating Scale: Strongly Agree (SA = 5), Agree (A = 4), Neutral (N = 3), Disagree (D = 2), Strongly Disagree (SD = 1)

Statement	**SA**	**A**	**N**	**D**	**SD**
a. I would use instructional technology tools more often, if they were available in my classroom.	5	4	3	2	1
b. I would like to use subject/curricular-based software in my instruction.	5	4	3	2	1
c. I would like to use a computer for instruction more often, if it were provided in my classroom.	5	4	3	2	1
d. I would like to perform Internet searches in my classroom.	5	4	3	2	1
e. I would like to use a campus-wide web-based system for instruction online.	5	4	3	2	1
f. I hardly ever use instructional technology in my class.	5	4	3	2	1
g. I use basic computer applications (e.g., word processing, spreadsheets and PowerPoint) for instruction.	5	4	3	2	1
h. If I get the opportunity, I would like to use audio and video web-based systems for instruction.	5	4	3	2	1
i. I use the Internet to search for teaching materials.	5	4	3	2	1
j. Overall, the use of instructional technology has been helpful in my teaching and learning tasks.	5	4	3	2	1

<u>Faculty Attitudes towards Technology Integration into Science Curriculum</u>

Please, circle the option that best reflects how you feel about each of the following statements.

Rating Scale: Strongly Agree (SA = 5), Agree (A = 4), Neutral (N = 3), Disagree (D = 2), Strongly Disagree (SD = 1)

Statement	SA	A	N	D	SD
40. Using a computer with technology equipment and subject-based software in my instruction would make me a better instructor.	5	4	3	2	1
41. Use of instructional technology requires unnecessary curriculum reforms.	5	4	3	2	1
42. Decentralizing faculty technology professional development programs to the various academic departments would make them more relevant.	5	4	3	2	1
43. I will probably never have a need to use a computer in my	5	4	3	2	1

instructional activities.					
44. I believe that all faculty members should know how to use instructional technology.	5	4	3	2	1
45. Anything that a computer can be used for, I can do just as well some other way.	5	4	3	2	1
46. My inability to manage all that technology integration in the curriculum requires of me discourages me.	5	4	3	2	1
47. I am unsure how to integrate computers into instruction.	5	4	3	2	1
48. It is important that my university's ICT plan includes the use of instructional technology.	5	4	3	2	1
49. I believe technology integration into the curriculum enriches the teaching and learning environment.	5	4	3	2	1

Perceptions of the Effects of Faculty Use of IT on Pedagogy

Please, circle the option that best reflects how you feel about each of the following statements.
Rating Scale: Strongly Agree (SA = 5), Agree (A = 4), Neutral (N = 3), Disagree (D = 2), Strongly Disagree (SD = 1)

Statement	SA	A	N	D	SD
50. I am helping students to acquire the basic computer education needed for their future careers.	5	4	3	2	1
51. The use of web-based technology almost always reduces the personal treatment of students.	5	4	3	2	1
52. Computer tools would enable me to interact more with students.	5	4	3	2	1
53. I believe by integrating technology in teaching and learning,	5	4	3	2	1
54. I feel the use of technology for instruction affects my students' learning and teaching methods in a positive way.	5	4	3	2	1

Faculty Perceptions of their Technology Professional Development Needs

Please, circle the option that best reflects how you feel about each of the statements.
Rating Scale: Strongly Agree (SA = 5), Agree (A = 4), Neutral (N = 3), Disagree (D = 2), Strongly Disagree (SD = 1)

Statement	SA	A	N	D	SD
55. I have an immediate need for more training with curriculum that integrates technology.	5	4	3	2	1
56. I need convenient access to more computers for my students.	5	4	3	2	1
57. I need more reliable access to the Internet.	5	4	3	2	1
58. I would need more technical support to keep the computers	5	4	3	2	1

working during instruction.					
59. I need more software that is subject/curricular-based.	5	4	3	2	1
60. I need more resources that illustrate how to integrate technology into the curriculum.	5	4	3	2	1
61. I need more training opportunities with teaching strategies that integrate technology.	5	4	3	2	1
62. I need more compelling reasons why I should incorporate technology into teaching.	5	4	3	2	1
63. I need more time to change the curriculum to incorporate technology.	5	4	3	2	1
64. I believe faculty members must have a stronger voice in the technology professional development program.	5	4	3	2	1
65. Attending a few technology workshops and seminars is enough for me to start using instructional technology.	5	4	3	2	1
66. I need more regular instructional technology seminars/workshops.	5	4	3	2	1
67. I would like to collaborate with my colleagues on instructional technology issues.	5	4	3	2	1
68. My effort is primarily directed towards mastering tasks required to use instructional technology.	5	4	3	2	1
69. My university's faculty technology professional development plan meets my technology needs.	5	4	3	2	1

70. Please indicate your experience with the following Web-Based Learning Management Systems by:
a. Indicate the number of semesters you have used a particular system (column B).
b. Checking the system you primarily use as the entry point for students to conduct or supplement your courses (column C) (that is, where do you send your students *first* to access Web-based resources if you use these systems).
If you have not used a particular system, please select None.

A. System	B. Indicate the approximate number of semesters you have used this system, at any time previously and including this semester.	C. Check the system you primarily use as the entry point for your students.
Moodle		☐
Jusur		☐
Dokeos		☐
Other (Please describe):		☐
None - I don't use any Web-based Learning Management Systems	XXXXXXXXXXXXXXXXXXXX	☐

71. Have you received any formal training (sponsor by the university) in using Web-Based Learning Management Systems?
 YES NO
72. Have you received any grants that have supported your use of Web-Based Learning Management Systems?
 YES NO
73. Do you have access to personnel (e.g. student assistants, staff) that can help you use Web-based Learning Management Systems?
 YES NO

74. Provide professional development activities, incentives, support, etc., you need to have in order for you to use blended learning to support your instruction. Use the space below. If there is not enough space, then write on the back, as well:

75. Provide the most important professional development activity, incentive, support , etc. that you need at this time in order for you to use blended learning to support your instruction. Use the space below. If there is not enough space, then write on the back, as well:

Demographic Information

76. Gender ☐ Male ☐ Female
77. Age ______________
78. Academic rank ☐ Faculty ☐ Associate Faculty
☐ Assistant Faculty ☐ Lecturer
☐ Teaching Assistant
79. Nationality ☐ Saudi ☐ Non-Saudi (Please identify country)
____
80. You obtain your last degree from
☐ Arab country ☐ Non-Arab country (Please identify country)
____
81. Your major is ☐ Biology ☐ Chemistry
☐ Physics
82. Teaching experience ______________

Appendix B - SEDL License Agreement

ADVANCING RESEARCH SEDL IMPROVING EDUCATION

SEDL License Agreement

TO: Nauaf AL-Sarrani (Licensee)
322 Roble Drive
Indiana, PA 15701

FROM: Nancy Reynolds
Information Associate
SEDL Information Resource Center
4700 Mueller Blvd.
Austin, TX 78723

SUBJECT: License Agreement to reprint and distribute SEDL materials

DATE: December 17, 2008

Thank you for your interest in using the following excepts from *Measuring Implementation in Schools: The Stages of Concern Questionnaire (SoCQ)* published by SEDL and written by Archie A. George, Gene E. Hall, and Suzanne M. Stiegelbauer in 2006.

1. **Figure 2.1 The Stages of Concern About an Innovation,** published on p. 8
2. **Stages of Concern Questionnaire (SoCQ)**, published as Appendix A, pp. 79-82 and also available as a PDF document on an accompanying CD-ROM

These excerpts will be referred to as the "works" in this License Agreement. SEDL is pleased to grant permission for use of the works cited above by the Licensee, a PhD candidate at Kansas State University in Manhattan, Kansas, who will copy and distribute the SoCQ and will include both works in his dissertation to be entitled *Concerns and Professional Development Needs of Science Professors at Taibah University in Adopting Blended Learning*. The following are the terms, conditions, and limitations governing this limited permission to reproduce the works:

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Fax: 512-476-2286
www.sedl.org
4700 MUELLER BLVD., AUSTIN, TX 78723

SEDL License Agreement, p. 2

2. The Licensee is hereby granted permission to translate the SoCQ into Arabic and to replace in this instrument the words "the innovation" with a word or phrase participants will recognize, such as the name of the innovation or initiative; otherwise, the wording and order of the items in the SoCQ cannot be changed, and no additional adaptations, deletions, or changes will be made in the material nor shall any derivative work based on or incorporating the works be created without the prior consent of SEDL.

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Thank you, again, for your interest in using the SoCQ. If you have any questions, please contact me at 800-476-6861, ext. 6548 or 512-391-6548, or by e-mail at nancy.reynolds@sedl.org.

Sincerely,

______________________________________ ___________________________
Nancy Reynolds for SEDL Date signed

Agreed and accepted:

Signature: ______________________________ ___________________________
Date signed

Printed Name: ___________________________

Appendix D- Petherbridge's Permission

Hi Nauaf,
The first part of my survey (Questions 1 - 35) utilized the Stages of Concern Questionnaire, and I don't own the copyright for that, and thus can't grant permission. To get permission to use that part, you'll need to contact the Southwest Educational Development Laboratory. My contact there several years ago was the person I've listed below (though it is possible this has changed):

Jill Dodge
Communications Specialist
Southwest Educational Development Laboratory
211 E. 7th St., Suite 200
Austin, TX 78701
Ph: 800-476-6861 ext. 201
Fax: 512-476-2286
E-mail: jdodge@sedl.org
www.sedl.org

You are certainly welcome to use any of the other questions or scales that I developed and modify them to fit your needs (q. 36 - the end).

Best of luck,
Donna :-)

alsarran@ksu.edu wrote:
Dear Dr. Petherbridge,

I'm Nauaf Al-Saran a PhD candidate at Kansas State University. I would like to take your permission to use your dissertation survey for my dissertation survey.

Best Regards,
Nauaf Al-Sarrani
===

Donna Petherbridge, Ed.D.
Associate Vice Provost of Instructional Support Services
Distance Education and Learning Technology Applications
(delta)
Adjunct Assistant Faculty, Adult & Higher Education
College of Education

919.513.3737(phone)
919.513.4237(fax)

North Carolina State University
Venture II (Centennial Campus)
Suite 500, Room 500-55
Campus Box 7113
Raleigh NC 27695-7113

donna_petherbridge@ncsu.edu
learntech@ncsu.edu
https://webmail.ksu.edu/horde/util/go.php?url=http%3A%2F%2Fdelta.ncsu.edu&Horde=015a1fb9da0fabb0c45230efbca94985
==

Appendix C- Yidana's Permission

Brother Alsarrani,

Thanks for your interest in some aspect of my dissertation. You have my permission to use the following documents from my dissertation in your dissertation:

* Question number one.
* the survey as requested.

I wish you all the best in your studies.
You may get back to me, if you ever need any further assistance.

Best regards,

Issifu Yidana, Ph. D.

Department of Math Education/ICT Center
UEW
P.O. Box 25
Winneba, CR, Ghana

Other email adds: iy305204@ohio.edu, yyidana@hotmail.com, iyidana@uew.edu.gh
Tel.: +233-24-5035900 or +233-244-763787

We learn to share ideas and knowledge! It is better to give than to receive!

--- On **Fri, 12/12/08, alsarran@ksu.edu <*alsarran@ksu.edu*>** wrote:

From: alsarran@ksu.edu <alsarran@ksu.edu>
Subject: Request permission
To: yyidana@yahoo.com
Date: Friday, December 12, 2008, 11:41 PM

Dear Dr. Issifu Yidana,

I'm Nauaf Al-Sarrani PhD student at Kansas State University. I would like to take your permission to use the following documents from your dissertation in my dissertation:

* Question number one.
* the survey.

Best Regards,
Nauaf Al-Sarrani

Appendix E- Alshammari’s Permission

. I here by give my permission to Mr. Nauaf Al-Sarrani to use the Arabic version of Stages of Concern Questionnaire (SoCQ). The SoCQ was first translated to Arabic by me, and I hold my copy right. Please provide me with results when you finish you research. Also, feel free to contact me when ever you need.

Bandar Alshammari, PhD
Associate Faculty
College of Basic Education, Kuwait

> Date: Sun, 21 Dec 2008 11:45:14 -0600
> From: alsarran@ksu.edu
> To: bandars@hotmail.com
> Subject: Permission Request
>
>
> Dear Dr.Al-Shammari,
>
> I’m Nauaf Al-Sarrani a PhD candidate at Kansas State University.
> I would like to take your permission to use your translation of Stages
> of Concern questioner into Arabic.
>
> Best Regards,
> Nauaf Al-Sarrani

Appendix F- Letters in Arabic

بسم الله الرحمن الرحيم
سعادة وكيل جامعة طيبة الدكتور عبد العزيز السراني
حفظه الله

السلام عليكم ورحمة الله وبركاته وبعد

أحيط سعادتكم علماً بأنني أحد المحاضرين في قسم المناهج وطرق التدريس بكلية التربية بالجامعة والمبتعث إلى جامعة كانسس الحكومية للحصول على درجة الدكتوراة في استخدام التعليم الإلكتروني في تدريس العلوم وأقوم حالياً ببحث بعنوان

المخاوف وإحتياجات التطوير المهني لأعضاء هيئة التدريس بكليات العلوم في جامعة طيبة لتبني التعليم المدمج

Concerns and Professional Development Needs of Science Professors at Taibah University in Adopting Blended Learning

وقد حصلت ولله الحمد على موافقة لجنة الإشراف على الدكتوراة في قسم المناهج وطرق التدريس بكلية التربية بجامعة كانسس الحكومية على إجراء وتطبيق هذا البحث.

سوف تُسهم نتائج هذا البحث بمشيئة الله تعالى على معرفة مخاوف وأسباب عزوف بعض أعضاء هيئة التدريس بكليات العلوم بالجامعة على الدمج بين طريقتي التعليم داخل الفصل وخارجه عن طريق إستخدام إدارة محتوى التعلم. إضافةً إلى ذلك سوف يقدم هذا البحث أيضاً برنامجاً تدريبياً للتطوير المهني لأعضاء هيئة التدريس بكليات العلوم في الجامعة حول كيفية استخدام التعليم المدمج في التدريس.

هذا ولكم خالص تحياتي وتقديري،،،

المبتعث
نواف بن مقبل السراني
جامعة كانسس الحكومية
كلية التربية/ قسم المناهج وطرق التدريس
الولايات المتحدة الأمريكية
هاتف: **0017245413150**
البريد الإلكتروني alsarran@ksu.edu

KINGDOM OF SAUDI ARABIA
Ministry of Higher Education
TAIBAH UNIVERSITY

المملكة العربية السعودية
وزارة التعليم العالي
جامعة طيبة

وكيل الجامعة

سعادة رئيس قسم الفيزياء **حفظه الله**

السلام عليكم ورحمة الله وبركاته

أشير إلى خطاب المبتعث / **نواف بن مقبل السراني** ، أحد المحاضرين في قسم المناهج وطرق التدريس بكلية التربية بالجامعة والمبتعث إلى جامعة كانسس الحكومية للحصول على درجة الدكتوراة في استخدام التعليم الإلكتروني في تدريس العلوم ويقوم حالياً ببحث بعنوان :

" المخاوف وإحتياجات التطوير المهني لأعضاء هيئة التدريس بكليات العلوم في جامعة طيبة لتبني التعليم المدمج " ومرفق به استبانة .

آمل تكرم سعادتكم بتعميد من يلزم بتوزيعها على السادة أعضاء هيئة التدريس بالقسم لتعبئتها وإعادتها شاكرين لسعادتكم سلفاً حسن تعاونكم .

والله أسأل أن يحفظكم ويرعاكم،،

وتقبلوا خالص التحية ووافر التقدير ،،

وكيل الجامعة

د. عبد العزيز بن قبلان السراني

جامعة طيبة
مكتب وكيل الجامعة
الرقم الموحد ١٤٣٠٣٢١٤٦
التاريخ ١٤٣٠-٠٦-٠٢
المرفقات عدد (٢١نسخة لقسم الفيزياء)

الرقم / التاريخ / ٣ / ٦ / ١٤٣٠هـ المشفوعات / عدد ٢١ نسخة

هاتف: ٨٤٧١٢٢٧ فاكس: ٨٤٧٠٥٨٥ ص.ب : ٣٤٤ المدينة المنورة

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سعادة رئيس قسم الكيمياء **حفظه الله**

السلام عليكم ورحمة الله وبركاته

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" **المخاوف وإحتياجات التطوير المهني لأعضاء هيئة التدريس بكليات العلوم في جامعة طيبة لتبني التعليم المدمج** " ومرفق به استبانة .

آمل تكرم سعادتكم بتعميد من يلزم بتوزيعها على السادة أعضاء هيئة التدريس بالقسم لتعبئتها وإعادتها شاكرين لسعادتكم سلفاً حسن تعاونكم .

والله أسأل أن يحفظكم ويرعاكم،،

وتقبلوا خالص التحية ووافر التقدير ،،

وكيل الجامعة

د. عبد العزيز بن قبلان السراني

جامعة طيبة
مكتب وكيل الجامعة
الرقم الموحد ١٤٣٠٣٢١٤٦
التاريخ ١٤٣٠/٠٦/٠٣
المرفقات عدد (٣٣) نسخة لقسم الكيمياء

الرقم /
التاريخ / ٣ / ٦ / ١٤٣٠هـ
المشفوعات / عدد ٣٣ نسخة

هاتف: ٨٤٧١٢٢٧ فاكس: ٨٤٧٠٥٨٥ ص.ب : ٣٤٤ المدينة المنورة

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جامعة طيبة

وكيل الجامعة

سعادة رئيس قسم الأحياء **حفظه الله**

السلام عليكم ورحمة الله وبركاته

أشير إلى خطاب المبتعث / **نواف بن مقبل السراني** ، أحد المحاضرين في قسم المناهج وطرق التدريس بكلية التربية بالجامعة والمبتعث إلى جامعة كانسس الحكومية للحصول على درجة الدكتوراة في استخدام التعليم الإلكتروني في تدريس العلوم ويقوم حالياً ببحث بعنوان :

" المخاوف وإحتياجات التطوير المهني لأعضاء هيئة التدريس بكليات العلوم في جامعة طيبة لتبني التعليم المدمج " ومرفق به استبانة .

آمل تكرم سعادتكم بتعميد من يلزم بتوزيعها على السادة أعضاء هيئة التدريس بالقسم لتعبئتها وإعادتها شاكرين لسعادتكم سلفاً حسن تعاونكم .

والله أسأل أن يحفظكم ويرعاكم،،

وتقبلوا خالص التحية ووافر التقدير ،،

وكيل الجامعة

د. عبد العزيز بن قبلان السراني

جامعة طيبة
مكتب وكيل الجامعة
الرقم الموحد ١٤٣٠٣٢١٤٦
التاريخ ١٤٣٠/٠٦/٠٢
عدد (٣١) نسخة لقسم الأحياء
المرفقات

الرقم / .... التاريخ / ٣ / ٦ / ١٤٣٠هـ المشفوعات / .... عدد ٢٩ نسخة

هاتف: ٨٤٧١٢٢٧ فاكس: ٨٤٧٠٥٨٥ ص.ب : ٣٤٤ المدينة المنورة

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جامعة طيبة

وكيل الجامعة

سعادة وكيلة عمادة كلية العلوم التطبيقية

د. مها أحمد الحازمي **حفظها الله**

السلام عليكم ورحمة الله وبركاته

أشير إلى خطاب المبتعث / **نواف بن مقبل السراني** ، أحد المحاضرين في قسم المناهج وطرق التدريس بكلية التربية بالجامعة والمبتعث إلى جامعة كانسس الحكومية للحصول على درجة الدكتوراة في استخدام التعليم الإلكتروني في تدريس العلوم ويقوم حالياً ببحث بعنوان :

" **المخاوف وإحتياجات التطوير المهني لأعضاء هيئة التدريس بكليات العلوم في جامعة طيبة لتبني التعليم المدمج** " ومرفق به استبانة .

آمل تكرم سعادتكم بتعميد من يلزم بتوزيعها على السادة أعضاء هيئة التدريس بالقسم لتعبئتها وإعادتها شاكرين لسعادتكم سلفاً حسن تعاونكم .

والله أسأل أن يحفظكم ويرعاكم،،

وتقبلوا خالص التحية ووافر التقدير ،،

وكيل الجامعة

د. عبد العزيز بن قبلان السراني

قسم الكيمياء عدد (١٣) نسخة
قسم الفيزياء عدد (٢٠) نسخة

جامعة طيبة
مكتب وكيل الجامعة
الرقم الموحد ١١٤٣٠٣٢٤٧٥
التاريخ
المرفقات

الرقم / ٤١/و/٣٥٠ التاريخ / ٦-٦-١٤٣٠هـ المشفوعات

هاتف: ٨٤٧١٢٢٧ فاكس: ٨٤٧٠٥٨٥ ص.ب : ٣٤٤ المدينة المنورة

المملكة العربية السعودية
وزارة التعليم العالي
جامعة طيبة

الرقم / ٥٦٢٥/ك ع
التاريخ / ١٤ / ٦ / ١٤٣٠هـ
المرفقات / (١١٨) استبانة

مكتب وكيلة كلية العلوم التطبيقية

سعادة / وكيل جامعة طيبة **الموقر .**

السلام عليكم و رحمة الله و بركاته :. .... و بعد .

إشارة إلى خطاب سعادتكم رقم ٥٣٠ / و . ك و تاريخ ٦ / ٦ / ١٤٣٠ هـ المشار فيه إلى خطاب المبتعث نواف مقبل السراني أحمد الحاضرين في قسم المناهج و طرق التدريس بكلية التربية بالجامعة و المبتعث إلى جامعة كانسس الحكومية للحصول على درجة الدكتوراه في استخدام التعليم الإلكتروني في تدريس العلوم و يقوم حالياً بحث بعنوان ((المخاوف و إحتياجات التطوير المهني لأعضاء هيئة التدريس بكليات العلوم في جامعة طيبة لتبني التعليم المدمج . و المرفق استبانه لتوزيعها و تعبئتها من قبل الأعضاء . عليه نرفق لسعادتكم الإستبانة بعد تعبئتها .

و الله الموفق ،،،،

وكيلة كلية العلوم التطبيقية المكلفة
١٤/٦
د . مها بنت أحمد سعيد الحازمي

Appendix G- Survey in Arabic

بسم الله الرحمن الرحيم

عزيزي عضو هيئة التدريس بكلية العلوم بجامعة طيبة حفظه الله

السلام عليكم ورحمة الله وبركاته وبعد

فأنا أحد المبتعثين من قسم المناهج وطرق التدريس في كلية التربية بجامعة طيبة ؛ للحصول على درجة الدكتوراة بمشيئة الله تعالى من جامعة كانسس الحكومية في الولايات المتحدة الأمريكية .

أرجو مساعدتكم في تعبئة هذه الاستبانة المرفقة ، والتي تختص بدراستي بعنوان" المخاوف واحتياجات التَّطوير المهني لأعضاء هيئة التدريس بكليات العلوم في جامعة طيبة لتبني التعليم المدمج

Concerns and Professional Development Needs of Science Professors at Taibah University in Adopting Blended Learning"

والتي هي عبارة عن متطلب للحصول على درجة الدكتوراة.

هذه الدراسة ستقوم بمعرفة وتحديد المخاوف المصاحبة لأعضاء هيئة التدريس بكليات العلوم لتبني التعليم المدمج في التدريس ، كما ستقوم _ أيضاً _ بتحديد احتياجات التطوير المهني لأعضاء هيئة التدريس ، لتبني وتطبيق التعليم المدمج في التدريس .

إنَّ نتائج هذه الدراسة سوف تساعد بمشيئة الله في إيجاد طريقة مناسبة تساعد أعضاء هيئة التدريس على تبني التعليم المدمج في كليات العلوم ، وتقديم برامج التطوير المهني لهم لدمج التقنية بالتدريس الجامعي .

مشاركتكم في هذا الاستبانة مشكورة سلفاً ، علماً بأنها تطوعيَّة ؛ لذا يمكنكم التَّوقف عن المشاركة بدون أي قيد أو شرط ، مع العلم بأنَّ إجابتكم لكامل الاستبانة التي تستغرق فقط (20) دقيقة تقريباً تعني موافقتكم للمشاركة في هذه الدراسة .

علماً بأنَّ المعلومات الشَّخصية التي ستتقدمها في هذه الاستبانة سرية ، وستستخدم فقط لأغراض هذا البحث ، والتي سوف يتم تزويد مكتبة جامعة طيبة به عند الانتهاء من البحث بمشيئة الله.

أخيراً إذا كان لديكم أي سؤال أواستفسار الرجاء الاتصال بالباحث عن طريق العنوان الموضح في الأسفل .

هذا ولكم خالص تحياتي وتقديري،،،

الباحث
نواف بن مقبل السراني
جامعة كانسس الحكومية
كلية التربية/ قسم المناهج وطرق التدريس
الولايات المتحدة الأمريكية
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المحور الأول:اسئلة لمعرفة الاهتمام

الأسئلة من 1-35 تم إعادة طباعتها بموافقة Southwest Educational Developmental Laboratory

إنَّ الهدف من هذه الاستبانة تحديد كيفية تقبل أعضاء هيئة التدريس للتعليم المدمج وشعورهم نحو هذا التغيير، تم تطوير هذه الأسئلة بناءً على الإجابة المعتادة لمعلمي المدراس و أساتذة الجامعات التي تتفاوت خبراتهم من معرفة تامة بالموضوع إلى عدم معرفة نهائياً ؛ لذا فإنَّ جزءاً كبيراً من الأسئلة قد يبدو لكم من أول وهلةٍ أنَّه لا علاقة له بالموضوع حالياً أو العكس .

الرجاء عند الإجابة على هذه الأسئلة، أن تعطيها علامات تتطابق مع شعورك في الوقت الحاضر. تتراوح الإجابة على هذه الأسئلة من (٠) إلى (٧) ، حيث يمثل الرقم (٠) عدم اهتمام كليٍّ ، أو معرفة بالسؤال المطروح ، والرقم (٧) يمثل معرفة تامة و تطابق كليٍّ ، بينما تشكل الأرقام ما بينهما نسبة معرفتك وشعورك تجاة الموضوع ؛

لذا يرجى وضع دائرة واحدة حول الإجابة المناسبه على المقياس المدرج المعطى.

مثلا:

إن هذا التعبير صحيح جداً في الوقت الحاضر.	٠ ١ ٢ ٣ ٤ ٥ ٦ (٧)
إن هذا التعبير ينطبق عليّ بعض الشيء.	٠ ١ ٢ ٣ (٤) ٥ ٦ ٧
إن هذا التعبير لا ينطبق عليّ في الوقت الحاضر.	٠ (١) ٢ ٣ ٤ ٥ ٦ ٧
إن هذا التعبير لا يعني لي شيئاً.	(٠) ١ ٢ ٣ ٤ ٥ ٦ ٧

الرجاء الإجابه على العبارات بناءً على شعورك تجاهها في الوقت الحاضر، وبناءً على اهتمامك بالتعليم المدمج. (علماً بأن التعليم المدمج عباره عن دمج طرق التدريس المستخدمه داخل القاعه الدراسيه مع التعليم المعتمد على الانترنت وذلك بالاستفادة من إيجابيات كل طريقة منهما).

شاكراً لكم سلفاً حُسن تعاونكم.

٠	١	٢	٣	٤	٥	٦	٧
لا يعني لي شيئاً	غير صحيح بالنسبة لي حالياً	ينطبق علي بعض الشيء حالياً			ينطبق علي جداً حالياً		

	العبارة	٠	١	٢	٣	٤	٥	٦	٧
1	أنا مهتم بمعرفة شعور الطلبة تجاه التعليم المدمج.	٠	١	٢	٣	٤	٥	٦	٧
2	أنا على معرفة بطرق أخرى قد تحقق نتائج أفضل.	٠	١	٢	٣	٤	٥	٦	٧
3	أنا لا أعلم حتى ما هو التعليم المدمج.	٠	١	٢	٣	٤	٥	٦	٧
4	أنا قلق لعدم وجود وقت كافٍ لتنظيم نفسي كل يوم	٠	١	٢	٣	٤	٥	٦	٧
5	أرغب بمساعدة المدرسين الآخرين على تعلم كيفية استخدام التعليم المدمج	٠	١	٢	٣	٤	٥	٦	٧
6	عندي معرفة محدودة عن التعليم المدمج .	٠	١	٢	٣	٤	٥	٦	٧
7	أرغب بمعرفة تأثير عملية استخدام التعليم المدمج على مركزي الوظيفي .	٠	١	٢	٣	٤	٥	٦	٧
8	أنا قلق بالنسبة للتضارب بين اهتماماتي ومسؤولياتي .	٠	١	٢	٣	٤	٥	٦	٧
9	أنا مهتم بمراجعة وتصحيح استعمالي للتعليم المدمج .	٠	١	٢	٣	٤	٥	٦	٧
10	أرغب بإقامة علاقة عمل مع كل من طاقم التعليم الخاص بنا وطاقم تعليم آخر من خارج الجامعة يستعمل التعليم المدمج .	٠	١	٢	٣	٤	٥	٦	٧
11	أنا مهتم بمعرفة تأثير التعليم المدمج على الطلبة .	٠	١	٢	٣	٤	٥	٦	٧
12	أنا غير مهتم بالتعليم المدمج .	٠	١	٢	٣	٤	٥	٦	٧
13	أرغب بمعرفة من سيتخذ القرارات في هذا النوع من التعليم الجديد .	٠	١	٢	٣	٤	٥	٦	٧
14	أرغب بمناقشة كيفية استخدام التعليم المدمج .	٠	١	٢	٣	٤	٥	٦	٧
15	أرغب بمعرفة المصادر والوسائل التعليمية المتوفرة في حال قُرر استعمال التعليم المدمج .	٠	١	٢	٣	٤	٥	٦	٧
16	أنا قلق بالنسبة لعدم مقدرتي على إدارة كل متطلبات التعليم المدمج .	٠	١	٢	٣	٤	٥	٦	٧
17	أرغب بمعرفة كيفية تغيير طريقة تعليمي أو إدارتي عند استعمال التعليم المدمج .	٠	١	٢	٣	٤	٥	٦	٧
18	أرغب بتزويد الأقسام المختلفة والأفراد بمعلومات عن عملية سير هذا التوجه الجديد .	٠	١	٢	٣	٤	٥	٦	٧
19	أنا مهتم في تقييم تأثيري على الطلبة .	٠	١	٢	٣	٤	٥	٦	٧
20	أرغب بمراجعة وتصحيح التوجه التعليمي للتعليم المدمج .	٠	١	٢	٣	٤	٥	٦	٧
21	أنا مشغول كلياً بأشياء أخرى .	٠	١	٢	٣	٤	٥	٦	٧
22	أرغب بتعديل استخدامنا للتعليم المدمج وفقاً لخبرات طلبتنا .	٠	١	٢	٣	٤	٥	٦	٧
23	بالرغم من عدم معرفتي بالتعليم المدمج فإنني قلق حول بعض الأشياء في هذا المجال .	٠	١	٢	٣	٤	٥	٦	٧
24	أرغب ببث الحماس بين طلبتي حول دورهم في التعليم المدمج .	٠	١	٢	٣	٤	٥	٦	٧
25	أنا قلق بالنسبة للوقت المخصص للمسائل غير التعليمية المتعلقة بالتعليم المدمج .	٠	١	٢	٣	٤	٥	٦	٧
26	أنا ارغب بمعرفة متطلبات استعمال التعليم المدمج على المدى القريب .	٠	١	٢	٣	٤	٥	٦	٧
27	أرغب بتنسيق جهودي مع الآخرين للحصول على أقصى فوائد التعليم المدمج .	٠	١	٢	٣	٤	٥	٦	٧
28	أرغب بالحصول على معلومات أكثر حول الوقت والجهد اللذان يتطلبهما التعليم	٠	١	٢	٣	٤	٥	٦	٧

المدمج .

29	أرغب بمعرفة ما يفعلة الأساتذة الآخرون في التعليم المدمج .	٠	١	٢	٣	٤	٥	٦	٧
30	في الوقت الحاضر أنا غير مهتم بالتعليم المدمج .	٠	١	٢	٣	٤	٥	٦	٧
31	أنا أرغب بتحديد كيفية تقوية أو استبدال التعليم المدمج .	٠	١	٢	٣	٤	٥	٦	٧
32	أرغب باستعمال ردة فعل الطلبة بالنسبة للتعليم المدمج بهدف تغييره .	٠	١	٢	٣	٤	٥	٦	٧
33	أرغب بمعرفة كيفية تغير دوري عند استعمال التعليم المدمج .	٠	١	٢	٣	٤	٥	٦	٧
34	إن التنسيق بين الأعمال والأشخاص يأخذ الكثير من وقتي .	٠	١	٢	٣	٤	٥	٦	٧
35	أود أن أعرف لماذا يعتبر التعليم المدمج أفضل مما لدينا حالياً .	٠	١	٢	٣	٤	٥	٦	٧

36. **أكتب أي مخاوف أو ملاحظات أخرى حول استخدام التعليم المدمج في تدريسك؟ يمكنك الكتابة في خلف الصفحة عند الحاجة لذلك**.

المحور الثاني: استخدام أعضاء هيئة التدريس للتقنية في التدريس

37. **ما مدى تكرار استخدامك لتقنية الحاسب في المجالات التالية: من فضلك ضع دائرة حول الخيارالذي يحدد مدى استخدامك بناءً على المقياس التالي: دائماً(5) عادة(4) أحياناً (3) نادراً(2) لا استخدمه أبداً (1)**

العبارة	دائماً	عادة	أحيانا	نادراً	لا استخدمه أبداً
أ. في التواصل الشخصي و إعداد الوثائق الخاصة على سبيل المثال الإيميل وبرنامج معالج النصوص االوورود	٥	٤	٣	٢	١
ب. الأعمال البحثية مثل تصفح الإنترنت لغرض علمي	٥	٤	٣	٢	١
ج. لأغراض إدارة الصف وتقييم الطلاب	٥	٤	٣	٢	١
د.تقديم نشاطات تدريسية و تعليمية للطلاب	٥	٤	٣	٢	١

38. **ما مدى تكرار استخدامك للبرامج الحاسوبية التالية في التدريس**:

من فضلك ضع دائرة حول الخيارالذي يتفق مع درجة موافقتك أو عدم موافقتك، وذلك بناءً على المقياس التالي:

دائماً(5) بشكل متكرر (4) أحياناً (3) نادراً(2) لا استخدمه أبداً (1)

العبارة	دائماً	بشكل متكرر	أحيانا	نادراً	أبداً
أ. برنامج معالج النصوص "الورود" للكتابة والتدريس Microsoft Word	٥	٤	٣	٢	١
ب. برنامج اكسل وآكسس للتدريس وإدارة محتوى المقرر Microsoft Excel/Access	٥	٤	٣	٢	١
ج. برنامج العرض "باور بوينت" في تقديم المادة الدراسية و حلقات النقاش PowerPoint	٥	٤	٣	٢	١
د. الانترنت / الإيميل للبحث والتدريس	٥	٤	٣	٢	١

39. **من فضلك ضع دائرة حول الخيارالذي يتفق مع درجة موافقتك أو عدم موافقتك، وذلك بناءً على المقياس التالي:**

أوافق بشدة (5)   أوافق (4)   غير متأكد (3)   لا اوافق (2)   لا اوافق أبداً (1)

العبارة	أوافق بشدة	أوافق	غير متأكد	لا أوفق	لا أوافق أبدا
أ. أقومُ باستخدام تقنيات التعليم في التدريس إذا كانت متوفرة في قاعة الدراسة	٥	٤	٣	٢	١
ب. أفضل إستخدام البرامج المتعلقة بالمادة الدراسية subject -based software في التدريس	٥	٤	٣	٢	١
ج. أفضل إستخدام تقنية الحاسب الآلي في التدريس بشكل أكبر إذا توفرت في قاعة الدرس	٥	٤	٣	٢	١
د. أرغب في البحث عن طريق الانترنت في قاعة الدرس	٥	٤	٣	٢	١
ه. أفضل التدريس عن طريق الإنترنت "اون لاين" عبر نظام شبكة خاص بالحرم الجامعي campus-wide web-based system	٥	٤	٣	٢	١
و. نادراً ما أستخدم إحدى تقنيات الحاسب الآلي في التدريس	٥	٤	٣	٢	١
ز. أستخدم بعض تطبيقات الحاسب (مثل برنامج معالج النصوص "الوورد" و برنامج باور بوينت) في التدريس	٥	٤	٣	٢	١
ح. لو أتيحت لي الفرصة فسأستخدم الوسائل السمعية والبصرية المتوفرة على شبكة الانترنت في تدريسي .	٥	٤	٣	٢	١
ط. أستخدم الانترنت في عملية البحث عن مواد مساعدة لي في عملية التدريس	٥	٤	٣	٢	١
ي. بشكل عام أستخدام تقنية الحاسب الآلي في التعليم كان مفيداً لي في مجال التدريس	٥	٤	٣	٢	١

المحور الثالث: اتجاهات أعضاء هيئة التدريس حول دمج تقنية الحاسب الآلي في التدريس

من فضلك ضع دائرة حول الخيارالذي يتفق مع درجة موافقتك أو عدم موافقتك، وذلك بناءً على المقياس التالي:

(5) أوافق بشدة   (4) أوافق   (3) غير متأكد   (2) لا اوافق   (1) لا اوافق أبداً

العبارة	أوافق بشدة	أوافق	غير متأكد	لا أوفق	لا أوافق أبدا
40. أستخدام تقنية الحاسب الآلي والبرامج الخاصة بإدارة المحتوى التعليمي subject-based software في التدريس سوف تطور من أدائي	٥	٤	٣	٢	١
41. لايتطلب أستخدام تقنية الحاسب الآلي تغييرات جذرية في المقرر	٥	٤	٣	٢	١
42. لا يوجد هناك تحسن يُذكر في عملية التعليم عند مقارنة طرق التدريس التقليدية بتلك التي -تستخدم فيها التقنية	٥	٤	٣	٢	١
43. ربما لا أحتاج أبداً لاستخدام الحاسب الآلي في التدريس	٥	٤	٣	٢	١
44. أؤمن بأهمية إلمام جميع أعضاء هيئة التدريس بطرق ربط التقنية في التدريس	٥	٤	٣	٢	١
45. أستطيع استبدال ما يقدمه الحاسب الآلي بأي طريقة أخرى	٥	٤	٣	٢	١
46. يحبطني عدم إلمامي بمتطلبات دمج التقنية في المقرر واستخدامها في التدريس	٥	٤	٣	٢	١
47. لستُ ملماً بكيفية دمج الحاسب في التدريس	٥	٤	٣	٢	١
48. من المهم أن تتضمن خطة الجامعة استخدام التقنية في التدريس	٥	٤	٣	٢	١
49. أؤمن بأن دمج التقنية في المناهج يثري كلاً من البئية التعليمة والتدريسية	٥	٤	٣	٢	١

المحور الرابع: الإلمام بالآثار المترتبة على استخدام تقنية الحاسب في التدريس

من فضلك ضع دائرة حول الخيارالذي يتفق مع درجة موافقتك أو عدم موافقتك، وذلك بناءً على المقياس التالي:

(5) أوافق بشدة (4) أوافق (3) غير متأكد (2) لا اوافق (1) لا اوافق أبداً

العبارة	أوافق بشدة	أوافق	غير متأكد	لا أوفق	لا أوافق أبدا
50. أساعد الطلاب على اكتساب مهارات الحاسب الآلي الآساسية المطلوبة لمستقبلهم المهني.	٥	٤	٣	٢	١
51. أستخدام التقنية المعتمدة على الإنترنت web-based technology يقلل من التواصل الشخصي مع الطلاب	٥	٤	٣	٢	١
52. قد يُمكنني استخدام الحاسب في التدريس من التفاعل بشكل أكثر مع الطلاب	٥	٤	٣	٢	١
53. أؤمن بضرورة دمج التقنية في التدريس	٥	٤	٣	٢	١
54. أشعر بأن استخدام التقنية في التدريس يؤثر إيجابياً على طريقة التدريس وتحصيل الطلاب	٥	٤	٣	٢	١

المحور الخامس: إدراك أعضاء هيئة التدريس لتطوير إحتياجاتهم التقنية

من فضلك ضع دائرة حول الخيارالذي يتفق مع درجة موافقتك أو عدم موافقتك، وذلك بناءً على المقياس التالي:

(1) لا أوافق أبدا ً (2) لا أوافق (3) غير متأكد (4) اوافق (5) أوافق بشدة

العبارة	لا أوافق أبدا	لا أوفق	غير متأكد	أوافق	أوافق بشدة
55. أنا بحاجة ماسة للتدريب أكثر على المنهج المدمج بالتقنية	١	٢	٣	٤	٥
56. أحتاج إلى قدر مناسب من الصلاحية للحصول على أكبر عدد من أجهزة الحاسب للطلاب	١	٢	٣	٤	٥
57. أحتاج إلى اتصال دائم بالانترنت	١	٢	٣	٤	٥
58. أحتاج لتوفر الدعم التقني لضمان استمرارية عمل أجهزة الحاسب الآلي أثناء التدريس	١	٢	٣	٤	٥
59. أحتاج إلى زيادة في كمية برامج السفت وير المتعلقة بالمنهج curricular-based	١	٢	٣	٤	٥
60. أحتاج إلى زيادةفي المصادر التي توضح كيفية دمج التقنية في المنهج	١	٢	٣	٤	٥
61. أحتاج إلى فرص تدريبية أكثر فيما يتعلق بطرق التدريس التي تدمج التقنية	١	٢	٣	٤	٥
62. أحتاج إلى أسباب أكثر إقناعاً لوجوب دمج التقنية في التدريس	١	٢	٣	٤	٥
63. أحتاج إلى مزيد من الوقت لتغيير المنهج لأجل دمج التقنية في التدريس	١	٢	٣	٤	٥
64. أعتقد بأنه يجب أن يكون لأعضاء هيئة التدريس صوت أقوى في برنامج التطوير المهني	١	٢	٣	٤	٥
65. يكفيني حضور عدد من ورش العمل وحلقات النقاش الخاصة بالتقنية لأبدأ باستخدامها في التدريس	١	٢	٣	٤	٥
66. أحتاج إلى ورش عمل وحلقات نقاش دوريه تتعلق باستخدام التقنية في التدريس	١	٢	٣	٤	٥
67. أرغب في التعاون مع زملائي في القضايا المتعلقة باستخدام التقنية في التدريس	١	٢	٣	٤	٥
68. جهدي مركز بشكل أساسي نحو الإلمام بالمهارات اللازمة لإستخدام التقنية في التدريس	١	٢	٣	٤	٥
69. تُلبي خطة الجامعة في مجال التطوير المهني إحتياجاتي في مجال التقنية	١	٢	٣	٤	٥

70. **<u>أرجو توضيح درجة معرفتك أوإلمامك ببرامج الانترنت الخاصة بالإدارة التعليمية Web-Based Learning Management System (LMS) من خلال</u>:**

أ. حدد في عمود (ب) عدد الفصول الدراسية التي استخدمت فيها واحدً أو أكثر من هذه الأنظمة المذكورة في عمود (أ)

ب. ضع علامة في العمود (ج) على النظام الذي قمت باستخدامه مع طلابك

أ. النظام	ب. حدد عدد الفصول الدراسية التي استخدمت فيها هذا النظام بمافيها الفصل الحالي	ج. ضح علامة على النظام المُختار
Moodle موودل		□
Jusur جسور		□
Dokeos دوكسي		□
أخرى (أرجو التحديد)		□
لا شيء: لم أستخدم أي نظام خاص بإدارة المحتوى التعليمي	XXXXXXXXXXXXXXXXXXX	□

71. هل سبق وأن حصلت على أي تدريب من الجامعة على استخدام أنظمة إدارة المحتوى أو التعليم (Web-Based Learning Management System)
□ لا
□ نعم

72. هل سبق وأن حصلت على دعم مادي لدعم استخدامك لنظام أو أكثر من أنظمة إدارة التعليم (Web-Based Learning Management System)
□ لا □ نعم

73. هل تحصل على مساعدة من قبل موظف أو أكثر من العاملين في الجامعة تساعدك في استخدام أنظمة إدارة التعليم (Web-Based Learning Management System)
□ لا
□ نعم

74. **ماالنشاطات التطويرية المهنية والحوافز والدعم التي تحتاج إليها لدعم استخدامك للتعليم المدمج في تدريسك؟ يمكنك الكتابة في خلف الصفحة عند الحاجة لذلك.**

75. **حدد أهم نشاط أو تطوير مهني تحتاجه في الفترة الحالية لكي تستخدم التعليم المدمج لزيادة فاعلية تدريسك؟ يمكنك الكتابة في خلف الصفحة عند الحاجة لذلك.**

المحور السادس: بيانات ديموغرافيه (تعريفية)

76. **الجنس** ☐ **ذكر** ☐ **انثى**
77. **العمر** ____________
78. **الرتبة الأكاديمية** ☐ **استاذ** ☐ **استاذ مشارك** ☐ **استاذ مساعد** ☐ **محاضر** ☐ **معيد**
79. **الجنسية** ☐ **سعودي** ☐ **غير سعودي** **حدد الدولة من فضلك** ____________
80. **حصلت على آخر مؤهل علمي من** ☐ **دولة عربية** ☐ **دولة غير عربية** **من فضلك أذكر اسم الدوله** ________
81. **التخصص** ☐ **أحياء** ☐ **كيمياء** ☐ **فيزياء** ☐ **جيولوجيا**
82. **عدد سنوات الخبرة في التدريس** ____________

شاكر لكم كريم تعاونكم،،،

Appendix-H

IRB approval Form

COPY

K-STATE
Kansas State University
University Research
Compliance Office
203 Fairchild Hall
Lower Mezzanine
Manhattan, KS 66506-1103
785-532-3224
Fax: 785-532-3278
http://urco.ksu.edu

TO: Rosemary Talab
Secondary Education
226 Bluemont

Proposal Number: 4974

FROM: Rick Scheidt, Chair
Committee on Research Involving Human Subjects

DATE: February 19, 2009

RE: Proposal Entitled, "Concerns and Professional Development Needs of Science Professors at Taibah University in Adopting Blended Learning"

The Committee on Research Involving Human Subjects / Institutional Review Board (IRB) for Kansas State University has reviewed the proposal identified above and has determined that it is EXEMPT from further IRB review. This exemption applies only to the proposal - as written – and currently on file with the IRB. Any change potentially affecting human subjects must be approved by the IRB prior to implementation and may disqualify the proposal from exemption.

Based upon information provided to the IRB, this activity is exempt under the criteria set forth in the Federal Policy for the Protection of Human Subjects, **45 CFR §46.101, paragraph b, category: 2, subsection: i.**

Certain research is exempt from the requirements of HHS/OHRP regulations. A determination that research is exempt does not imply that investigators have no ethical responsibilities to subjects in such research; it means only that the regulatory requirements related to IRB review, informed consent, and assurance of compliance do not apply to the research.

Any unanticipated problems involving risk to subjects or to others must be reported immediately to the Chair of the Committee on Research Involving Human Subjects, the University Research Compliance Office, and if the subjects are KSU students, to the Director of the Student Health Center.