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Faculty Perceptions About Attributes and Barriers Impacting the Diffusion of Online Education in Two Saudi Universities

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FACULTY PERCEPTIONS ABOUT ATTRIBUTES AND BARRIERS IMPACTING THE DIFFUSION OF ONLINE EDUCATION IN TWO SAUDI UNIVERSITIES

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ABSTRACT

Recognizing that faculty are an essential part of the success of any distance education program, this study sought to examine faculty perceptions of attributes and barriers impacting diffusion of online education at two Saudi universities: Taif University and Tabuk University. More specifically, the study intended to (a) give an overview of faculty members' current stage in the innovation-decision process in regards to online education, (b) examine faculty perceptions about attributes (motivating factors) and barriers (inhibiting factors) impacting diffusion of online education, (c) investigate the relationship between faculty members' selected personal characteristics (including age, years of teaching, DE experience, gender, academic rank, nationality, and level of education) and their perceptions about attributes (motivating factors) and barriers (inhibiting factors) impacting diffusion of online education, (d) investigate the relationship between faculty members' selected personal characteristics (including age, years of teaching, distance education experience, gender, academic rank, professional area, nationality, and level of education) and their stage in the innovation-decision process, and (e) demonstrate how these factors can be used to increase faculty adoption of online education to respond to the increasing demands for this kind of education.

Rogers' (1995) diffusion of innovation theory was employed to discuss the findings from this study and to reveal which attributes of innovation are perceived to be important in the innovation decision process by faculty members as they decide to adopt or reject online education. Data was collected using a self-administrated and cross-sectional questionnaire.

The findings revealed that the most important attribute of WBDE was relative advantage and that the main barriers that prevented faculty members from adopting online education were technical expertise, infrastructure, and planning issues. The inferential analysis showed that distance education experience was a significant predictor for faculty perceptions about relative advantage, compatibility, observability, and complexity. It also showed that age, academic rank, and level of education were significant predictors of faculty perceptions of financial concerns as a barrier to WBDE. Moreover, the relationship between DE experience and faculty's stage in the innovation-decision process was found to be statistically significant.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

Introduction

During the past few years, there have been rapid changes regarding adult learning and teaching associated with expanding access and new developments in information and communication technologies. The growth of telecommunications technologies has enabled higher education institutions to reach a varied range of audiences and increased student access to higher education. Therefore, distance education programs have expanded and the number of distance courses has increased. According to Allen and Seaman (2010) more than 4.6 million students (more than 25% of all U.S. higher education students) were taking at least one online course during the fall semester of 2008. That is a 17% increase over the number reported the preceding year. The authors also reported that over 80% of U.S. colleges offered at least one online course each semester (Allen & Seaman, 2010).

One of the immediate results of this growth in distance education is that many faculty members at higher education institutions are increasingly expected or being asked to teach different courses in an online format. Moreover, many traditional face-to-face courses are integrating one or more elements of online education such as using email, discussion boards, online post of instructional materials (e.g., presentations, links, tutorials), and online assessment tools (e.g., online tests). The increasing use of online technology will likely continue in the future (Hislop & Ellis, 2004). As a result, the nature of faculty work is changing as they are

increasingly expected to utilize the potential of online technology to either partially or fully deliver instruction.

The greater development of online programs will necessitate a reformed commitment to its most valuable resource, faculty. According to Olcott and Wright (1995), even though the advancement of online technologies have enabled higher education institutions to provide the delivery of education and training programs to adult audiences who may have geographical or social restrictions that prevent them from attending traditional on-campus courses, the development of learning and the cumulative quality of such programs still depends on faculty. According to Black (1992), one of the major challenges facing the development and expansion of distance education programs is "faculty skepticism about its suitability for university degree credit" (p. 6). Even though there has been greater acceptance of online learning by higher education administrators, as can be seen in higher levels of institutional involvement in this kind of education, faculty acceptance has not increased at the same rate. This gap between institutional acceptance and faculty acceptance of online education has influenced the widespread adoption of this type of education (Mitchell & Geva-May, 2009).

Research studies have shown that distance education is not solely a technological issue, rather it is an academic one (Howell, Saba, Lindsay, &Williams, 2004). In addition, recent research revealed that the most important group that needs administrators' attention is faculty who may feel uncomfortable about the transition to distance education. Thus, administrators can help faculty and facilitate this transition more effectively through understanding faculty attitudes, needs, and concerns and by developing detailed strategies suitable to the needs and contexts of faculty at their own institution (Howell et al., 2004).

Faculty satisfaction is considered to be one of the five pillars of distance education quality, which also includes student satisfaction, learning effectiveness, access, and institutional cost-effectiveness (Bolliger & Wasilik, 2009). Thus, faculty concerns, needs, and interests should be investigated as online education programs increase. According to Bolliger and Wasilik (2009), recent research has demonstrated that faculty satisfaction is strongly correlated to student learning.

The Definition of Distance Education

The definition of distance education (DE) has been elaborated and discussed many times over the past years. However, probably the most cited definition of distance education is the one introduced by Moore and Kearsley (2005). They defined distance education as "planned learning that normally occurs in a different place from teaching" and requires "special organizational and administrative arrangements" (Moore & Kearsley, 2005, p. 2). This definition incorporates all forms of DE; however, for the purpose of this study, distance education will refer only to asynchronous and synchronous online formats.

Statement of the Problem

The benefits of offering distance degree programs for both learners and faculty have been acknowledged by previous studies. The most cited benefits of distance education include expanding the level of interaction between learners and instructors and among learners themselves, meeting the needs of learners who are geographically distant or have family responsibilities that might prevent them from attending traditional daytime college courses (Maguire, 2005), providing faculty with the opportunity for professional recognition and research, increasing student's achievement level, and encouraging the systematic design of instruction (Shea, Pickett, & Li, 2005). According to Conceicao (2006), the use of computer-

mediated communication technologies for teaching adult learners online has helped higher education institutions to provide "better access, convenience, and flexibility as a way to support adult learners' educational opportunities" (p. 26).

Despite the aforementioned benefits of distance education, many faculty members are still reluctant to teach online (Bower, 2001; Maguire, 2005; Mwaura, 2004; Rockwell, Schauer, Fritz, & Marx, 2000). Faculty play a very important role in the diffusion of distance education; however, their needs, concerns, and opinions have been neglected by education institutions. Schifter (2000b) illustrated that while most distance education literature reviews focused on *how-to-do* issues such as course design and distance learning environments, a small portion of the literature review has focused on faculty attitudes toward distance education or explored the specific motivating and inhibiting factors that influence their participation in distance education. Schifter asserted that knowing these factors "will facilitate implementation of new and expansion of current DE programs" (p. 16). Shea et al. (2005) also highlighted the importance of such studies:

> In order to respond to bold calls for increasing the number of online courses and students … in the next 10 years, careful attention must be paid to the participation of such faculty, without whom even existing levels of online offerings will not be sustainable. (p. 3)

Rockwell et al. (2000) emphasized that higher education institutions should "take into account the wants, needs, interests, and aspirations of the faculty" to help them succeed in distance education teaching (¶ 5).

Purpose of the Study

Recognizing that faculty are an essential part of the success of any distance education program, this study sought to identify key factors that influence Saudi faculty participation in online education. The primary goal of this study was to examine faculty perceptions of attributes and barriers impacting diffusion of online education at two Saudi universities, especially those factors relating to attitudes, pedagogy, institutional policy, and technology.

Rogers' (1995) diffusion of innovation theory was employed to discuss the findings from this study and to reveal which attributes of innovation are perceived to be important in the innovation decision process by faculty members as they decide to adopt or reject online education. In summation, the purpose of this study was to identify the most motivating and inhibiting factors influencing faculty adoption of online education in Saudi Arabia.

Research Questions

The following research questions were addressed:

1. What are faculty perceptions about attributes influencing diffusion of online education in two Saudi universities?
2. What are faculty perceptions about barriers influencing diffusion of online education in two Saudi universities?
3. What are faculty current stages in the innovation-decision process related to online education?
4. Do faculty's different personal characteristics (including age, years of teaching, DE experience, gender, academic rank, nationality, and level of education) impact their perceptions about attributes of online education?

a. Can faculty's different personal characteristics significantly predict their perceptions about relative advantage of online education?
b. Can faculty's different personal characteristics significantly predict their perceptions about compatibility of online education?
c. Can faculty's different personal characteristics significantly predict their perceptions about complexity of online education?
d. Can faculty's different personal characteristics significantly predict their perceptions about trialability of online education?
e. Can faculty's different personal characteristics significantly predict their perceptions about observability of online education?

5. Do faculty's different personal characteristics (including age, years of teaching, DE experience, gender, academic rank, nationality, and level of education) impact their perceptions about barriers to diffusion of online education?
   a. Can faculty's different personal characteristics significantly predict their perceptions about time as a barrier to diffusion of online education?
   b. Can faculty's different personal characteristics significantly predict their perceptions about lack of adequate incentives as a barrier to diffusion of online education?
   c. Can faculty's different personal characteristics significantly predict their perceptions about online program credibility as a barrier to diffusion of online education?
   d. Can faculty's different personal characteristics significantly predict their perceptions about financial issues as a barrier to diffusion of online education?

e. Can faculty's different personal characteristics significantly predict their perceptions about planning issues as a barrier to diffusion of online education?

f. Can faculty's different personal characteristics significantly predict their perceptions about fear of technology as a barrier to diffusion of online education?

g. Can faculty's different personal characteristics significantly predict their perceptions about conflict with traditional education as a barrier to diffusion of online education?

h. Can faculty's different personal characteristics significantly predict their perceptions about lack of technical expertise as a barrier to diffusion of online education?

i. Can faculty's different personal characteristics significantly predict their perceptions about lack of administrative support as a barrier to diffusion of online education?

j. Can faculty's different personal characteristics significantly predict their perceptions about lack of infrastructure as a barrier to diffusion of online education?

6. Is there a relationship between faculty members' selected personal characteristics (including age, years of teaching, DE experience, gender, academic rank, professional area, nationality, and level of education) and their stage in the innovation-decision process in regard to online education?

   a. Is there a relationship between faculty members' age and their stage in the innovation-decision process?

b. Is there a relationship between faculty members' teaching experiences and their stage in the innovation-decision process?
c. Is there a relationship between faculty members' DE experience and their stage in the innovation-decision process?
d. Is there a relationship between faculty members' gender and their stage in the innovation-decision process?
e. Is there a relationship between faculty members' academic rank and their stage in the innovation-decision process?
f. Is there a relationship between faculty members' professional area and their stage in the innovation-decision process?
g. Is there a relationship between faculty members' nationality and their stage in the innovation-decision process?
h. Is there a relationship between faculty members' level of education and their stage in the innovation-decision process?

7. Is there a relationship between faculty's attitudes toward the problem of limited access to higher education by students in Saudi Arabia and their stage in the innovation-decision process in regard to online education?

Significance of the Study

The growth in the population of Saudi students who desire to receive quality higher education or even those who are currently employed and need to have advanced training that can help them in their current jobs have encouraged higher education institutions in Saudi Arabia to participate in distance education (Al-Erieni, 1999; Albalawi, 2007; Alsaif, 2005). As noted before, the growth of any online education depends primarily on faculty engagement that

insures the quality of instruction as well as learning. Since faculty have a critical role in the success of any distance education program, understanding the factors that encourage or inhibit their participation in distance education may assist in maintaining academic quality and integrity (Tabata & Johnsrud, 2008). According to Howell et al. (2004), higher education institutions that wish to establish or expand their distance education programs must align their goals with those of faculty. In addition, they must "understand the obstacles and barriers impeding faculty participation and seek to remove or mitigate them" (Howell, Saba, Lindsay, & Williams, 2004, p. 37).

Although extensive research has been done in the U.S. and other countries about diffusion of distance education programs, the literature review shows that, to date, there is still no systematic study about factors influencing faculty members' adoption of online education in Saudi Arabia.

This study would help administrators in Saudi higher education institutions gain better understanding of the needs, concerns, and interests of their faculty in online education. Specifically, the findings of this study would assist Saudi universities to develop effective and reliable online education programs by (a) giving an overview of faculty members' current stage in the innovation-decision process in regards to online education, (b) faculty perceptions about attributes (motivating factors) and barriers (inhibiting factors) impacting diffusion of online education, (c) investigating the relationship between faculty members' selected personal characteristics (including age, years of teaching, DE experience, gender, academic rank, nationality, and level of education) and their perceptions about attributes (motivating factors) and barriers (inhibiting factors) impacting diffusion of online education, (d) investigating the relationship between faculty members' selected personal characteristics (including age, years of

teaching, DE experience, gender, academic rank, professional area, nationality, and level of education) and their stage in the innovation-decision process, and (e) demonstrating how these factors can be used to increase faculty adoption of online education in order to respond to the increasing demands for this kind of education.

Theoretical Framework

Rogers' (1995) diffusion of innovation theory was employed as the theoretical framework of this study. Specifically, the innovation-decision process model, attributes of innovation, and characteristics of adopter categories were employed in this study.

The diffusion theory has been used as a framework for many studies from a wide range of disciplines such as political science, public health, communication, history, education, and especially in the area of technology diffusion (Dooley, 1999; Sahin, 2006; Surry, 1997). Furthermore, many researchers perceive Rogers' (1995) diffusion of innovation theory as "the most appropriate for investigating the adoption of technology in higher education and educational environments" (Sahin, 2006, ¶ 2). According to Dillon and Walsh (1992), perceiving distance education as an innovation "provides an important means for understanding the phenomena of distance education, particularly from the perspective of those upon whom its acceptance depends: the faculty" (p. 6).

Rogers (1995) defined diffusion as "the process by which an innovation is communicated through certain channels over time among the members of social system" (p. 5). According to Rogers, the four main elements in the diffusion process are innovation, communication channels, time, and social system. He also defined an innovation as "an idea, practice or object that is perceived as new by an individual or other unit of adoption" (Rogers,

1995, p. 11). For the purpose of this study, *innovation* refers to distance education and *diffusion* is the extent to which all faculty members have adopted online education.

According to Rogers (1995), the innovation-decision process is

> The process through which an individual (or other decision-making unit) passes (1) from first knowledge of an innovation, (2) to forming an attitude toward the innovation, (3) to a decision to adopt or reject, (4) to implementation of the new idea, and (5) to confirmation of this decision. (p. 161)

Rogers also identified five characteristics (attributes of innovation) by which an innovation may be described. These include relative advantage, compatibility, complexity, trialability, and observability. Rogers argued that individuals' perceptions of these characteristics predict the rate of adoption of the innovation.

According to Rogers (1995), the individuals in a social system do not adopt an innovation at the same time. Rather, the time it takes for an individual to go through the different stages of the innovation-decision process varies from person to person. Thus, members of a social system can be classified based on similar degrees of innovativeness—the degree to which an individual is relatively earlier in adopting new ideas than other members of a system—into five adopter categories: innovators, early adopters, early majority, late majority, and laggards. Different categories of adopters have different characteristics according to their (1) socioeconomic status, (2) personality values, and (3) communication behavior.

Assumptions of the Study

1. It was assumed that faculty answered the survey included in this study honestly and accurately.
2. It was assumed that faculty could identify their motivation in written format.

Conceptual Framework of the Study

Based on an initial review of the literature, a framework for investigating the factors that motivate or inhibit faculty participation in online education was developed and is presented in Figure 1. The conceptual framework designed for this study consisted of three components:

1. Faculty characteristics**:** These included gender, age, academic rank, professional area, number of years teaching at postsecondary education, faculty experience in regard to online education, nationality, and educational level.
2. Perceived attributes of online education: These attributes were categorized into five categories. These are relative advantage, compatibility, complexity, trialability, and observability.
3. Perceived barriers to the diffusion of online education: These barriers were also categorized into ten categories: concerns about time, concerns about incentives, Web-based distance education (WBDE) program credibility, financial concerns, planning issues, fear of technology, conflict with traditional education, technical expertise, administrative support, and infrastructure.
4. Faculty members' stage in the innovation-decision process: The stages were no knowledge, knowledge, persuasion, decision, implementation, and confirmation.

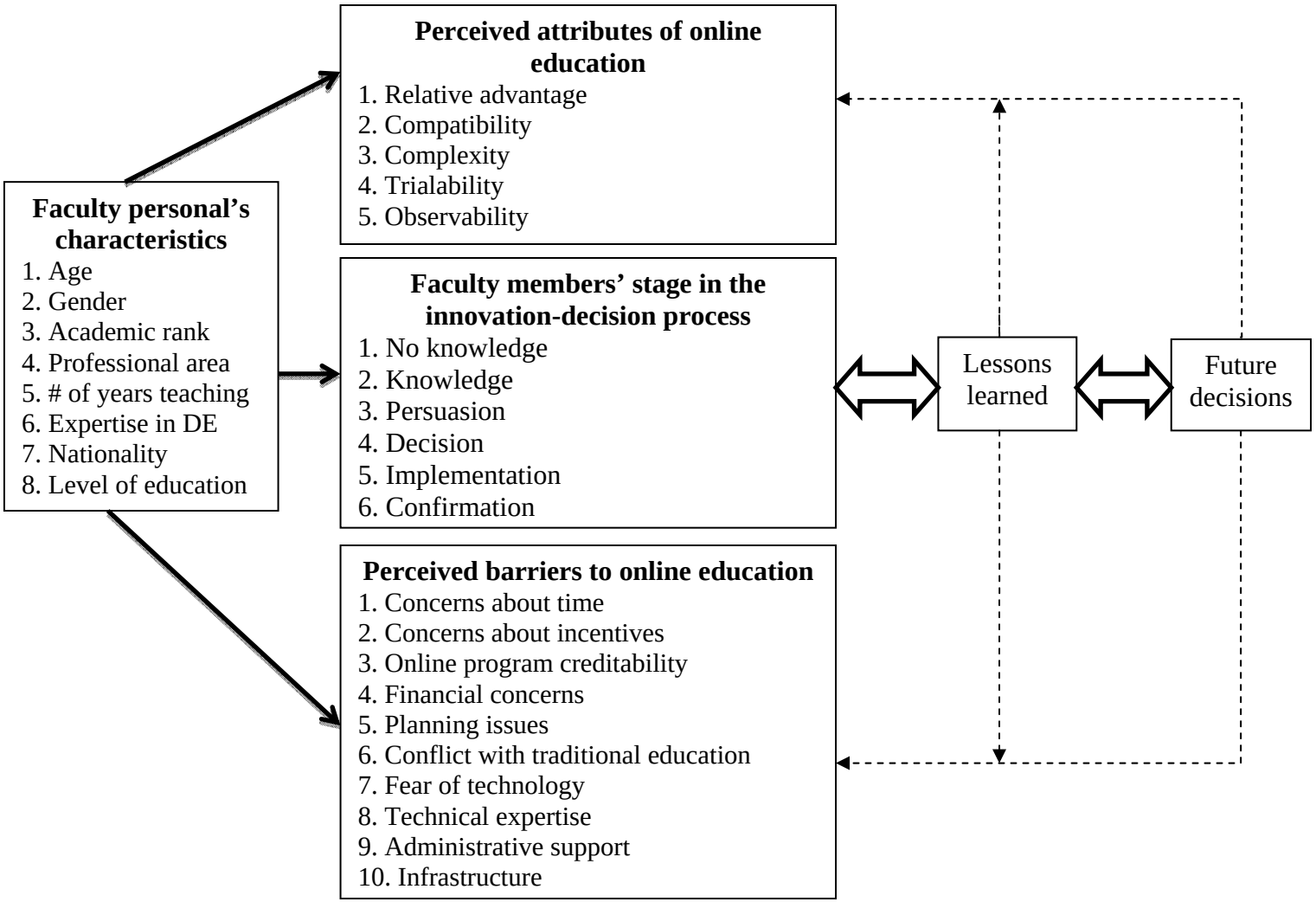

Figure 1. Conceptual framework of the study

Definitions of Terms

For the purpose of this study, the following operational definitions are used:

Diffusion of Innovation: the process by which an innovation is communicated through certain channels over time among the members of a social system (Rogers, 1995).

Distance Education: 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).

Faculty: teaching members of the administration who have academic degrees in particular fields that are qualified to teach in an educational institution (Alsadoon, 2009).

Faculty Workload: all activities that take the time of a college or university professor and which are related directly or indirectly to his or her professional duties, responsibilities, and interests (Betts, 1998a).

Inhibitors: any phenomenon that would cause a faculty member to have a negative attitude toward delivering his or her course content via DE technology (Bruner, 2007).

Innovation: an idea, practice or object that is perceived as new by an individual or other unit of adoption (Rogers, 1995).

Motivators: any phenomenon that would cause a faculty member to have a positive attitude toward delivering his or her course content via DE technology (Bruner, 2007).

Overload: teaching an extra course during a semester (Betts, 1998a).

Rank: Refers to a faculty member's contracted position in an educational institution (Betts, 1998a).

Web-Based Instruction: WBI is a hypermedia-based instructional program which utilizes the attributes and resources of the World Wide Web to create a meaningful learning environment where learning is fostered and supported (Khan, 1997).

Organization of the Study

This study is organized as follows: Chapter 1 provides the introduction, a background for the study, statement of the problem, research questions, the significance of the study, assumptions, definitions of the terms, and organization of the study. Chapter 2 presents a review of the literature related to online education. Chapter 3 focuses on the research method used in conducting the study and collecting data. Chapter 4 provides and analyzes results of the research. Finally, Chapter 5 discusses the study's findings and provides conclusions based on the results.

CHAPTER 2

Literature Review

The evolution of distance education technologies have made the process of obtaining educational opportunities without regard to time and place possible and much easier for students. At the same time, they have produced new challenges for educational institutions that provide this kind of education (Levy, 2003). Technology plays a very important role in facilitating and delivering online instruction. However, providing technology by itself does not guarantee successful implementation of online learning. Rather, it is putting the technology in the hands of well-trained teachers (Alsadoon, 2009). Research studies have shown that distance education is not a technological issue, rather it is an academic one (Howell et al., 2004). Thus, as many use educational technology to move to distance education each year, the most important group that needs administrators' attention are faculty who may feel uncomfortable about this transition.

While the implementation of distance education programs undoubtedly involves the use of technology, what is more critical is the *people variables*. Rather than viewing technology as something that is separated from the human world, administrators need to perceive distance education as a social phenomenon (Bruner, 2007). In order to do so, administrators need to understand the factors that motivate and inhibit faculty members from participation in distance education, which will give them an edge in the implementation of distance education.

With regard to the purpose of this study and in accordance with the stated problem, the literature review presented in this chapter is divided into six sections. The first section provided an overview of the field of distance education including its definition and a historical review of its evolution. The second section provides an introduction to online education including its definition, types of online technologies, benefits of online learning, and barriers facing the growth of online education. The third section discusses the current implementation of distance education in postsecondary education and predicts trends affecting future implementation. The fourth section provides an overview of the higher education system in Saudi Arabia and explores the development of distance education in Saudi higher education institutions. The fifth section provides a discussion of Roger's (1995) diffusion of innovation theory. The last section of this chapter provides in-depth discussion of motivating (attributes) and inhibiting factors (barriers) influencing faculty adoption of distance education.

Distance Education

The field of distance education has changed rapidly during the last decade. Educational programs in which learners and instructors are separated by place and usually by time became the most rapidly growing form of education, not only in the United States but also throughout the world (Gunawardena & Mclsaac, 2004; Tracey & Richey, 2005). As a result of the rapid development of educational technology, many courses have been delivered to potential students in various and different locations to respond to the increasing demands for higher education. This development in technology has enabled higher education institutions to provide specialized courses to students who are geographically distant with increasing interaction between students and teachers and among students themselves (Gunawardena & Mclsaac, 2004).

Even though the evolution of distance education has been greatly influenced by the advancement of educational technology, this development has also been influenced by the ongoing changes in educational values and philosophies (Tracey & Richey, 2005). According to Moore (2003), distance education is fundamentally derived from the adult learning theory, especially the informal education theory of Malcolm Knowles. In addition, Moore explained that distance education derived much of its foundation from the philosophical perspective of the adult education field. He wrote, "Distance education from the earliest times has shared three distinctive and often interlocking views of purpose and direction. The first… is the vocational; the second is the drive for equity of individual opportunity, the third is social change" (Moore, 2003, p. 9). Moore explained that these three views all came into play during the early 1970s in the form of the Open University in the United Kingdom and the consequent universal embrace of distance education.

The Definition of Distance Education

Over the years, researchers have used different terms to describe distance education such as open learning, distance learning, flexible learning, and distributed learning (Tracey & Richey, 2005). Albeit these terms are frequently used interchangeably, they do not always mean the same thing. Thus, the use of these different terms for describing distance education have led to variations in definition and differences in practice (Chacon, 2009). According to Chacon (2009), the variations in the definition of distance education can be attributed to several factors including the evolving history of DE, the different terms that are used for describing it, and the variety of technologies that are used for delivering this kind of education.

Chacon (2009) explained that there are several attributes that are critical for understanding the importance of the DE definition to practice. First, as discussed earlier,

distance education was primarily derived from the learning theories of adult learning which recognized the adult learners' capacity of being self-directed and self-managed during the learning process even when they are physically and psychologically separated from their teachers. This leads to the discussion of the second attribute central to the definition of distance education, interaction.

Interaction has always been an important and critical component of the learning process and context. However, early forms of distance education were affected by the distance problem that threatened the quality of distance education (Anderson, 2008). However, this problem does not exist in the new forms of distance education such as online learning which provides the capacity for high interactivity learning environments. According to Anderson (2008), "The World Wide Web is an extremely multifaceted technology that provides a large – and seemingly ever-growing – set of communication and information management tools which can be harnessed for education provision" (p. 52).

According to Chacon (2009), the third attribute central to the definition of distance education is the delivery mode that has always depended on the available technology. Distance education can be delivered using different modes including print, radio, television, telephone, computer, and the Internet. Each of these modes has its own advantages and limitations (Gunawardena & Mclsaac, 2004; Moore & Kearsley, 2005). However, the most dominant delivery mode today is through web-based knowledge management systems (KMS) such as Blackboard and WebCT (Moore & Kearsley, 2005). According to Gunawardena and Mclsaac (2004), the KMS "have shifted the focus away from the presentation of content to the integration of student contributions, building communities of learners and constructing a community of knowledge using web-based templates" (p. 370).

The fourth and the final attribute of distance education concerns the instructional methods that are used to facilitate learning (Chacon, 2009). Information technology, instructional technology, and educational technology are all terms used to describe the practice of using technology to enhance learning. According to Reiser (2001), the field of instructional design and technology (IDT) encompasses "the analysis of learning and performance problems, and the design, development, implementation, evaluation and management of instructional and non-instructional processes and resources intended to improve learning and performance" (p. 53). The aforementioned attributes of distance education – interaction, delivery systems, and methods of instruction—illustrate the complex nature of distance education, but also may lead to misconception.

The widely cited definition of distance education is the one introduced by Moore and Kearsley (2005). Moore and Kearsley defined distance education 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" (p. 2). The previous definition incorporates all forms of DE; however, for the purpose of this study, distance education refers only to asynchronous and synchronous online formats.

The Evolution of Distance Education

Distance education is not a new concept that began with the invention of the computer as some people may think (Gunawardena & Mclsaac, 2004; Moore, 2003; Moore & Kearsley, 2005; Tracey & Richey, 2005). Rather, the origins of some of the important ideas and strategies that are currently used lie in experiments and innovations that happened during the past century. Thus, it is important to review the historical development of distance education as a means for

understanding the current development of distance education (Moore, 2003). According to Moore and Kearsley (2005), distance education has developed through five historical generations, each defined by the availability of more advanced instructional technology (IT) and delivery systems: correspondence study print was the dominant technology; broadcasting as radio and television emerged; open learning systems that focused on the practice of distance education when IT included multimedia; teleconferencing when the satellite and interactive video-conferencing appeared; and the current web-based and virtual classes as electronic technologies including computer networks and the Internet appeared (Chacon, 2009; Moore & Kearsley, 2005).

First generation—print. The first generation of distance education was print-based correspondence study (also called *home study* or *independent study*). These courses began in the early 1880s as a result of the spread of mail services and the expansion of railway networks. People who wanted to study at home or those who were working could for the first time obtain education at a distance. The first correspondence course was offered by the Chautauqua Library and Science Library, founded by Bishop John Vincent, in 1878. The organization offered a four-year correspondence course of readings as an enhancement to the summer schools of Lake Chautauqua (Moore & Kearsley, 2005). Correspondence study became incorporated into the University of Chicago in 1890 when the university established the first division for correspondence study in an American university. The new division included five departments including lecture study, class study, correspondence teaching, library, and training. The correspondence division successfully attracted 3,000 students enrolled in 350 courses (Tracey & Richey, 2005).

As the number of for-profit organizations that offered correspondence courses increased, questioning sales practices by some of these organizations led more accountable schools to establish a monitoring organization in 1926 called the National Home Study Council (NHSC). In 1994, the NHSC changed its name to the Distance Education and Training Council (DETC). In 1968, higher educational institutions that were offering correspondence study decided to call their method *independent study* to distinguish themselves from home study schools. Thus, they created the Independent Study Division which eventually became the National University Continuing Education Association (Moore, 2003).

Second generation—broadcasting. Use of a new technology began with the spread of radio broadcasting during the early part of the 20th century. However, these attempts failed because of the lack of investment, but mainly because faculty members did not recognize the importance of radio programs and left them for commercial interests (Moore, 2003). Educational television started in 1934 when one of the first land-grant institutions, the state University of Iowa, presented television programs in subjects such as hygiene and astronomy. Five years later, the university's station broadcasted more than 400 educational programs. After World War II, 242 out of 2,053 television channels existing at that time were given to non-commercial use. In addition, some of the television educational programs were sponsored by commercial networks such as NBC and CBS (Moore & Kearsley, 2005).

In 1952, the first cable television began broadcasting. In 1972, the Federal Communications Commission (FCC) required all cable providers to start at least one educational channel. Educational courses provided by these cable providers were called *telecourses.* By the mid-1980s, there were approximately 200 telecourses at the college level produced by universities, community colleges, and private sectors (Moore & Kearsley, 2005). While

delivering instruction through television and radio-enhanced instruction, communication was typically asynchronous (Chacon, 2009).

Third generation—open universities. In the late 1960s, a commission was formed in the United Kingdom to expand the higher education system by opening the admission to working class adults. The interaction of the commission's members with Charles Wedemeyer had a major impact in the establishment of the concept of the Open University (OU). In 1969, the British government decided to set up an independent, large-scale educational institution dedicated entirely to distance education and having its own funds, faculty, and degree-giving authority (Moore & Kearsley, 2005). According to Moore (2003), the establishment of the OU was described as one of the most successful attempts of implementing political agendas in the education field. The success of the OU inspired other countries around the world including the United States. Several countries such as China, France, and Spain have created their own large-scale open universities. Many of these universities are large (with more than 100,000 students), so they are called *mega-universities*. Even though the quality of instruction and the number of distance students increased as a result of the establishment of open universities, the primary problem of distance education, geographic separation, continued to affect the quality and the efficiency of distance education as an instructional method (Chacon, 2009).

Fourth generation—teleconferencing. During the 1980s, distance education programs offered in the United States were based on the technologies of teleconferencing and were basically designed for group use. During the 1980s and the 1990s, audio-conferencing was the dominant form of distance education. Audio-conferencing allowed for students and teachers to interact in real time from different locations. During the 1990s, as a result of the development of the new technology of Direct Broadcast Satellite (DBS), people could receive programs directly

in their homes and schools could also receive these programs directly at schools. During this period, two-way video-conferencing became more commonly used. By the mid-1990s, two-way video conferencing was integrated into personal computers (Moore & Kearsley, 2005).

Fifth generation—online instruction. The adoption rate of web communication increased rapidly in comparison to preceding information technologies. While in 1995 only 9% of all American adults accessed the Internet (Greenspan, 2002); by June 2010, this percent increased to be more than 77% with a total of 248 million users (Internet World Statistics, 2010).

Although courses were offered over computer networks during the 1980s, the development of computer technologies such as CD-ROMs, DVDs, and the World Wide Web provided learners with various learning environments and enabled instructors to act as facilitators rather than only providers of information (Tracey & Richey, 2005). According to Moore (2003), during the 1990s, some universities began to offer online courses and many of them set up a separate management unit to support this kind of education. Examples of the early universities that offered online instruction include the Online Campus of the New York Institute of Technology and the International School of Information Management. The first university that offered an online graduate degree was Penn State University which provided this program through its World Campus. By the end of the decade, more than 84% of public universities in the United States and 83% of 4-year public colleges offered web-based courses (Moore, 2003).

Online Learning

Online learning involves a wide range of learning technologies and instructional methods including formal (e.g., online courses) and informal (e.g., surfing the Internet) learning. According to Clarke (2003), there is significant interest and enthusiasm about online learning for both education and training. Clarke explained that a major factor for this enthusiasm is the

potential to overcome many of the social and economic barriers that prevent adults from accessing learning opportunities, especially those of pace, place, and time. However, to do so, online learning environments should include many resources, encourage collaboration, and support both advanced users and novice ones (Khan, 1997).

Definition of Online Instruction

According to Ally (2008), different terms have been used to describe online learning which makes it difficult to develop a standard definition. These terms include: e-learning, Internet learning, distributed learning, networked learning, web-based learning, virtual learning, and distance learning. Khan (1997) defined online instruction as an innovative approach for delivering instruction to distant learners using the Internet as the medium. However, Ally (2008) argued that online learning involved more than just presenting or delivering instruction to learners via the Web. He explained that the learner and the learning process are more important than the medium that is used for delivering instruction, and therefore they should be the focus of online learning. Thus, he defined online learning as

> The use of the Internet to access learning materials; to interact with the content, instructor, and other learners; and to obtain support during the learning process, in order to acquire knowledge, to construct personal meaning, and to grow from the learning experience. (p. 17)

There are two basic delivery systems for online instruction based on how and when interactions with others occur. The first is synchronous instruction which requires simultaneous interaction from all students and instructors. This type of delivery system provides learners with *real time* education. The second delivery system of online instruction is asynchronous learning which does not require students to participate at the same time; rather, they can choose their

instructional time based on their own schedules. They also can communicate with their peers or their instructors by leaving messages that can be answered later (Alsadoon, 2009; Betts, 1998a).

Online Tools

According to Khan (1997), instruction is the delivery of information and instructional activities that facilitate learning and help learners to accomplish specific learning goals. Thus, in order to deliver instruction, teachers use different types of media and a variety of technologies. Moore and Kearsley (2005) explained that many people use the terms media and technology as synonyms, but there are not. Moore and Kearsley explained, "It is the technology that is the vehicle for communicating messages, and the messages are represented in a medium" (p. 6). Accordingly, each technology supports at least one medium and some technologies can support more than one (Gunawardena & Mclsaac, 2004; Moore & Kearsley, 2005). For example, the video medium can be carried by videocassettes, DVDs, satellite, or cable. According to Moore and Kearsley the most common problem throughout the history of distance education has been the tendency of educators to become *fixated* on a specific technology and to try to deliver all components of the instruction using that technology.

Fahy (2008) defined five types of media (tools) that are used in online learning. These include print and text, video and graphics, audio, mobile devices such as PDAs and smartphones, and the Internet. According to Fahy (2008), regardless of the differences between these five types of media, all online teaching and learning tools have in common the ability to engage students in timely contact with their instructors, peers, and the content. However, the differences in how these technologies accomplish their effects have important implications for online learning and teaching practices. Thus, it is important for online instructors to understand some

of the *silent differences* among these technologies in order to be able to select the appropriate medium that best serve their learners' needs (Fahy, 2008).

Moore and Kearsley (2005) explained that there are many models that can help distance educators select the best medium or mixture of media for delivering a specific course or program. However, a key model is Bates' (1998) ACTIONS model. Bates (n.d.) suggested that there are seven factors that teachers need to consider while determining which technology to use. These are:

1. **A**ccess (i.e., where the learning process taking place; at home, work, or local center?)
2. **C**ost, teaching function (i.e., what are presentational requirements of the subject to be taught?)
3. **T**eaching and learning (i.e., what kinds of learning are needed? What instructional approaches will best meet these needs? What are the best technologies for supporting this teaching and learning?)
4. **I**nteraction (i.e., what types of interaction between instructors and students will be possible?)
5. **O**rganization (i.e., what are the organizational changes needed to facilitate the use of a specific technology?)
6. **N**ovelty (i.e., will the t*rendiness* of the technology motivate innovation?)
7. **S**peed (i.e., how quickly and easily can the instructional materials be updated or modified?)

Benefits of Online Learning

Increasingly, higher education institutions are adopting online learning as a method of teaching and learning (Allen & Seaman, 2010). For educational institutions to take such a step,

there must be a perception that the adoption of online learning will provide several benefits for learners, instructors, and educational institutions (Ally, 2008). For learners, online learning has the ability to provide educational opportunities at any location acceptable to learners, at a time that meets the needs and the family responsibilities of learners, and at a pace that is controlled by the learner (Clarke, 2003). In asynchronous online instruction, learning is not limited to a specific time zone or location. Students can access the learning materials anytime and from any location. On the other hand, synchronous online learning allows learners to interact in real-time with their peers and instructors. In addition, learners can use the Internet to access up-to-date information and communicate with experts in their field of study. Moreover, since online learning allows students to complete courses while they are working on jobs, they will be able to see the applicability of the knowledge and skills they learned in online courses, which facilitates situated learning (Ally, 2008). Online learning can also increase the access to higher education especially for nontraditional learners who may have job or social responsibilities that prevent them from attending traditional courses (Matthews, 1999).

For instructors, online learning helps them to provide instruction from anywhere and at any time. In addition, instructors can quickly and easily update instructional materials and learners can see the changes immediately. Moreover, since learners use the Internet to access the instructional materials, the instructor can easily direct learners to relevant information on the web, especially information that is new and changing (Ally, 2008). Additionally, instructors can use online learning systems to assess learners' needs and to evaluate students' current level of expertise in computer use, Internet research, reading, and communication skills, which help instructors to appropriately select and design instructional materials that best meets the needs of their students (Ally, 2008; Alsadoon, 2009).

Educational institutions also benefits from offering online courses. It increases students' enrollment and attracts new teaching staff, reduces the necessity of building and maintaining university buildings, and sends an indication to the public that the institution is forward-thinking and uses advanced technologies (Matthews, 1999).

Challenges Facing Online Instruction

The development and the implementation of online learning is not a simple process. Several challenges may appear before, during, or after the implementation of online learning. The changes in students' and faculty members' roles in the learning process are examples of challenges that may occur before the implementation process even begins. Lack of faculty training and inadequate technical support are examples of problems that may occur during the implementation of online courses (Alsadoon, 2009; Matthews, 1999). According to Hill (1997), general distance education issues, as well as online education, can be presented using a framework that includes five areas of consideration: pedagogical, technological, organizational, institutional, and ethical. These areas of considerations will be briefly discussed.

Pedagogical issues. According to Hill (1997), pedagogical issues relate to teaching and learning. One of the most vital issues relates to the importance of the medium in distance learning environments. As discussed earlier, even though all online tools (print and text, video and graphics, audio, mobile devices, and the Internet) have in common the ability to engage students into timely contact with their instructors, peers, and the content, the differences in how these technologies accomplish their effects have important implications for online learning and teaching practices (Fahy, 2008). Hill (1997) explains that the medium used in instruction often drives the methodology, creating constraints on instruction.

Another important pedagogical issue pertains to the impact of distance education on the learner. DE learners often complain that they feel isolated and unconnected in DE learning environments (Hill, 1997). Thus, higher education institutions that are interested in implementing online education must develop strategies that encourage cooperation among learners and increase interaction between learners and instructors and among learners to overcome this limitation.

Information overload is also a fundamental issue in online education. Online learners may feel overwhelmed as a result of the multiple media that are usually used in online learning environments. According to Hill (1997), this issue of discord among these media is often linked to hyperlinked environments. She explains that strategies for helping the learner to overcome this *lost in hyperspace* phenomena should be integrated into the course.

Guessoum (2009) identified two pedagogical challenges to online education in the Arab World. The first challenge pertains to the preparedness of students for the online learning paradigm. Guessoum argues that the Arab education systems, to a large extent, fail to prepare students to be active, independent, and lifelong learners. The second pedagogical challenge to online education in the Arab World relates to the fact that Arabic web pages do not exceed 0.1% of the entire content of the web. According to Guessoum, since most of Arab Internet users have inadequate mastery of English, online education can only serve as a realistic learning platform to small portions of the society. Thus, there is a huge challenge to Arab higher educational institutions to develop high-quality content in Arabic for teaching or independent learning.

Technological issues. According to Hill (1997), technological issues relate to the hardware and software used in distance learning environments. Since online education is largely reliant on the use of computers, access to hardware is a fundamental issue. Without access,

interaction in an online learning environment is not possible. The issue of interaction is also closely connected to the issue of cost. Even though the learner may choose (or be required) to buy the necessary equipment, the costs associated with this decision pose a significant challenge to the widespread use of online education, especially within minority student groups.

However, the biggest technological challenge to online education, according to Hill (1997), is frustration that is often associated with technical difficulties. This frustration can result from a lack of knowledge in relation to hardware and software used in online education; however, it also can be caused from an inability to connect to the network or in the need to wait while information downloads to the desktop.

Organizational issues. According to Hill (1997), organizational issues relate to the preparation of the distance learning course. Planning for a DE course is one of the important issues that can be classified under this category. This includes how much of the course will be based on web-related interactions and what types of assignments and interactions are to be included in the course. Each of these activities should be considered and designed before the implementation of an online course.

Another important organizational issue is the ongoing support, both technological and human-based, throughout a course. This kind of support is very important in order to maintain the course momentum and be effective. This support is considered to be a continuous challenge throughout a Web course (Hill, 1997).

Organizing the course so there is a sense of continuity poses another challenge to online education. According to Hill (1997), one feature of the Web that makes this issue less debilitating than other DE technologies is the ease with which pages can be updated and revised. Hill explains that while daily revisions to a Web site are very important, too much change can

distract the learner. Thus, a Web page template should be established and followed to minimize learner discord.

Institutional issues. According to Hill (1997), institutional issues relate to policies generally established by the organization involved in the DE implementation. Organization-related issues may include faculty development, promotion and tenure, course validity, evaluation, and support. A major issue associated with institutional/policy decisions is the amount of time it takes for a faculty member to not only prepare online courses, but also getting to know the equipment and how it works and staying informed of major technological updates.

Another important organizational issue is the accreditation of online programs and evaluating the quality of online courses. Because of increased use of the Internet as the delivery mode and the strong growth of distance education, concerns are raised that it is demand rather than sound pedagogy that is shaping this expansion (Sherry, 2003). According to Sherry (2003), quality-based issues are not always at the forefront of decisions about DE. While the World Wide Web has been used for more than a decade now, only during the last few years has it begun to be accepted as a workable mode for delivering instruction. Thus, many faculty members teaching in postsecondary institutions were not employed with the expectation that they would teach online courses. According to Caplan (2008), most of faculty concerns about using new technologies are often centered on pedagogy. Unfortunately, many examples of poor pedagogical application in online instruction can be found, often in the form of text-based instruction. Caplan explained that one way to address concerns about inferior online pedagogy is to demand that the same educational standards apply to the development of online instruction as to any delivery medium such as in the classroom.

The American Association of Higher Education's (AAHE) *Seven Principles for Good Practice in Undergraduate Education* is one such set of standards (Chickering & Gamson, 1987). These standards were originally written for classroom instruction; however, they have been recently revised to include online instruction. Another set of standards is the one proposed by The Higher Education Program and Policy Council of The American Federation of Teachers (AFT) (AFT, 2000). These standards were primarily based on surveying 200 members of AFT who themselves taught distance education courses in different major academic areas and used different delivery modes. The study suggests general principles and standards pertaining to faculty, course design, learners, and student assessment that can be used for evaluating the quality of DE programs.

According to Guessoum (2009), even though the issue of accreditation is important for ensuring the quality of DE programs, higher education institutions in the Arab world do not seem to have persuasively addressed this issue. Guessoum wrote, "This is undoubtedly a crucial issue that needs to be definitely resolved if one wishes this educational (and commercial) paradigm to succeed, that is one needs to address the fears and worries of the public" (p. 467).

Ethical issues. According to Hill (1997), ethical considerations in a distance learning environment act as a foundation for other issues discussed earlier. Hill explained that this category included admission, course development and admission, learner/facilitator interaction, and learner evaluation. The latter issue—learner evaluation—is the most ethical challenge to online education. For example, Li and Irby (2008) critiqued how faculty members teaching online courses would know who they are evaluating without meeting students face-to-face. They added that plagiarism can be a potential problem in online programs.

Implications of Distance Education in Postsecondary Education

Higher education institutions are experiencing several changes as a result of the advancements in information technology. One of the most important impacts of this development is the significant increase in the number of higher education institutions offering online learning opportunities (Betts, 1998a; Tracey & Richey, 2005). In the following section, a description of the current rise of distance education in postsecondary education and the factors that have led to this rise are discussed.

Current Status of Distance Education

Recent reports have shown an ongoing increase in the number of higher educational institutions that offer distance education associated with an unexpected increase in students' enrollments (Allen & Seaman, 2010; NCES, 2008). According to the NCES (2008) report, 66% of all two-year and four-year degree-granting institutions throughout the United States offered distance education courses during the academic year of 2006-07. The percentage of institutions offering distance education courses and programs varied according to the institutional size (enrollment) and institutional type (private, public institutions). According to the report, 97% of public two-year institutions and 89% of public four-year institutions offered distance education courses during the academic year of 2006-07. On the other hand, 18% of private for-profit two-year institutions, 53% of private not-for-profit institutions, and 70% of private for-profit four-year institutions offered distance education courses during the same year. The NCES report revealed that there were more than 12.2 million students enrolled in distance education courses during the academic year of 2006-07. Of these enrollments, 77% were taking online courses, 12% were taking hybrid/blended online courses, and 10% were reported in other types of distance education courses (NCES, 2008).

The most recent survey on online learning in higher education institutions in the United States was conducted by Allen and Seaman (2010). The sample of this study consisted of 2,590 active, degree-granting institutions of higher education in the United States. The authors reported only on online courses—courses in which at least 80% of the content was delivered online. The authors found that about 4.6 million students, which accounted for more than 25% of all U.S. higher education students, were taking at least one online course during the fall semester of 2009 with a 17% increase over the number reported the preceding year. The majority of these students (more than 82%) were studying at the undergraduate level and only 14% were taking graduate courses. According to the authors, the number of online students was positively correlated with the size of institution, and the very largest institutions had the biggest portion of online population.

Future Trends

Distance education is becoming increasingly prevalent in the United States and its presence is growing. With the reported increase in the number of students returning to higher education for training, retraining, or seeking advanced degrees, distance education will help administrators to increase access in order to meet the increasing demands of a changing student population (Betts, 1998a).

Predicating the future of distance education in higher education is complex since it involves reviewing educational, technological, and social trends that may affect the growth of distance education (Betts, 1998a). From this literature review, three major trends have been identified: (1) the number of distance education courses offered by higher education institutions will exceed their traditional counterparts; (2) the current economic crisis will increase the

demands for existing and new online courses; and (3) the demographic of distant students will continue to change.

Trend 1: According to Allen and Seaman (2010), the number of students taking online courses continued to increase at a rate that far exceeds the overall growth of higher education enrollment. While the overall annual rate of higher education student enrollment has only grown at 1.5% from the fall 2002 to the fall of 2008 (from 16.6 million students in fall 2002 to 18.2 million for all 2008), the cumulative annual growth rate of online education during the same period was 19% (from 1.6 million students in fall 2002 to 4.6 million for all 2008). Thus, as more students are entering higher education, it is likely that postsecondary institutions will offer more online courses to meet the growing demands for this kind of education.

Trend 2: Allen and Seaman (2010) have also asserted that a large portion of higher education administrators reported an increased demand for both face-to-face and online courses offerings at their institutions as a result of the economic downturn, with 73% of institutions reporting increased demands for *existing* online courses and programs. However, the more interesting finding about the effect of the economic downturn on the growth of online education is that 66% of institutions reported an increased demand for *new* online courses and programs.

Allen and Seaman (2010) explained that bad economic times have been historically correlated with an increasing demand on higher education and training. This may be due to the fact that the availability of good job opportunities decrease in such economic circumstances which makes people more motivated to seek education, or because those who are already employed desire to improve their chances for advancement by seeking advanced education. Whatever the reason, what is evident is that the current economic downturn will increase the

demands for higher education and accordingly increase the number of distance education courses and programs offered by higher education institutions.

Another impact of the current fiscal crises is the decline in most states' revenue which led to reduced state appropriations for public postsecondary education. In a report published by the American Association of State Colleges and Universities (AASCU) in January 2009, the report predicted such impact, "The cascading effect of the states' financial crises will impact many crucial state policies and programs, including state student grant programs, tuition prices and student enrollment" (p. 2). In their study, Allen and Seaman (2010) reported such impact. However, they illustrated that the impact of the economic downturn on institutional budgets has been mixed. While 50% of higher education institutions' budgets have decreased as a result of the economic turndown, 25% reported an increase. Allen and Seaman reported that many institutions, especially public ones, are finding themselves in a difficult situation in which there are increasing demands for their face-to-face and online courses while having negative financial factors that prevent them from expanding their programs.

Even though the current fiscal crisis has a huge impact on higher education institutions, this is not the first time in which postsecondary institutions have faced such a dilemma. Betts (1998a) explained that over the last two decades, economic factors have greatly influenced higher education in the United States. Betts wrote,

> As higher education continues to compete with other government entities—health, social security, defense, and the national debt—for public money and support, higher education is caught between society's growing need for advanced education and society's strained ability to pay for advanced degrees and certificates. (p. 54)

Betts (1998a) explained that one approach that administrators have effectively used to overcome this dilemma is the implementation of distance education programs. Increasingly, distance education is viewed as a cost effective and flexible alternative to traditional education programs. This trend has been increased during the current economic downturn. According to Allen and Seaman (2010), more than 300 institutions with no current online offerings had reported increased student demand to begin offering such courses. Thus, the current economic turndown will positively influence the size and the number of distance education courses and programs.

Trend 3: Recent studies have reported an ongoing change in the demographic characteristics of distance education students (Allen & Seaman, 2010; NEA, 2000). Traditionally, distance education has been viewed as an alternative method of teaching and learning that provides non-traditional students, who have social responsibilities, geographical restrictions, or job restrictions that prevent them from attending traditional on-campus courses, with opportunities to receive quality higher education. In addition, distance education students were considered to be older, part-time students. However, these demographic characteristics have changed.

The first study that pointed out these changes was published by the NEA in 2000. The NEA report indicated that in contrast to stereotypes of distance education students, the ages of students in distance education courses varied significantly, with the largest percentage of courses (38%) having an even mix of students over and under 25 years old. The reminder percentage of courses was equally divided between under 25 years old (27%) and above 25 years old (27%). Likewise, distance education courses varied concerning whether students are enrolled as full-time or part-time students. Finally, the research results showed that most of the students enrolled

in distance education courses were not living far away. Indeed, the majority of these students (56%) were living within an hour from campus.

Allen and Seaman (2010) also found similar results. They found that the majority (more than 82%) of students who were taking online courses during the fall semester of 2009 were studying at the undergraduate level. Only 14% of student enrollments were taking graduate-level courses. By comparing their study results with the most recent federal data on higher education published by the NCES (2008), they found that the enrollment patterns of online education reflect the entire higher education student body. For example, the percentage of undergraduate students in online education (83%) was only 3% below that of the total population of higher education students (86%). Based on the aforementioned results, it is evident that the demographics of distance students have changed during the last decade and it is more likely to continue changing during the following few years.

Higher Education in Saudi Arabia

The focus of Saudi Arabia on higher education started during the 1970s when the country entered a new phase of development as a result of the increase in oil prices. Established in 1975, the Ministry of Higher Education created a long-term plan for higher education in Saudi Arabia. The primary goal of this plan was to insure that higher education institutions provide the fully capable manpower that the country needed to run the increasingly growing economy. One of the plan objectives was to increase the number of higher education institutions and to expand the capability of the existing ones (Royal Embassy of Saudi Arabia in U.S.A., 2010, Education section). In Saudi Arabia today, there are 24 government universities, eight private universities, and 20 private colleges serving more than 630,000 students throughout the country (Ministry of Higher Education, 2010).

Distance Education in Saudi Arabia

The population of Saudi Arabia is growing very quickly. According to UNESCO (2007), the total population of Saudi Arabia in 2006 was 24,735,000 with an average annual growth rate of 2.4%. One of the major concerns associated with this growth in the population is the limited capability of the existing higher education institutions to provide access to all high school graduates as well as other prospective students (AL-Arfaj, 2001). In addition, Saudi college graduates only meet a fifth of the country's needs for employment and more than 68% of jobs that require science majors are filled by foreign workers. For example, while 60,000 pharmacists are needed each year, only 100 Saudi students graduate yearly with a pharmacology degree (Abdullah, 2010).

In the past, the Ministry of Higher Education has responded to this problem by building new universities and colleges. While building new higher education institutions has provided more access to Saudi students, this solution was found impractical and costly, especially during the current global financial crisis (Albalawi, 2007; Al-Erieni, 1999; Alsaif, 2005). In addition, there are many nontraditional students who may work during the day or who are geographically distant and cannot attend face-to-face courses (Alsaif, 2005). Thus, the most promising solution seems to be the adoption of distance education. Abdullah (2010) argued, "… why spend billions on the construction of new universities and proceed with such a time-consuming plan instead of utilizing distance education and the graduates it can produce to fill the shortage of local talent?" (¶ 5).

Until two years ago, most distance education programs that were offered by Saudi higher education institutions were correspondence-based distance education in which students were receiving course materials at home and using the mail to send assignments to their instructors.

However, this form of distance education did not receive greater attention from potential Saudi students since the process of sending and receiving the materials took weeks and there was a lack of interaction between students and instructors (AL-Arfaj, 2001). For years, this was the only form of distance education that was acceptable and formally accredited by the Ministry of Higher Education. However, this trend has changed since the Saudi King, Abdullah bin Abdulaziz, called for a national plan in 2005 that aimed at widespread adoption of information technology across the kingdom. One part of this plan calls for the implementation of distance education programs and the integration of online technologies in higher education platforms (Ministry of Communications and Information Technology, 2005).

The national plan also called for the establishment of a national center that offers consultancy for all higher education institutions seeking to adopt distance education. The primary mission of this center was defined by the plan as follows:

> This project aims at the establishment of a national center for e-Learning to offer the service and its encouragement by preparing the regulations and policies governing the e-learning process, formulate a unified model for e-learning using standard specifications, develop quality assurance standards for e-learning, issue quality assurance certificates for e-learning systems, and measure the efficiency of various in technologies as aids for the e-learning process. (Ministry of Communications and Information Technology, 2005, p. 75)

As a result, the National Center for E-learning and Distance Education (NCEL) was founded in Riyadh in 2005. The NCEL defined several principal goals that the center will seek to achieve its mission as defined by the national plan. These include:

1. Broadening the use of online instruction applications in higher education institutions;

2. Supporting researchers and studies in the field of online learning and distance education;
3. Providing consultancy in the field of online learning and teaching;
4. Organizing and holding conferences, seminars, and workshops that focus specifically on the field of online learning; and
5. Setting standard for the design and publication of online courses. (NCEL, 2010)

The first government university that introduced distance education programs was King Abdulaziz University (KAU) in 2005 by establishing the Deanship and Faculty of Distance Education (Albalawi, 2007; Alsadoon, 2009; Alsaif, 2005). The distance education programs were offered by two faculty: the Faculty of Economic and Administration and the Faculty of Arts and Humanities (Abdullah, 2010). According to Dr. Hisham Bardesi, the Dean of Distance Learning Faculty at KAU, Saudi students have joined the KAU online courses with a 200% increase in enrollment during academic year 2009-2010 (Abdullah, 2010). King Saud University (KSU), the oldest university in Saudi Arabia, also adopted distance education and established the Deanship of e-Learning and Distance Education (DED) in 2008. The DEDs mission was to set up the policies and regulations of online learning and distance education and to support faculty members by providing them with the needed technological support and training (Alsadoon, 2009).

Other government universities have also started to adopt DE as a method for delivering instruction, however, at slower rates. Examples of these universities are the ones included in this study: Tabuk University and Taif University. Even though each of the two universities established a special unit for DE, they rarely offer DE courses. Moreover, they do not have educational programs that can be completed totally online. This is not only true for these two

universities. Indeed, most Saudi universities do not regularly offer DE courses or even have a plan for a systematic integration of this type of education into their institutions' traditional mission. This led many people to criticize the slow adoption of online instruction by Saudi universities (Abdullah, 2010). Therefore, this study sought to examine faculty perceptions about attributes and barriers impacting diffusion of online education in Saudi higher education institutions based on Rogers' (1995) diffusion of innovation theory.

Diffusion of Innovations Theory

Professionals in a wide range of different disciplines, such as political science, marketing, and communication, have incorporated diffusion of innovation theory (DoI) to enhance the adoption of different products and practices (Dooley, 1999; Sahin, 2006; Surry, 1997). Likewise, professionals in the field of instructional technology, as a result of the growing challenges associated with the lack of utilization of innovative instructional products and ideas, have incorporated the diffusion theory in order to increase the adoption of instructional technologies (Surry, 1997).

The use of diffusion theory in the field of instructional technology has three main advantages. First of all, many instructional technologists do not know why their instructional products or practices are adopted (or not adopted). Accordingly, the lack of utilization of instructional technologies remains a mystery for them. This led some technologists to attribute this lack of utilization of instructional technologies to teachers' intrinsic resistance to change, entrenched bureaucracies, and/or inadequate resources. However, by using the diffusion theory, instructional technologists were able to identify the factors that influence the diffusion of innovative instructional technologies, and accordingly, better able to explain and predict the factors that motivate or inhibit the diffusion of their products (Surry, 1997).

Second, since the field of instructional technology is an *innovation-based* discipline and most of the products produced by the professionals in the field represent fundamental innovations in the organization and methods of delivering instruction, it is reasonable to assume that an instructional technologist who understands the diffusion theory and the innovation-decision process will be better prepared for working with potential adopters. Finally, the use of the diffusion theory in the field of instructional technology could result in the development of a systematic model of adoption and diffusion. Traditionally, instructional technologists have used systematic models to guide their process of instructional design. This led to the development of effective, efficient, and appealing innovations. Likewise, it was assumed that the development of a systematic model of diffusion could help in understanding the process of adopting instructional products and practices in a similar manner and with similar effective results (Surry, 1997).

Rogers' (1995) diffusion of innovation theory is perceived by many researchers as "the most appropriate for investigating the adoption of technology in higher education and educational environments" (Sahin, 2006, ¶ 2). According to Dillon and Walsh (1992), perceiving distance education as an innovation "provides an important means for understanding the phenomena of distance education, particularly from the perspective of those upon whom its acceptance depends: the faculty" (p. 6)(p. 6).

Rogers (1995) defined diffusion as "the process by which an innovation is communicated through certain channels over time among the members of a social system" (p. 5). From this definition, one can easily identify the four main elements in the diffusion of innovation theory: the innovation, communication channels, time, and the social system.

Rogers (1995) defined an innovation as "an idea, practice or object that is perceived as new by an individual or other unit of adoption" (p. 11). According to Rogers, the perceived

novelty of an idea, practice, or object for an individual is determined based on his/her reaction to it. If the idea seems to be new to the individual, then it can be considered an innovation. In other words, the newness of an idea is based on the subjective perception rather than the objective measurement. Rogers (1995) asserted that newness of an innovation need not just be determined based on the individual's (or other adoption units) knowledge about the innovation. An idea can be known for some time and still be considered an innovation for a particular group of people since they have not yet developed a favorable or unfavorable attitude toward it, nor have adopted or rejected it. Rogers also explained that the diffusion and adoption of all innovations should not always to be considered desirable. Thus, a specific innovation can be considered desirable for a potential adopter in one situation, but undesirable for another potential adopter in a different situation.

Attributes of Innovation

According to Rogers (1995), the way individuals in a social system perceive the five attributes (characteristics) of an innovation helps to explain their different rate of adoption. The five attributes are relative advantage, compatibility, complexity, trialability, and observability. Rogers explained that each of these five attributes is somewhat empirically related to the other four. However, they are conceptually separate. Rogers also asserted that these attributes are selected based on the results of previous research as well as on a desire for increasing generality. According to Rogers (1995), individuals' perceptions about the attributes of an innovation, rather than the attributes as classified by experts, influence its rate of adoption. These five attributes will be discussed in the following section.

Relative advantage. According to Rogers (1995), relative advantages "is the degree to which an innovation is perceived as being better than the idea it supersedes" (p. 15). Rogers

illustrated that researchers have found relative advantage to be one of the best predictors of an innovation's rate of adoption. The degree of relative advantage can be measured using economic terms; however, other factors such as social prestige, convenience, and satisfaction are also important. According to Rogers (1995), it does not matter so much if an innovation has many advantages; rather, what really matters is whether the potential adopter views the innovation as advantageous. Furthermore, even though the nature of the innovation determines what specific type of relative advantage (e.g., economic, social, etc.) is important to potential adopters, the characteristics of adopters can also determine which sub-dimension of relative advantages are important.

According to Rogers (1995), when individuals or other decision-making units of adoption pass through the innovation-decision process, they usually seek information about the innovation to help them decrease uncertainty about the relative advantages of the innovation. During the innovation-decision process, potential adopters try to decide whether the degree to which the innovation (in the case of this study, the innovation refers to online education) is better than the existing practice (in the case of this study, existing practice refers to traditional face-to-face instruction). Therefore, relative advantage is often an important part of the message content about an innovation. Rogers (1995) explained that an innovation's relative advantage, as perceived by individuals of a social system, is positively correlated to the rate of adoption. Thus, the greater the perceived relative advantage of an innovation, the more rapid its rate of adoption will be.

Compatibility. Rogers (1995) defined compatibility as "the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters" (p. 15). That is, compatibility of an innovation is determined based on

sociocultural values and beliefs, previously introduced ideas, or the potential adopter's needs for the innovation. This means that an innovation that is incompatible with the values or the existing norms of a social system will not be adopted as fast as an innovation that is compatible. According to Rogers, the adoption of such incompatible idea requires the earlier adoption of a new value system which is a relatively slow process.

An innovation should not only be compatible with sociocultural norms of a social system, but it also needs to be compatible with previous practice or old ideas (in the case of this research old idea refers to teaching face-to-face courses). According to Rogers (1995), these old ideas or practices serve as the *mental tools* that potential adopters use to assess new ideas. That is, previous practice (old ideas) provide familiar standards through which the new idea can be interpreted, and accordingly help in decreasing the potential adopter's uncertainty about the innovation. Thus, a negative experience with one innovation can negatively affect the adoption of future innovations. Another dimension of an innovation's compatibility is the degree to which it meets the needs of the potential adopters. Rogers explained that potential adopters may not recognize their needs for an innovation until they become aware of the new idea and/or its consequences; thus, it is the role of the change agents to carefully generate needs among their clients.

Complexity. Rogers (1995) defined complexity as "the degree to which an innovation is perceived as difficult to understand and use" (p. 16). Some innovations are readily understood by most of individuals in a social system, however, there are other innovations that are more complex and its adoption will be relatively slow. According to Rogers, new ideas that are easy to understand are adopted more rapidly than those that require the adopter to develop new skills

and understandings. According to Rogers, opposite to other attributes of innovation, complexity is negatively correlated with the rate of adoption.

Trialability. Rogers (1995) defined trialability as "the degree to which an innovation may be experimented with on a limited basis" (p. 16). Rogers illustrated that innovations that can be tried on the installment plan are more likely to be adopted by members of a social system than those that are not divisible. Moreover, some ideas are more difficult to divide for trial than others. Rogers explained that when potential adopters have the opportunity to try-out an innovation, they will be able to give meaning to it and to understand how that innovation works under their own conditions. Moreover, this trial serves as a means to reduce the potential adopters' uncertainty about the innovation. Thus, the perceived trialability of an innovation is positively correlated to its rate of adoption. According to Rogers, trialability is perceived by early adopters of an innovation as more important than those classified as later adopters since they do not have precedent to follow when they adopt while later adopters are surrounded by peers (in the case of this study, other faculty members) who have already adopted the innovation.

Observability. According to Rogers (1995), observability is "the degree to which the results of an innovation are visible to others" (p. 16). Rogers explained that some innovations are easily observed and communicated to others, while others innovations are difficult to observe or to be described to others. The easier it is for members of a social system to observe the results of an innovation, the more likely they are to adopt it. Thus, the perceived observability of an innovation is positively correlated to its rate of adoption.

The Innovation-Decision Process

An individual's decision of whether to adopt or reject an innovation is not an instantaneous act. Yet, it is a process that occurs over time and consists of a series of actions. Thus, Rogers (1995) defined the innovation-decision process as,

> The process through which an individual (or other decision-making unit) passes from first knowledge of an innovation to forming an attitude toward the innovation, to a decision to adopt or reject, to implementation and use of the new idea, and to confirmation of this decision. (p. 20)

Rogers' (1995) model of the innovation-decision process consists of five main steps: (1) knowledge, (2) persuasion, (3) decision, (4) implementation, and (5) confirmation. Before explaining these five steps, it is important to note that Rogers' discussion of the innovation-decision process is mainly focused on optional innovation-decisions that are made by individual adopters (in the case of this research, faculty members in Saudi higher education institutions).

Knowledge Stage. Rogers' (1995) model proposes that the innovation-decision process starts with the knowledge stage which occurs when potential adopters (individuals or other units of adopters) are exposed to an innovation's existence and gain some understanding of how it works. According to Rogers, the innovation-decision process is basically an information-seeking and information-processing activity in which potential adopters seek information that reduces uncertainty about the cause-effect relationships involved in the innovation's capability to solve an individual's problem. Individuals at this stage ask questions such as "What is the innovation?" "How does it work?" and "Why does it work?"

Three types of knowledge about an innovation are identified by Rogers (1995). The first type of knowledge about an innovation, *awareness-knowledge*, is information about an

innovation's existence. This type of knowledge then motivates potential adopters to seek the other two types of knowledge—*how-to knowledge* and *principles knowledge*. However, Rogers explained that even though this type of information-seeking is mainly focused at the knowledge stage, it may also occur at the persuasion and decision stages. *How-to knowledge* consists of information that a potential adopter needs in order to use the innovation properly. According to Rogers, the amount of how-to knowledge about complex innovations necessary for proper adoption is much greater than for less complex innovations. Rogers also asserted that if an adequate level of how-to knowledge is not provided before the trial and adoption of innovation, rejection or discountenance are likely to result. Finally, *principles knowledge* consists of information about the *functioning principles* that illustrates how an innovation works. Rogers asserted that the adopter's ability to decide whether to adopt or reject an innovation is facilitated by principles knowledge.

Rogers (1995) argues that knowledge about an innovation is very different than using it. Most people know about many innovations that they have not actually adopted. This occurs when an individual does not regard an innovation as relevant or potentially useful. Thus, Rogers argues,

> Consideration of a new idea does not go beyond the knowledge function if an individual does not define the information as relevant to his or her situation or if sufficient knowledge is not obtained to become adequately informed so that persuasion can take place. (p. 167)

Persuasion Stage. The main outcome of the persuasion stage is either a favorable or an unfavorable attitude toward the innovation. While the main type of thinking at the knowledge stage was primarily cognitive (or knowing), the main mental activity at the persuasion stage is

affective (or feeling). At this stage of the innovation-decision process, the potential adopter becomes more psychologically involved with the innovation. That is, he or she actively seeks information about the innovation and develops a general perception of the innovation. Thus, perceived attributes of the innovation such as relative advantage, compatibility, complexity, trialability, and observability, are especially important at the persuasion stage (Rogers, 1995).

Rogers (1995) explained that the persuasion stage, and particularly at the decision stage, potential adopters seek *innovation-evaluation* information to reduce uncertainty about the innovation's expected consequences. During these two stages, an individual asks questions such as "What are the innovation's consequences?" and "What will its advantages and disadvantages be in my situation?" While scientific evaluations of an innovation are often easily accessible, most individuals form their attitudes toward the innovation based on their near-peer whose subjective opinions of the innovation, based on their personal experience with adoption of the innovation, is most convincing.

Decision Stage. According to Rogers (1995), the decision stage occurs when a potential adopter is involved in activities that result in a choice to adopt or reject a new idea. Adoption means that the adopter decided to make full use of the innovation as the best course of action available. Rejection, on the other hand, is the individual's decision not to adopt the innovation. Most potential adopters will not adopt a new idea without trying it first on a provisional basis to determine its usefulness in their own situation. This small-scale trial is often considered to be an important part of the decision to adopt. Rogers explained that methods of facilitating the trial of innovations, such as the distribution of free samples to clients, will speed up the rate of adoption.

Individuals who try an innovation will move to an adoption decision if they perceive the new idea to be relative and useful. Otherwise, they will reject it. Rogers (1995) defined two

different types of rejection: active rejection and passive rejection. *Active rejection* occurs when an individual considered the adoption of an innovation and tried it, but then decided not to adopt it. *Passive rejection*, on the other hand, occurs when an individual has never really considered the use of the innovation. Thus, each stage in the innovation-decision process is considered to be a potential rejection point.

Implementation Stage. While at previous stages the innovation-decision process has been a strictly mental exercise, the implementation stage involves overt behavior change as the new idea is actually put into practice. At this stage of the innovation-decision process, an individual tries to answer questions such as "Where do I obtain the innovation?" "How do I use it" "How does it work" and "What operational problems am I likely to encounter, and how can I solve them?" According to Rogers (1995), the implementation stage may take a lengthy period of time, depending on the nature of the new idea. This stage ends when eventually a point is reached at which the innovation becomes an *institutionalized* part of the adopter's ongoing operations. The implementation stage may also be the last stage in the innovation-decision process for most adopters. However, others may proceed to the final stage, the confirmation stage.

Confirmation Stage. As discussed above, an individual's decision to adopt or reject is often not the terminal stage in the innovation decision. Such decisions can be reversed at a later point. For example, discontinuance, an individual's decision to reject an innovation after he or she has previously adopted, may occur if he or she became dissatisfied with the innovation or when the innovation is replaced with an improved idea. Moreover, it is also possible for an individual to adopt an innovation after a previous decision to reject it. Thus, individuals at the confirmation stage seek reinforcement of the innovation-decision already made or reverse

previous decisions to adopt or reject the innovation if exposed to conflicting messages about the innovation.

Faculty Adoption of Distance Education in Postsecondary Education

The growth of telecommunications technologies has led to increased interest in distance education as an alternative method for teaching and learning in higher education institutions (Betts, 1998a). Despite this increased capacity of distance education technologies, a large number of mainstream faculty members have not adopted distance education (Allen & Seaman, 2010; Betts, 1998a; Bolliger & Wasilik, 2009; Chacon, 2009; Giannoni & Tesone, 2003; Muilenburg & Berge, 2001; Wasilik & Bolliger, 2009). According to Mitchell and Geva-May (2009), even though there has recently been greater acceptance of online learning by higher education administrators, as can be seen in higher levels of institutional involvement in this kind of education, faculty acceptance has not increased at the same rate. This gap between institutional acceptance and faculty acceptance of distance education has influenced the widespread adoption of this type of education.

Bruner (2007) argues that the emotional responses of faculty members towards distance education are more important than the hard facts about the success or the failure of distance education. Black (1992) explained that one of the major challenges facing the development and expansion of distance education programs is faculty disbelief in its suitability for university degree credit. Giannoni and Tesone (2003) argue that a common mistake that seems to emerge in the literature review on faculty participation and adoption of online education is overlooking the degree of influence that beliefs and affective motivations play as influencers of faculty participation in online learning. Thus, as distance education programs are implmented, the determination of faculty perceptions, concerns, and interests regarding distance education will be

critical. According to Murphrey and Dooley (2000), understanding faculty perceptions and concerns about distance education "can facilitate the diffusion of DE technologies throughout the institution to enhance student learning while maintaining employee (adminstrators, faculty, and staff) involvement and satisfaction" (p. 39).

The following section reviews the literature on faculty attitudes and adoption regarding the implementation of distance education as an alternative method of teaching and learning in postsecondary institutions.

Studies of Faculty Attitudes Regarding Distance Education Adoption

Faculty resistance to distance education is multifaceted (Betts, 1998a). Many factors can be attributed to faculty decisions for not participating in distance education including institutional factors, technological factors, pedagogical factors, and personal factors. However, before discussing these factors, it will be helpful to illustrate two important thoughts. First, it is important to note that faculty can resist distance education individually (by choosing not to teach at a distance) or as a group (Giannoni & Tesone, 2003). An example of faculty resistance to distance education as a group is the American Association of University Professors' (AAUP) New Jersey conference which has lobbied its state legislature to ban for-profit online institutions, such as the University of Phoenix, from offering online degrees in New Jersey (Coppola, Hiltz, & Rotter, 2002). Second, it is also important to note that the concept of faculty participation in distance education does not simply mean teaching via a particular distance education technology, but involves "a broader role that includes instructional and scholarly leadership" (Olcott & Wright, 1995, p. 10). According to Olcott and Wright (1995), faculty participation includes their engagement in instructional leadership activities such as the instructional design process, the

design of student support services, conducting discipline-research on the educational use of technology, and the development of technology training programs.

Researchers studying faculty attitudes towards distance education have identified a number of factors that affect faculty adoption of online education. These factors can be classified into five main categories: institutional, pedagogical, personal, and technological, and demographics.

Institutional Factors

This category includes external motivating factors that are controlled and influenced by the institution's policies and procedures with regard to distance education.

Institutional motivators. The literature review revealed that faculty members perceive release time as a major institutional motivator for their participation in distance education (Betts, 1998a; Bruner, 2007; Giannoni & Tesone, 2003; Lee, 2002; McKenzie, Mims, Bennett, & Waugh, 2000; Mwaura, 2004; Rockwell, et al., 2000; Schifter, 2000b; Wilson, 1998). They stated that teaching at distance "took one and half times more effort than the traditional counterpart" (Lee, 2002, p. 41). Wilson (1998) investigated the needs and the concerns of 77 instructors who were teaching web-based distance courses at the Southern Regional Electronic Campus during the spring 1998 semester. The study's results showed that sufficient time to develop and maintain course materials was the most ranked concern of instructors. Thus, Wilson suggested that release time be used as an incentive for faculty to participate in distance education.

Other external rewards such as monetary compensation also can be used to motivate faculty to adopt distance education. For instance, some research studies have reported that momentary support, either in the form of stipends, overload pay, or raised salaries, would

motivate faculty members to adopt distance education (Betts, 1998a; Bruner, 2007; Giannoni & Tesone, 2003; Lee, 2002; Mwaura, 2004; Rockwell et al., 2000). Based on findings from two distinct studies that investigated faculty reward and incentive issues in the context of distance education, Wolcott and Betts (1999) found that providing release time was the common form of compensation for distance educators. However, they also reported the use of other forms of incentives such as establishing travel accounts, purchasing new computer equipment, and providing graduate assistants.

Moreover, faculty members viewed administrative recognition and encouragement for distance education efforts as an important motivator for adopting distance education (Betts, 1998a; Schifter, 2000b; Wilson, 1998). According to a study conducted by Lee (2001), faculty motivation, dedication, and satisfaction increase when they feel that they are well-supported by their schools. According to Wolcott and Betts (1999), even though incentives encourage faculty participation, rewards can provide the formal means by which the institution recognizes faculty for good performance.

Nichols (2008) indicated that the existence of ownership and intellectual property policy was an important and common success factor in higher education institutions. He also asserted that "most successful stories of diffusion came from those institutions that either already had systems and policies aligned with e-learning in place, or had them under official development" (p. 603).

Institutional barriers. Most of the factors that deter faculty from teaching distance courses are found to be institutional. Lack of release time (Betts, 1998a; Birch & Burnett, 2009; Bolliger & Wasilik, 2009; Bruner, 2007; Haber & Mills, 2008; Howell, et al., 2004; Lee, 2002; Muilenburg & Berge, 2001; NEA, 2000; Nichols, 2008; Pajo & Wallace, 2001; Rockwell, et al.,

2000; Schifter, 2000b; Seaman, 2009; Shannon & Doube, 2004; Wilson, 1998) and faculty concern about workload (Berge, 1998; Betts, 1998a; Bolliger & Wasilik, 2009; Bruner, 2007; Conceicao, 2006; Coppola et al., 2002; Lee, 2002; McCann & Holt, 2009; Schifter, 2000a; Wolcott & Betts, 1999) were the most cited institutional barriers in the literature review. Faculty members stated that distance education required about one and a half times more work than the traditional counterpart (Lee, 2002). However, some studies have found no difference in the amount of time spent between the two modes. For example, Hislop and Ellis (2004) reported on the results of a study that involved the logging of instructor time for seven comparable pairs of online and traditional course sections to support a comparison of effort expenditure between the two modes of delivery. The researchers categorized instructional activities into 11 groups including administration, discussion, e-mail, grading, lecture, materials, phone preparation, talk, technology, and other. The study results indicated that the total time expended by instructors in this study was actually less for the online sections as compared with the traditional sections, but when the data were normalized for class size, the amount of instructor effort expended per student was approximately equivalent for both modes of delivery.

In a similar study, Bender, Wood, and Vredevoogd (2004) reported on the time that faculty spent teaching both the classroom version and distance version of an introductory course at two state universities in the Midwestern United States. The instructor and teaching assistants used a time-and-task data collection method for recording time spent engaged in teaching activities. Categories for data collection included: the coordination category, the student contact category, the assessment category, and the instruction category. When considering the differences in student enrollment, the DE course was substantially more time consuming for the instructor than the classroom course.

Lack of institutional policy that counts teaching in distance education courses for tenure and promotion purposes was also found to be a barrier (Bolliger & Wasilik, 2009; Bruner, 2007; Howell et al., 2004; Mwaura, 2004; Wolcott & Betts, 1999). Faculty members stated that they prefer to concentrate on "research that rewarded them more than effective teaching" (Mwaura, 2004, p. 4). They explained that effective teaching has a very little impact on tenure and promotion and that what is really important is research conducted by faculty.

Wolcott (1997) examined the relationship between distance education and the faculty reward systems in four research universities using a qualitative approach. Wolcott summarized this relationship into three main points. First, even though distance education contributed to the fulfillment of a university's mission, it was disconnected from the institution's mission statement and removed from its main focus. Second, teaching distance education courses was perceived to have little status among the activities that constitute faculty work and upon which the institutional reward systems are based. Third, teaching at distance, based on an institutional context, contributes little in the promotion and tenure processes. Indeed, teaching distance education courses result in serious consequences for non-tenured faculty members if they spend too much time in distance education at the cost of more institutionally valued and rewarded activities such as publishing.

Based on these results, Wolcott (1997) suggested three important institutional implications. First, distance education should be clearly integrated into the institution's goals and aligned with the university's mission. Second, universities should review their current practices and policies, and when appropriate, adjust them to reflect the changing nature of higher education and faculty work. Finally, since new faculty may be more motivated to teach at a

distance than older faculty members, institutions should provide assurances that faculty future careers will not be affected by their involvement in distance education programs.

Lack of institutional policy regarding copyright was also cited as a major barrier for faculty adoption of distance education (Bolliger & Wasilik, 2009; Levy, 2003; Muilenburg & Berge, 2001; Murphrey & Dooley, 2000; NEA, 2000). Until recently, the issue of ownership in higher education was simple: faculty held copyright with everything except for patents. However, with the emerging of new technology, especially the capacity of the World Wide Web, the issue of intellectual property surfaced again (Kelley, 2000). According to the American Council on Education (ACE) (2000), one of the most important steps that an institution should take when developing distance education policy is to review its existing intellectual property policies to determine whether these policies need further revision as the institution moves toward offering distance education. Kelley (2000) explained that the major issue in intellectual property is faculty ownership of online courses. Faculty often argue that instructional materials designed for distance education courses should be regulated by an institution's existing copyright policies which usually places ownership in the hands of faculty. On the other hand, administrators argue that the institution's patent policy should govern because of the considerable support and resources that are usually provided by the institution in online courses (ACE, 2000).

According to ACE (2000), there are several models that are used by institutions to govern the ownership of online courses. Many institutions have incorporated the ownership issues of distance education into their existing policies; accordingly, they have arrived at the following ownership policies. The copyright for an online course that a faculty member created on his or her initiative in the course of satisfying teaching duties will be owned by the faculty member. However, the copyright for works that have been created under a contract with the institution or

as *a work for hire*, will be owned by the institution. Other institutions have developed another model of ownership in which the institution holds the copyright for a limited period of time. After that period is ended, the ownership will return to the faculty member.

Faculty also viewed the lack of compensation for teaching distance courses as a barrier (Birch & Burnett, 2009; Bolliger & Wasilik, 2009; Conceicao, 2006; Haber & Mills, 2008; Muilenburg & Berge, 2001; Murphrey & Dooley, 2000; NEA, 2000; Seaman, 2009; Wolcott & Betts, 1999). According to the NEA's (2000) report, even though more than half of distance education faculty reported that they spend more hours per week delivering distance education course than they do for equivalent traditional courses; most of them (84%) get no course reduction. Moreover, 73% of distance education faculty reported that they are compensated for delivering distance courses as part of their regular course load.

Technological Factors

Technology is an important part of distance education since it provides the means by which instructional materials are delivered in a variety of formats while providing reliable instructional delivery to learners with diverse learning needs (Milheim, 2001). Thus, this category includes technological factors that motivate or inhibit faculty participation in distance education including technical support, distance education training, and other infrastructure elements necessary for delivering distance education courses.

Technological motivators. Online education necessitates a radical shift from traditional teaching methods toward a technological realm where teaching involves the use of computer and more specialized computer applications and learning management systems (Gibson, Harris, & Colaric, 2008). Thus, effective online education requires faculty members to not only have knowledge about their own disciplines, but also to have interpersonal skills that would enable

them to effectively communicate with their students online (Levy, 2003). Several research studies have reported that faculty perceived early and appropriate training about distance education technologies and teaching methods as a motivator to teach at distance (Bruner, 2007; Haber & Mills, 2008).

Technical support for both distance faculty members and students was also recognized as a critical factor in the diffusion of distance education (Betts, 1998b; McKenzie, et al., 2000; Mwaura, 2004; Rockwell, et al., 2000; Schifter, 2000a; Shea, et al., 2005; Wilson, 1998). This includes providing faculty members with the necessary hardware and software for delivering instruction, helping faculty to solve any technical problems either via phone or e-mail, assisting faculty to develop and maintain online courses, and any other operating support. Shea et al. (2005) asserted that "the continued diffusion of this innovation [distance education] may rest upon the ability to persuade faculty that adequate technical support will be available as they decide whether to participate" (p.17).

Technological barriers. Lack of early and appropriate training was perceived by faculty as a major inhibitor for their adoption of distance education (Betts, 1998a; Mitchell & Geva-May, 2009; Muilenburg & Berge, 2001; Pajo & Wallace, 2001; Rockwell, et al., 2000; Schifter, 2000a; Shannon & Doube, 2004). Wilson (1998) indicated that 61% of faculty members included in her study had not received any training before teaching via distance. Even when such training is available, trainers usually use very technical language that confuses faculty members (Mwaura, 2004). Several studies have reported that faculty opinion about designing and implementing instructional support are usually neglected (Lee, 2002; Mwaura, 2004). Lee (2002) asserted that "lack of faculty involvement implies that higher education institutions may not provide faculty members with appropriate kind of instructional support" (p. 29).

One of the most cited barriers of faulty adoption of distance education is the lack of technical support (Berge, 1998; Betts, 1998a; Muilenburg & Berge, 2001; Mwaura, 2004; Pajo & Wallace, 2001; Schifter, 2000a; Seaman, 2009; Shea, et al., 2005). The NEA (2000) noted that when policy regarding distance education is in a faculty collective bargaining agreement, it is more likely that the institution offers distance education training sessions on a regular basis. In a recent study conducted by Allen and Seaman (2010), chief academic officers were asked about the training provided to faculty when teaching online. About one-fifth of all institutions included in the study have reported that they do not provide any formal or informal training for their online faculty.

Personal Factors

Personal factors explain the roles of the human component in the diffusion of innovation process and how people differ in their acceptance and use of the innovation (Alsaif, 2005).

Personal motivators. The literature review revealed that faculty adoption of distance education is mainly influenced by attitudinal or personal factors. The opportunity to reach a new range of learners who cannot attend traditional face-to-face classes due to geographic distance or family and work obligations (Betts, 1998a; Bolliger & Wasilik, 2009; Dooley & Murphrey, 2000; McKenzie et al., 2000; Murphrey & Dooley, 2000; Rockwell et al., 2000; Schifter, 2000a; Wolcott & Betts, 1999), and a personal motivation to use technology (Betts, 1998a; Bolliger & Wasilik, 2009; Rockwell, et al., 2000; Schifter, 2000a, 2000b; Tabata & Johnsrud, 2008; Wolcott & Betts, 1999) were the most cited personal motivators. In addition, much of the literature review indicated that faculty members view teaching via distance as an intellectual challenge that motivates them to adopt this kind of education (Betts, 1998a; Bolliger & Wasilik, 2009;

Giannoni & Tesone, 2003; Rockwell, et al., 2000; Schifter, 2000a, 2000b; Wolcott & Betts, 1999).

The research studies also revealed that some faculty members stated that teaching via distance contributes to their overall job satisfaction (Betts, 1998b; Schifter, 2000a, 2000b) and increased flexibility in working conditions since they are able to teach at any time and from any place (Betts, 1998a; McKenzie, et al., 2000; Schifter, 2000b). Other faculty members stated that teaching via distance provides them with professional development opportunities, research, and collaboration with colleagues (Bolliger & Wasilik, 2009; Seaman, 2009). Peer recognition (Bolliger & Wasilik, 2009; Wolcott & Betts, 1999) and professional prestige (Bolliger & Wasilik, 2009; Giannoni & Tesone, 2003; Rockwell, et al., 2000; Schifter, 2000a, 2000b) were also cited in the literature review as personal motivators.

Personal barriers. The literature review revealed that faculty members' philosophical position toward distance education is one of the major inhibitors for their adoption of distance education (Berge, 1998; Mwaura, 2004; Nichols, 2008; Tabata & Johnsrud, 2008). Bower (2001) illustrated that most faculty members are trained to teach face-to-face traditional classrooms where they have direct contact with learners, so they can observe learners' reactions and listen to their verbal responses. Therefore, they perceive this personal interaction with learners "as one of the most gratifying aspects of teaching" (Bower, 2001, ¶10). However, the technology interface used in distance education usually deprives them of this opportunity.

In addition, some faculty members fear that the increased use of distance education technologies in higher education may decrease the need for teachers (Giannoni & Tesone, 2003; Muilenburg & Berge, 2001; Murphrey & Dooley, 2000). Feeling intimidated by technology may also threaten faculty members' sense of competence and authority and lead them to reject

distance education (Betts, 1998a; Howell, et al., 2004; Muilenburg & Berge, 2001). According to Howell et al. (2004), even more experienced distance educators can feel isolated which may affect their satisfaction, motivation, and their future decision of involvement in distance education.

Pedagogical Factors

According to Howell et al. (2004), increased university interest in implementing distance education as well as the integration of new technologies into postsecondary education are the major two factors that are shifting faculty roles. The way faculty members worked 10 years ago is significantly different from how current faculty members do their work. Rather than having multiple tasks all performed by a single faculty member, universities have adopted a team approach in which these tasks are assigned to teams of specials and professionals. In this changing context of distance education, the traditional faculty often takes the role of course manager. Howell et al. (2004) explained that while faculty members are still responsible for different instructional activities such as teaching, grading, organizing, and facilitating, some of these roles such as facilitating are magnified while others such as mentoring and supervising are lessened.

There are several instructional activities for faculty involved in distance education. These include coaching students during the learning process, encouraging learners to be active learners, designing and guiding learning experiences and activities, and providing explanations, references, and encouragement (Milheim, 2001). According to Milheim (2001), while many of the aforementioned activities can provide motivation to faculty members who are interested in teaching distance learners, they can be also threatening for those who need more contol over the educational process.

Coppola et al. (2002) used a qualitative method to investigate the changes that occur when faculty teach online. They conducted 20 semi-structured interviews. The interviews focused on faculty members' perceptions of several pedagogical issues that are related to interaction, teaching styles, changes in course design, and changes in faculty roles as they become virtual professors. Based on these interviews, Coppola et al. (2002) defined the following roles of online instructors:

1. Cognitive role: This role deals with mental processes relating to learning, information storage, and thinking. According to Coppola et al. (2002), the interviewed professors reported that learning became more obviously a two-way process when they teach online. In addition, they reported that online courses helped them to extend their students' abilities to analyze information since they could easily refer them to other sources of information on the Web to assist their analysis.
2. Affective role: This role relates to instructor behavior influencing the relationships between students, the instructor, and the classroom atmosphere. This role requires faculty to find new tools to express emotion. According to the participants, the faculty's role changed in terms of nonverbal communication, intimacy, and energy or humor.
3. Managerial role: This role deals with class and course management, requires greater attention to detail, more structure, and additional student monitoring. This role includes instructor behavior in regard to course planning, organizing, leading, and controlling.

Pedagogical motivators. The most cited pedagogical factors on the literature review were the use of technology to enhance teaching and learning (Dooley & Murphrey, 2000;

McKenzie, et al., 2000; Mwaura, 2004; Rockwell, Schauer, Fritz, & Marx, 1999; Rockwell, et al., 2000; Schifter, 2000a, 2000b; Shea, et al., 2005) and the opportunity to provide innovate instruction (Mwaura, 2004; Rockwell, et al., 1999; Schifter, 2000a, 2000b; Shea, et al., 2005). In addition, some faculty noted that teaching via distance gave them the chance to interact with their students more frequently (Bolliger & Wasilik, 2009; Coppola, et al., 2002; McKenzie, et al., 2000; Mwaura, 2004; NEA, 2000; Rockwell, et al., 2000; Shea, et al., 2005) and increased the flexibility of their courses (Bolliger & Wasilik, 2009; Coppola, et al., 2002; Mwaura, 2004; NEA, 2000; Rockwell, et al., 1999; Schifter, 2000a, 2000b).

Instructional support in a higher education institution refers to "the kind of support the institution provides faculty members to develop and improve their instruction" (Lee, 2002, p. 28). Such support is usually provided by specialists in specific areas in which faculty members need training and help in order to deliver their courses effectively. Instructional support usually takes the form of seminars or workshops that focus on course design skills, the use of information and communication technologies, and teaching strategies (Betts, 1998a; Lee, 2002). According to Lee (2002), several research studies stated instructional support as major motivating factors for faculty adoption of distance education (Betts, 1998a; Dooley & Murphrey, 2000; Lee, 2002; McKenzie, et al., 2000; Mwaura, 2004; Nichols, 2008; Rockwell, et al., 2000; Schifter, 2000b; Wilson, 1998). According to Lee, a small number of research studies have investigated instructional support in distance education learning environments which indicated that there is a need for instructional support specifically designed for distance education in higher education institute.

Pedagogical barriers. The literature review revealed that faculty members have concerns about the quality of distance education courses that can make them rejecting to teach

via distance (Betts, 1998a; Bolliger & Wasilik, 2009; Dooley & Murphrey, 2000; Haber & Mills, 2008; Muilenburg & Berge, 2001; Murphrey & Dooley, 2000; NEA, 2000; Schifter, 2000a, 2000b; Seaman, 2009; Shannon & Doube, 2004). A recent report by Seaman (2009) revealed that faculty participation status in online education is largely influenced by their concerns about the quality of online education. While over 80% of non-participant faculty members believe that the learning outcomes of online learning are *inferior* or *somewhat inferior* to traditional face-to-face instruction, the majority of participant faculty believe that the learning outcomes of online learning are equivalent or better than face-to-face instruction.

Some faculty believe that distance education would diminish community involvement on campus (Bruner, 2007), others believe that there is a lack of effective evaluation methods of distance education (Berge & Muilenburg, 2001; Muilenburg & Berge, 2001). In addition, some faculty inhibition comes from the perceived lack of face-to-face interaction with students and the preference for traditional student-teacher interaction (Bruner, 2007; Haber & Mills, 2008; Ulmer, Watson, & Derby, 2007). Another faculty inhibition comes from the faculty's lack of design knowledge (Birch & Burnett, 2009; Murphrey & Dooley, 2000).

Demographics

Some studies included demographic information such as age (Bruner, 2007; NEA, 2000; Tabata & Johnsrud, 2008), gender (Black, 1992; Seaman, 2009), teaching experience (Mitchell & Geva-May, 2009; NEA, 2000), academic rank (Giannoni & Tesone, 2003; Seaman, 2009; Wolcott & Betts, 1999), and institutional type (Allen & Seaman, 2010; Berge & Muilenburg, 2001; Haber & Mills, 2008; NEA, 2000; Tabata & Johnsrud, 2008) as possible variables, either as motivators or inhibitors, which affect faculty adoption of distance education.

Summary

The evolution of distance education technologies have made the process of obtaining educational opportunities without regard to time and place possible and much easier for students. At the same time, they have produced new challenges for educational institutions that provide this kind of education. Research studies have shown that distance education is not a technological issue; rather it is an academic one. Even though there has recently been greater acceptance of online learning by higher education administrators, faculty acceptance has not increased at the same rate. This gap between institutional acceptance and faculty acceptance of distance education has influenced the widespread adoption of this type of education. Thus, higher education institutions that are interested in implementing or expanding distance education programs should develop their own plans to capitalize on the factors that motivate faculty to adopt distance education and to eliminate inhibiting factors that discourage or deter faculty.

This review indicates that most of the factors that motivate faculty to participate in distance education are personal motivators. These include using technology to enhance teaching, the opportunity to reach a new range of audiences, receiving early and appropriate training, fulfilling a personal desire to use technology and to provide innovative instruction, increased flexibility in working conditions, and the opportunity to interact with students more frequently. Other institutional factors such as release time and incentives were found to be motivators for faculty to participate in distance education. The literature review also revealed that most of the factors that deter faculty from participating in distance education are the institutional factors. These include lack of release time, faculty overload, lack of grants, and inadequate compensation and incentives for delivering distance courses.

Presented in this chapter was (a) an overview of the field of distance education including its definition and a historical review of its evolution, (b) an introduction to online education including its definition, types of online technologies, benefits of online learning, and barriers facing the growth of online education, (c) a discussion of the current implementation of distance education in postsecondary education and trends affecting future implementation, (d) an overview of the higher education system in Saudi Arabia including the development of distance education in Saudi higher education institutions, (e) a discussion of Roger's (1995) diffusion of innovation theory, and (f) an in-depth discussion of motivating (attributes) and inhibiting factors (barriers) influencing faculty adoption of distance education.

CHAPTER 3

Research Methodology

This chapter describes the methodology and procedures used to conduct this study. The chapter begins by giving an overview of the study and its purpose, followed by a description of the research type, the population and the sample, sampling procedures, research questions and hypotheses, instrumentation, data collection procedures, and a description of the data analysis methods employed in this study.

Overview

The primary goal of this study was to examine faculty perceptions about attributes and barriers impacting diffusion of online education at two Saudi universities. More specifically, the study aimed to (a) give an overview of faculty members' current stage in the innovation-decision process in regards to online education, (b) examine faculty perceptions about attributes (motivating factors) and barriers (inhibiting factors) impacting diffusion of online education, (c) investigate the relationship between faculty members' selected personal characteristics (including age, years of teaching, DE experience, gender, academic rank, nationality, and level of education) and their perceptions about attributes (motivating factors) and barriers (inhibiting factors) impacting diffusion of online education, (d) investigate the relationship between faculty members' selected personal characteristics (including age, years of teaching, DE experience, gender, academic rank, professional area, nationality, and level of education) and their stage in

the innovation-decision process, and (e) demonstrate how these factors can be used to increase faculty adoption of online education to respond to the increasing demands for this kind of education.

Research Design

The research design of this study is descriptive and correlational in nature. This type of research was chosen since it provided the researcher with a quantitative description of faculty attitudes and opinions regarding online education. The purpose of survey research was to generalize from a sample to a population which enables researchers to make inferences about some characteristics, attitudes, opinions, or behavior of this population. There are many advantages of using survey research including the economy of the design and the rapid turnaround in data collection. However, the most important advantage of using this type of research is the ability of identifying attributes of a large population from a small group of individuals (Creswell, 2009; Nardi, 2006).

The theoretical framework for the study is based on the following: (1) Rogers' (1995) model of the innovation-decision process, (2) Rogers' (1995) attributes of innovation theory, (3) Moore and Benbasat's (1991) measurements of the attributes of innovation, (4) Muilenburg and Berge's (2001) study about barriers to distance education, and Rogers' (1995) characteristics of adopter categories.

The study contains 16 dependent variables and eight independent variables. One dependent variable is faculty members' stage in the innovation-decision process. The other 15 dependent variables were categorized into the following two groups: Perceived Attributes and Perceived Barriers. Sub-categories were then created for each group. The sub-categories included:

Perceived Attributes:

1. Relative Advantage
2. Compatibility
3. Complexity
4. Trialability
5. Observability

Perceived Barriers:

1. Concerns about time
2. Concerns about incentives
3. Online program credibility
4. Financial concerns
5. Planning issues
6. Conflict with traditional education
7. Fear of technology
8. Technical expertise
9. Administrative support
10. Infrastructure

The eight independent variables were age, teaching experiences, DE experience, gender, academic rank, professional area, nationality, and educational level.

Data was collected using a self-administrated and cross-sectional questionnaire (Appendix A). Self-administrated questionnaires help researchers to (a) measure variables with numerous values or response categories, (b) investigate attitudes and opinions, and (c) describe characteristics of a large population (Nardi, 2006). According to Kumar (2005), cross-sectional

studies, or as they sometimes called one-shot or status studies, are the most common design used in social sciences. The main purpose of cross-sectional studies is to find out "the prevalence of a phenomenon, situation, problem, attitude or issue, by taking a cross-section of the problem" (p. 93). Thus, cross-sectional studies are useful in obtaining an overview *picture* as it stands at the time of the study.

Descriptive statistics such as the mean, median and standard deviation were employed in this study to present data about the sample of faculty members. In addition, inferential statistics were used in order to allow the researcher to make inferences about the population of faculty members in Saudi higher education institutions based on findings from the sample of faculty members in the two universities (Fraenkel & Wallen, 2009).

Population and Sample

This research study was conducted in Saudi Arabia. Two Saudi universities were selected from all other Saudi universities and the sample of faculty came from these two universities. The two universities were selected for two reasons. First, previous studies (Albalawi, 2007; Alsaif, 2005) conducted in Saudi Arabia focused only on surveying the attitudes of faculty members at the two largest universities in Saudi Arabia: King Saud University (KSU) and King Abdulaziz University (KAU). However, there were no studies found in the literature that focused on surveying the attitudes of Saudi faculty members at middle and small institutions such as the ones included in this study. The effect of institutional size, and accordingly the institutional support provided by the postsecondary institutions for DE faculty, on faculty adoption of DE is evident in the literature. As previously discussed, the literature review revealed that most of the factors that deter faculty from participating in distance

education are institutional factors. These include lack of release time, faculty overload, lack of grants, and inadequate compensation and incentives for delivering distance courses.

Secondly, the two universities included in this study are located in two different parts of the country (Tabuk University is located in the Northwest of the Kingdom; Taif University is located in the Southwest part of the Kingdom) which may result in more generalizable results about faculty perceptions regarding attributes and barriers impacting diffusion of online education in Saudi universities. Berge and Muilenburg (2001) argued that the notion that technology is a panacea and that it is applicable across all types and sizes of institutions is a very dangerous assumption since not all institutions have the same mission or need, nor are they at the same stage of organizational capability. This study added perceptions from smaller universities to the knowledge base. Following is a brief description of the two universities included in this study.

Institutional Profiles

Tabuk University was founded in 2006 as a result of the national educational plan policy adopted by the Saudi King Abdullah bin Abdulaziz. University of Tabuk is located in Tabuk city, in the upper northwestern corner of Saudi Arabia. At the 11 colleges of the university, there are about 500 faculty members and more than 16,000 students working and studying within three campuses. The university offers various academic programs and courses designed to produce skillful graduates, especially in the majors that the country needs to secure for the very near future. During the academic year of 2009-2010, the university established the first graduate program in the disciplines of mathematics, curriculum and instruction, educational administration, and practical clinical psychology (Ministry of Higher Education, 2010).

Taif University was founded in 2003 as a result of a merger of the campuses of two Umm Al-Qura colleges located in Makkah. At the 10 colleges of the university, there are more than 1,400 faculty members and more than 37,000 students working and studying within four campuses. The university offers various academic programs and courses including mathematics, physics, biology, computer science, Arabic, Islamic studies, language, education, early childhood learning, medicine, engineering, accounting, marketing, and pharmacy (Ministry of Higher Education, 2010).

Population

The target population of this study included all faculty members of two Saudi universities: Taif University and Tabuk University. This included all female and male faculty members, Saudi citizens and non-Saudi citizens teaching at 18 colleges. The faculty participating in this study held full-time positions as instructors, lecturers, assistant professors, associate professors, and full professors.

Sample

The sampling design of this population was single-stage probability sampling. The sample was randomly selected using a systematic random sampling procedure (Creswell, 2009; Fraenkel & Wallen, 2009). In this study, the sample size was one-tenth of the population size as suggested by Grinnell (1997). According to Grinnell (1997), usually a sample size of one-tenth of the population, with a minimum of 30, is considered sufficient to provide reasonable control over sampling error. In Table 1, the participating universities, target population, and the sample size are presented.

Table 1

Study Target Population and the Sample Selected From Each University

Participating University	Faculty Population	Sample	% of Sample
Taif University	1,480	148	74%
Tabuk University	494	50	26%
Total	1,974	198	100%

Note. Number of the sample is 10% of the number of the population.

Selection of Participants

A total of 198 were randomly selected from the population using a systematic sampling procedure. Faculty members were numbered consecutively from 1 to 1,974. Based on the desired sample size of 198, the researcher determined the sampling interval to be 10. The researcher then randomly drew a number within the interval of one to 10 to determine the starting point. Once the starting point was selected, then every 10^{th} number from that point forward was selected for inclusion in the sample (Dillman, 2000; Kumar, 2005).

Research Questions

The following research questions were addressed:

1. What are faculty perceptions about attributes influencing diffusion of online education in two Saudi universities?
2. What are faculty perceptions about barriers influencing diffusion of online education in two Saudi universities?
3. What are faculty current stages in the innovation-decision process related to online education?

4. Do faculty's different personal characteristics (including age, years of teaching, DE experience, gender, academic rank, nationality, and level of education) impact their perceptions about attributes of online education?
    a. Can faculty's different personal characteristics significantly predict their perceptions about relative advantage of online education?
    b. Can faculty's different personal characteristics significantly predict their perceptions about compatibility of online education?
    c. Can faculty's different personal characteristics significantly predict their perceptions about complexity of online education?
    d. Can faculty's different personal characteristics significantly predict their perceptions about trialability of online education?
    e. Can faculty's different personal characteristics significantly predict their perceptions about observability of online education?
5. Do faculty's different personal characteristics (including age, years of teaching, DE experience, gender, academic rank, nationality, and level of education) impact their perceptions about barriers to diffusion of online education?
    a. Can faculty's different personal characteristics significantly predict their perceptions about time as a barrier to diffusion of online education?
    b. Can faculty's different personal characteristics significantly predict their perceptions about lack of adequate incentives as a barrier to diffusion of online education?

c. Can faculty's different personal characteristics significantly predict their perceptions about online program credibility as a barrier to diffusion of online education?

d. Can faculty's different personal characteristics significantly predict their perceptions about financial issues as a barrier to diffusion of online education?

e. Can faculty's different personal characteristics significantly predict their perceptions about planning issues as a barrier to diffusion of online education?

f. Can faculty's different personal characteristics significantly predict their perceptions about fear of technology as a barrier to diffusion of online education?

g. Can faculty's different personal characteristics significantly predict their perceptions about conflict with traditional education as a barrier to diffusion of online education?

h. Can faculty's different personal characteristics significantly predict their perceptions about lack of technical expertise as a barrier to diffusion of online education?

i. Can faculty's different personal characteristics significantly predict their perceptions about lack of administrative support as a barrier to diffusion of online education?

j. Can faculty's different personal characteristics significantly predict their perceptions about lack of infrastructure as a barrier to diffusion of online education?

6. Is there a relationship between faculty members' selected personal characteristics (including age, years of teaching, DE experience, gender, academic rank, professional

area, nationality, and level of education) and their stage in the innovation-decision process in regard to online education?

a. Is there a relationship between faculty members' age and their stage in the innovation-decision process?
b. Is there a relationship between faculty members' teaching experiences and their stage in the innovation-decision process?
c. Is there a relationship between faculty members' DE experience and their stage in the innovation-decision process?
d. Is there a relationship between faculty members' gender and their stage in the innovation-decision process?
e. Is there a relationship between faculty members' academic rank and their stage in the innovation-decision process?
f. Is there a relationship between faculty members' professional area and their stage in the innovation-decision process?
g. Is there a relationship between faculty members' nationality and their stage in the innovation-decision process?
h. Is there a relationship between faculty members' level of education and their stage in the innovation-decision process?

7. Is there a relationship between faculty's attitudes toward the problem of limited access to higher education by students in Saudi Arabia and their stage in the innovation-decision process in regard to online education?

Hypotheses

The following null hypotheses were generated from questions 4 to 7:

$H_0$1. Faculty's different personal characteristics (including age, years of teaching, DE experience, gender, academic rank, nationality, and level of education) do not impact their perceptions about attributes of online education.

a. Faculty's different personal characteristics do not predict their perceptions about relative advantage of online education.
b. Faculty's different personal characteristics do not predict their perceptions about compatibility of online education.
c. Faculty's different personal characteristics do not predict their perceptions about complexity of online education.
d. Faculty's different personal characteristics do not predict their perceptions about trialability of online education.
e. Faculty's different personal characteristics do not predict their perceptions about observability of online education.

$H_0$2. Faculty's different personal characteristics (including age, years of teaching, DE experience, gender, academic rank, nationality, and level of education) do not impact their perceptions about barriers to diffusion of online education.

a. Faculty's different personal characteristics do not predict their perceptions about lack of adequate time as a barrier to diffusion of online education.
b. Faculty's different personal characteristics do not predict their perceptions about lack of adequate incentives as a barrier to diffusion of online education.

c. Faculty's different personal characteristics do not predict their perceptions about online program credibility as a barrier to diffusion of online education.

d. Faculty's different personal characteristics do not predict their perceptions about financial issues as a barrier to diffusion of online education.

e. Faculty's different personal characteristics do not predict their perceptions about planning issues as a barrier to diffusion of online education.

f. Faculty's different personal characteristics do not predict their perceptions about fear of technology as a barrier to diffusion of online education.

g. Faculty's different personal characteristics do not predict their perceptions about conflict with traditional education as a barrier to diffusion of online education.

h. Faculty's different personal characteristics do not predict their perceptions about lack of technical expertise as a barrier to diffusion of online education.

i. Faculty's different personal characteristics do not predict their perceptions about lack of administrative support as a barrier to diffusion of online education.

j. Faculty's different personal characteristics do not predict their perceptions about lack of infrastructure as a barrier to diffusion of online education.

$H_0$3. There is no relationship between faculty members' selected personal characteristics and their stage in the innovation-decision process in regard to online education.

a. There is no relationship between faculty members' age and their stage in the innovation-decision process.

b. There is no relationship between faculty members' teaching experiences and their stage in the innovation-decision process.

c. There is no relationship between faculty members' DE experience and their stage in the innovation-decision process.

d. There is no relationship between faculty members' gender and their stage in the innovation-decision process.

e. There is no relationship between faculty members' academic rank and their stage in the innovation-decision process.

f. There is no relationship between faculty members' professional area and their stage in the innovation-decision process.

g. There is no relationship between faculty members' nationality and their stage in the innovation-decision process.

h. There is no relationship between faculty members' level of education and their stage in the innovation-decision process.

$H_0$4. There is no relationship between faculty's attitudes toward the problem of limited access to higher education by students in Saudi Arabia and their stage in the innovation-decision process in regard to online education.

Instrumentation

The survey instrument used in this study was designed by Li (2004), who examined faculty perceptions about attributes and barriers impacting diffusion of Web-based distance education (WBDE) at the China Agricultural University (CAU). The following section describes the process for measuring the validity and reliability of the instrument as reported by Li.

Validity of the Instrument

Validity is the most important idea researchers need to consider when developing or selecting an instrument for use (Fraenkel & Wallen, 2009). Validity of an instrument refers to its

ability to measure what is supposed to be measuring (Kumar, 2005). Therefore, validity depends on the amount of evidence that supports the interpretation researchers desire to make concerning data they have collected (Fraenkel & Wallen, 2009).

Content and face validity were addressed during the design of the survey instrument. Content validity refers to the extent to which an instrument comprehensively and appropriately measure the skills or characteristics it is supposed to measure (Fink, 2010). On the other hand, face validity refers to how the instrument appears to measure the subject matter under consideration (Grinnell, 1997). According to Grinnell (1997), it is important that an instrument not only accurately measures the variables under consideration (content validity), but also appears to be a relevant measure of those variables (face validity). According to Fraenkel and Wallen (2009), a common way of testing the content validity of an instrument is to to have a competent judge check the content and the format of an instrument and judge whether or not it is appropriate.

The survey instrument of the current study was tested for content and face validity by a panel of experts consisting of eight faculty members who have expertise in adoption/diffusion research. Experts' review about the instrument for content and face validity was controlled for internal validity and measurement error. Based on feedback from the panel of experts, the instrument was adjusted (Li, 2004).

Reliability of the Instrument

Reliability refers to the consistency of the scores obtained (Fraenkel & Wallen, 2009). According to Grinnell (1997), the reliability of an instrument indicates "the degree to which individual differences in scores are attributable to "true" differences in the property being measured or to error of measurement" (p. 173).

Li's (2004) survey was piloted with faculty members from the Department of Agricultural Education at Texas A&M University. Li used random sample procedures to randomly select 20 faculty members to participate in the pilot study. The pilot instrument along with a pilot cover letter was sent to each participant. Reliability tests were used and Cronbach's alpha was calculated for each item of perceived attributes and perceived barriers impacting diffusion of Web-based distance education (WBDE). Table 2 illustrates the reliability of dependent variables in the first pilot test.

Table 2

Reliability of Dependent Variables in Li's First Pilot Test

Items	*r*
Attributes of WBDE	
1. Relative Advantage	0.74
2. Compatibility	0.42
3. Complexity	0.83
4. Trialability	0.90
5. Observability	0.78
Barriers to diffusion of WBDE	
1. Faculty concerns about compensation and time	0.63
2. WBDE program credibility	0.65
3. Financial concerns	0.77
4. Planning issues	0.76
5. Conflict with traditional education	0.73
6. Fear of technology	0.73

Table 2 (continued)

Items	*r*
7. Technical expertise	0.84
8. Administrative support	0.78
9. Infrastructure	0.70

The results of the first pilot study indicated that three dependent variables—perceived compatibility of WBDE, concerns about compensation and time perceived barrier to diffusion of WBDE, and WBDE program credibility as a perceived barrier to diffusion of WBDE—had relatively low reliabilities. Thus, Li (2004) conducted a second pilot study to reconstitute these sections of the instrument. The dependent variable "faculty concerns about compensation and time" was divided into two variables: concerns about time and concerns about incentives. A new reliability test was conducted by recalculating Cronbach's alpha coefficient on supplementary data. The reliabilities of the revised items were: compatibility, $r = 0.92$; concerns about time, $r = 0.89$; concerns about incentives, $r = 0.95$; and WBDE program credibility, $r = 0.94$. The overall calculated reliability for faculty perceptions about attributes of WBDE was $r = 0.84$ and the overall reliability for faculty perceptions about barriers to diffusion of WBDE was $r = 0.78$.

Formal permission to use and adapt questions from the survey was obtained from Li (2004) before the survey was used (Appendix B). Two questions were added to the survey. The first question related to the nationality of the participants. This question was added since not all faculty members teaching at Saudi universities are Saudi citizens. Moreover, previous research studies (Albalawi, 2007; Alsaif, 2005) found that Saudi faculty members had more positive attitudes towards distance education than non-Saudi faculty. Two open-ended questions were

also added at the end of the survey instrument to allow faculty members to express their thoughts about any additional attributes or barriers that were not included in the close-ended questions. Open-ended questions, in opposite to close-ended ones, put few constraints on respondents' statement of their feelings, which enables them to go into details and express greater depth in their answers (Grinnell, 1997).

Description of the Instrument

The survey consisted of four sub-scales: Stages of the Innovation-Decision Process, Perceived Attributes, Perceived Barriers, and Personal Characteristics.

Subscale 1: Stages of the Innovation-Decision Process. The first section of the survey was used to measure participants' stage in the innovation-decision process regarding Web-based distance education. Rogers' (1995) model of the innovation-decision process was used as the theoretical base for this section. In addition to the five stages of innovation-decision process—knowledge, persuasion, decision, implementation, and confirmation—that are included in the model, Li (2004) added *no knowledge* as the first stage in the innovation-decision process.

Participants were asked to indicate their attitude toward the statement "Limited access to higher education by students is a big problem for Saudi institutions of higher education" by selecting one of the following three choices: "I agree," "I disagree," or "I am not sure." In addition, six statements were used to indicate participants' current stage (no knowledge, knowledge, persuasion, decision, implementation, and confirmation) in the innovation-decision process in regard to Web-based distance education. The participants were asked to select the statement that most reflects their current stage in the process. The level of measurement for these two questions was nominal.

Subscale 2: Perceived Attributes of WBDE. The second section consisted of five selected response items used to measure participants' perceptions about attributes of Web-based distance education. Rogers' (1995) five attributes of innovation—relative advantage, compatibility, trialability, and observability—were used as the theoretical base for this section. Moore and Benbasat's (1991) measurements of the attributes of innovation were also used and adjusted as the instrumental base for this section.

Participants were asked to indicate their perceptions about the five attributes of Web-based distance education by rating statements based upon a five-point Likert scale. The points in the scale were: 1= Strongly Disagree (SD), 2= Disagree (D), 3= Neutral (N), 4= Agree (A) and 5= Strongly Agree (SA). The measurement scale for these variables was interval.

Subscale 3: Perceived Barriers to WBDE. The third section consisted of 10 selected response items that were used to measure participants' perceptions about barriers to diffusion of Web-based distance education. The 10 barriers were identified based on Muilenburg and Berge's (2001) study about barriers to diffusion of Web-based distance education. Those barriers include: concerns about time, concerns about incentives, WBDE program credibility, financial concerns, planning issues, fear of technology, conflict with traditional education, technical expertise, administrative support, and infrastructure.

Participants were asked to indicate their perceptions about the barriers to Web-based distance education by rating statements based upon a five-point Likert scale. The points in the scale were: 1=No Barrier (NB); 2=Weak Barrier (WB); 3=Moderate Barrier (MB); 4=Strong Barrier (SB); and 5=Very Strong Barrier (VSB). The measurement scale for these variables was interval.

Subscale 4: Personal Characteristics. This section of the survey was designed to gather information about participants' personal characteristics. Rogers' (1995) characteristics of adopter categories were used as the theoretical base for this section. University name and professional area (college) were measured as the university and college to which a participant belongs. The level of measurement for these variables was nominal. Gender was measured as either male or female. The level of measurement for gender was also nominal. Age was measured as one of six age groups. The level of measurement for age was ordinal. Level of education was measured as bachelor, master, or doctoral degree. The level of measurement for level of education was ordinal. Academic rank was measured as instructor, lecturer, assistance professor, associate professor, and full professor. The level of measurement for academic rank was ordinal. Teaching experience was measured by the number of years for which a participant had been teaching at the university level. The level of measurement for teaching experience was ordinal. Distance education experience related to WBDE program, TV or broadcasting distance program, correspondence program, or others was measured by "yes" or "no" choices. The level of measurement for distance education experience was nominal. If a participant replied "yes," the length of using each distance education program was measured by the number of years for which the participant had been using the program. The level of measurement for length of distance education experience was interval. Nationality was measured as "Saudi" or "Non-Saudi." The level of measurement for nationality was nominal.

In addition to the aforesaid close-ended questions, the instrument included two open-ended questions to allow faculty members to express their thoughts about any additional attributes or barriers that are not included in the close-ended questions and to identify some of the steps that their institutions can take to encourage them to participate in Web-based distance

education. For open-ended questions, each response was coded for identifying themes. The purpose of using themes in analyzing open-ended response questions is to group answers that are analytically similar and to differentiate between answers that are different (Fowler, 2002).

Translation of the Instrument

The participants of this study were faculty members in two Saudi universities. Thus, the final version of the survey instrument was written in Arabic (Appendix C) to be presented in a manner that could be easily understood by the participants. The survey questionnaire was translated from English to Arabic by the researcher and two linguistic master's students at Indiana State University. The revised Arabic language questionnaire was then sent by email to a bilingual panelist who also has background about distance education to translate it back to English. The researcher then checked the translation of the instrument by comparing the Arabic version to the original English version and no significant difference was noted. Finally, to verify the accuracy of the translation and make sure that the design and translation suited the subject matter, the final version of the questionnaire was reviewed by the researcher and a linguistic master's student, whose native language is Arabic.

Data Collection Procedures

After receiving permission from Indiana State University's Institutional Review Board for Human Subjects (Appendix D) and the permissions of administrators in the two universities (Appendixes E and F) to conduct the study, the survey was distributed to respondents using two formats: hard copy and online. The reason for offering a printed version of the survey was to accommodate non-adopters.

The online survey was administrated first using secure survey software company Qualtrics®. Three contacts were made to the questionnaire respondents. The first contact was a

cover letter e-mail that was sent to the faculty members of the two universities to notify them of the availability of the online survey and to ask them to complete the survey online. This e-mail included the following elements: the cover letter and the web address for the online questionnaire. The purpose of this e-mail was to (a) explain the purpose of the survey; (b) emphasize the importance of the research; (c) explain to participants that their participation in the current study was voluntary; (d) assure the confidentiality and anonymity of the respondents; (e) explain that completion and return of the survey signifies consent to participate in the study; (f) and explain that findings may be disseminated through publication of this dissertation, publication in professional journals, and/or presentation at professional conferences; and (g) specify the date by which the completed questionnaire is to be returned. The cover letter e-mail also included the researcher's and dissertation chairperson's contact information in the event they had difficulty locating or completing the online survey and/or if they had any questions or concerns about the survey.

Two weeks after the cover letter e-mail, the second contact, the thank you/reminder e-mail, was sent to each participant to thank those who had already completed the questionnaire and to remind participants who had not responded to please do so. Two weeks later, the third and final contact e-mail that was similar in content to the first e-mail contact, was sent to only non-respondents in order to inform non-respondents that their questionnaire had not been received and to appeal for its return (Dillman, 2000).

One week after the online survey was completed; the hard copy of the survey was administrated. Each faculty member included in the randomly selected sample was mailed a questionnaire that carried no identifying marks, plus a postcard addressed to the researcher—with one of the faculty member's mailing labels affixed to the reverse side of the card.

Receiving the postcard helped the researcher know that the faculty member had not returned his or her questionnaire without indicating which questionnaire it was. This procedure helped the researcher reduce the follow-up mailing costs by mailing only to non-respondents. The cover letter asked participants to complete and return the survey—assuring anonymity—and to return the postcard simultaneously (Babbie, 1998). If the faculty person had already completed the online version, that faculty was thanked and asked not to complete the paper survey. Participants were assured that their responses would be confidential and that only group data would be reported. In addition, the cover letter explained to participants the postcard method and why it was being used. Two weeks letters, a new copy of the survey questionnaire along with a follow-up letter were sent to non-respondents only. Non-respondents were encouraged to return their questionnaire within a week.

Procedures for Treating, Coding, and Analyzing Data

This section provides a discussion of the steps used in treating, coding, and analyzing the collected data.

Treating and coding data. Fowler (2002) outlined the process of coding data which consisted of five separate phases including determining the way the data would be organized in a file, design of the code system and the rules by which respondents' answers were assigned values that could be processed by the statistical program, turning responses into standard categories (coding), and putting the data into computer-readable form (data entry). In accordance with this process, the researcher created an Excel file that included the names of the two universities participating in this study. Then, the names of faculty members of the two institutions and their e-mail addresses were added under the university name to which each faculty member belonged.

In addition, a coding system was developed to identify each participant and the university with which the participant was associated. This procedure helped the researcher to distinguish between respondents and non-respondents. To do so, the two universities were given a one-digit number (Taif University was 1 and Tabuk University was 2). Also, each participant was assigned a three-digit number since the total number of the sample was 198. Then, the numbers assigned to each university and each faculty member were merged.

Even though the software that was used for delivering the questionnaire allowed the researcher to identify those participants who completed the survey from non-respondents, it did not allow the researcher to identify faculty individual responses to the survey questions. Thus, while there was no known risk associated with participating in this study and the risk of any identifiable information being obtained by the researcher was minimized, the data collected was secured with a user name and a password to which only the researcher had access. In addition, for the paper survey, postcards received were destroyed by the researcher once the mailing survey was completed.

Analyzing Data

Collected data was analyzed using the Statistical Package for the Social Sciences (SPSS, v. 18). Alpha for all statistical procedures was set *a priori* at .05. A total of seven research questions were investigated. Following is a description of the statistical analysis that was used for answering each of these questions.

Research question 1. The first question in this study was designed to describe participant faculty based on their perceptions about attributes of online education (relative advantage, compatibility, complexity, trialability, and observability). These variables were analyzed by calculating frequencies and percentages for each attribute. A summative cumulative

mean was calculated for each attribute. Interpretations for faculty perceptions about attributes of online education were based on the following scales: 1—1.50 = strongly disagree, 1.51—2.50 = disagree, 2.51—3.50 = neutral, 3.51—4.50 = agree, and 4.51—5 = strongly agree.

Research question 2. The second question was designed to describe participant faculty based on their perceptions about barriers to diffusion of online education (concerns about time, concerns about incentives, online program credibility, financial concerns, planning issues, conflict with traditional education, fear of technology, technical expertise, administrative support, and infrastructure). These variables were analyzed by calculating frequencies and percentages for each attribute. A summative cumulative mean was calculated for each barrier. Interpretations for faculty perceptions about barriers to diffusion of online education were based on the following scales: 1—1.50 = no barrier, 1.51—2.50 = weak barrier, 2.51—3.50 = moderate barrier, 3.51—4.50 = strong barrier, and 4.51—5 = very strong barrier.

Research question 3. The third question was designed to describe participant faculty by their current stage in the innovation-decision process related to online education (no knowledge, knowledge, persuasion, decision, implementation, and confirmation). This variable was analyzed by calculating frequencies and percentages by level of response.

Research question 4. The purpose of the fourth question was to examine whether faculty's selected personal characteristics (including age, years of teaching, DE experience, gender, academic rank, nationality, and level of education) impacted their perceptions about attributes of online education. The relationship between each of the five attributes of online education (relative advantage, compatibility, complexity, trialability, and observability) and faculty's selected characteristics was analyzed and described using multiple regression procedures. A multiple regression test was conducted on each of the five attributes of online

education to reveal the impact of the selected set of personal characteristics on the participants' perceptions about each of these attributes.

Regression analyses are a set of statistical techniques that allow one to assess the relationship between one dependent variable and several independent variables. Regression techniques can be applied to a data set in which the independent variables are correlated with one another and with the dependent variable to varying degree. Since regression techniques can be used when the independent variables are correlated, they are helpful both in experimental research and in observational or survey research where the nature has manipulated correlated variables. Thus, this flexibility of regression techniques is very helpful especially to researchers who are interested in real-world or complex problems (Tabachnick & Fidell, 1996).

Since some of the independent variables included in these research questions were classified as discrete, each discrete variable was first converted into a set of dichotomous variables (numbering one fewer than the number of discrete categories) by dummy variable coding with 1s and 0s (Licht, 1995 ; Tabachnick & Fidell, 1996).

Research question 5. The purpose of the fifth research question in this study was to examine whether faculty's selected personal characteristics (including age, years of teaching, DE experience, gender, academic rank, nationality, and level of education) impacted their perceptions about barriers to diffusion of online education. The relationship between each of the 10 barriers to online education (concerns about time, concerns about incentives, online program credibility, financial concerns, planning issues, conflict with traditional education, fear of technology, technical expertise, administrative support, and infrastructure) and faculty's selected characteristics was analyzed and described using multiple regression procedures. A multiple regression test was conducted on each of the 10 barriers to online education to reveal the impact

of the selected set of personal characteristics on the participants' perceptions about each of these barriers. Since some of the independent variables included in this research questions were classified as discrete, each discrete variable was first converted into a set of dichotomous variables (numbering one fewer than the number of discrete categories) by dummy variable coding with 1s and 0s (Licht, 1995 ; Tabachnick & Fidell, 1996).

Research question 6. The sixth question was designed to examine the relationship between faculty members' selected personal characteristics (including age, years of teaching, DE experience, gender, academic rank, professional area, nationality, and level of education) and their stage in the innovation-decision process (no knowledge, knowledge, persuasion, decision, implementation, and confirmation). The relationship between each of the eight personal variables and faculty member's stage in the innovation-decision process was analyzed and described using two-way contingency tables and chi-square test of independence (X^2).

A chi-square test of independence is used to examine the relationship between two discrete variables and can be viewed as similar to other measures of association such as Pearson's *r* and Spearman's rho except that these latter measures cannot be used with qualitative variables (Harris, 1995). When the result of a chi-square test was statistically significant, Cramer's V was used to assess the strength of the relationship between the two variables.

Research question 7. The final question in this study examined the relationship between faculty attitudes toward the problem of limited access to higher education by students in Saudi Arabia and their stage in the innovation-decision process in regard to online education. The relationship between the two variables was analyzed and described using two-way contingency tables and the chi-square test of independence (X^2). Table 3 summarizes methods of analysis information associated with each research question.

Table 3

Summary of the Research Questions and Methods of Analysis

Q #	Research Question	Method of Analysis	Items in Survey
1	What are faculty perceptions about attributes influencing diffusion of online education in two Saudi universities?	Descriptive statistics	Part II
2	What are faculty perceptions about barriers influencing diffusion of online education in two Saudi universities?	Descriptive statistics	Part III
3	What are faculty current stages in the innovation-decision process related to online education?	Descriptive statistics	Part I, Item 2
4	Do faculty's different personal characteristics (including age, years of teaching, DE experience, gender, academic rank, nationality, and level of education) impact their perceptions about attributes of online education?	Multiple regression	Faculty perceptions about attributes: Part II Faculty's personal characteristics: Part IV, items 3-9
5	Do faculty's different personal characteristics (including age, years of teaching, DE experience, gender, academic rank, nationality, and level of education) impact their perceptions about barriers to diffusion of online education?	Multiple regression	Faculty perceptions about barriers: Part III Faculty's personal characteristics: Part IV, items 2-9
6	Is there a relationship between faculty members' selected personal characteristics (including age, years of teaching, DE experience, gender, academic rank, professional area, nationality, and level of education) and their stage in the innovation-decision process in regard to online education?	Contingency tables and chi-square test of independence	Stages in the innovation-decision: Part I, item 2 Faculty's personal characteristics: Part IV, items 3-9

Table 3 (continued)

Q #	Research Question	Method of Analysis	Items in Survey
7	Is there a relationship between faculty attitudes toward the problem of limited access to higher education by students in Saudi Arabia and their stage in the innovation-decision process in regard to online education?	Contingency tables and chi-square test of independence	Faculty attitudes toward the problem of limited access: Part I, item 1 Stages: Part I, item 2

To analyze the participants' responses to the two open-ended questions, the researcher followed the steps described by Ary, Jacobs, and Razavieh (2002). Data was coded into categories using the constant comparative method. According to Ary et al. (2002), this method combines inductive categories with simultaneous comparison of all units of meaning—words, phrases, sentences, and behavior patterns that appear frequently in the data and seem to be important. First, the researcher read and reread the data and sorted them by looking for units of meaning. The researcher then marked each unit of meaning (e.g., sentences or phrases) with the appropriate code. When the codes were developed, the researcher counted the frequency with which these codes appeared to determine the importance of each category of meaning.

Summary

This chapter (a) identified the target population of the study, (b) described sample method and procedures, (c) provided a detailed description of the survey instrument design process, (d) outlined the data collection procedures, (c) described the coding process that will be employed in this study, and (d) defined descriptive and inferential statistics used for answering the research questions.

CHAPTER 4

Results

This chapter presents the results of the statistical analyses of the data collected from participating faculty members in the two universities. This chapter also addresses and answers the seven research questions. The data is presented in three sections. The first section presents the response rate. The second section presents descriptive statistics of the demographic and professional characteristics of the participants including age, gender, nationality, academic rank, age, years of teaching at the university level, distance education (DE) experience, and level of education. The last section presents the findings related to each of the seven research questions.

Response Rate

Of the 198 randomly selected faculty members, a total of 127 responses were received within the predetermined response period. Of these responses, 115 were usable, resulting in a usable response rate of 58%. Among the 115 faculty members, 68 (59.10%) were from Taif University and 47 (40.90%) were from Tabuk University. Table 4 presents the response rate for each university as well as the percentages of participants from each university.

Table 4

University Affiliation of Respondents

University	*f*	%
Taif University	68	59.10
Tabuk University	47	40.90
Total	115	100.00

Demographics of Participants

This section describes participants by selected personal characteristics. These variables include professional area, age, gender, nationality, academic rank, years of teaching at the university level, DE experience, and level of education.

Professional area. Table 5 presents the distribution of participating faculty members by their professional area as indicated by the college to which each participant belongs. Faculty from 10 colleges were represented in the study. The three highest number of responses were from the Education College, Taif University (n = 29, 25.20%), the Arts and Humanities College, Taif University (n = 17, 14.80%), and the Computers and Information Systems College, Tabuk University (n = 14, 12.20%).

Table 5

Distribution of Respondents By Professional Area (N = 115)

College	*f*	%
Education	29	25.20
Arts and Humanities	17	14.80
Economics & Administration	10	8.70
Engineering	5	4.30
Science	12	10.40
Medicine	3	2.60
Computers & Information Systems	14	12.20
Applied Medical Sciences	10	8.70
Community	9	7.80
Health Sciences	6	5.20
Total	115	100.00

Gender. Table 6 presents the distribution of participating faculty members ($N = 115$) by gender. The majority of the participants ($n = 75$, 65.20%) identified their gender as male and the remaining ($n = 40$, 34.80%) were female.

Table 6

Distribution of Respondents By Gender (N = 115)

Gender	*f*	%
Male	75	65.20
Female	40	34.80
Total	115	100.00

Age. Table 7 presents dispersal of participating faculty (*N*=115) by age. Nineteen participants (16.50%) were under 30 years old; 27 (23.50%) were in 30-34 years old range; 26 (22.60%) were in 35-39 years old range; 22 (19.10%) were in 40-44 years old range; 12 (10.40%) were in 45-54 years old range; 7 (6.10%) were in 50-54 years old range; and 2 (1.70%) were more than 54 years old.

Table 7

Distribution of Respondents By Age (N = 115)

Age Group	*f*	%
< 30	19	16.50
30 – 34	27	23.50
35 – 39	26	22.60
40 – 44	22	19.10
45 – 49	12	10.40
50 – 54	7	6.10
> 54	2	1.70
Total	115	100.00

Nationality. Table 8 presents the distribution of participating faculty by their nationality. There were 65 (56.50%) Saudi participants and 50 (43.50%) were non-Saudi residents from other nations.

Table 8

Distribution of Respondents By Nationality (N = 115)

Nationality	*f*	%
Saudi	65	56.50
Non-Saudi	50	43.50
Total	115	100.00

Level of education. Table 9 describes participants by their highest level of education. Twenty- six participants (22.60%) had a bachelor's degree; 23 participants (20%) had a master's degree; and 66 (57.40%) had a doctoral degree.

Table 9

Distribution of Respondents By Level of Education (N = 115)

Degree	*f*	%
Bachelor's	26	22.60
Master's	23	20.00
Doctorate	66	57.40
Total	115	100.00

Academic rank. Table 10 presents the distribution of participants by academic rank. Twenty-six participants (22.60%) were instructors; 23 (20%) were lecturers; 38 (33%) were assistant professors; 13 (11.40%) were associate professors; and 15 (13%) were full professors.

Table 10

Distribution of Respondents By Academic Rank (N = 115)

Rank	*f*	%
Instructor	26	22.60
Lecturer	23	20.00
Assistant Professor	38	33.00
Associate Professor	13	11.40
Full Professor	15	13.00
Total	115	100.00

Teaching experience. Table 11 presents the distribution of participants by their teaching experience. Faculty teaching experience was divided into five ranges; the most reported experience range was less than five years (*n* = 45, 39.10%). Other participants reported 5-9 years of teaching experience (*n* = 30, 26.10%); 10-14 years of teaching experience (*n* = 23, 20%); 15-19 years of teaching experience (*n* = 6, 5.20%); and 11 (9.60%) participants reported more than 19 years of teaching experience.

Table 11

Distribution of Respondents By Teacher Experience (N = 115)

Teaching Experience	*f*	%
< 5 years	45	39.10
5 – 9 years	30	26.10
10 – 14 years	23	20.00
15 – 19 years	6	5.20
> 19 years	11	9.60
Total	115	100.00

Distance education experience. Of the 115 respondents, a third (*n* = 38, 33%) indicated that they had some experience with distance education (Table 12). The 38 faculty members who had experience with distance education indicated the nature of their experience (Table 13). About 87% of them (*n* = 33) had used web based distance education (WBDE); one participant (2.60%) had taught distance courses using radio and TV; one participant (2.60%) had taught correspondence-based distance courses; and three participants chose not answer this question.

Table 12

Distribution of Respondents By Distance Education Experience (N = 115)

Distance Education Experience	*f*	%
Have distance education experience	38	33.00
Have no distance education experience	77	67.00
Total	115	100.00

Table 13

Nature of Respondents' Experience With Distance Education

Type of Distance Education Experience	*f*	%
WBDE	33	86.80
Radio/TV	1	2.60
Correspondence	1	2.60
Total	35	92.00

Note. Three participants chose not to respond to this question.

Findings Related to Question One

The first question was designed to describe participant faculty based on their perceptions about attributes of online education. The attributes included in this study were relative advantage, compatibility, complexity, trialability, and observability. Following are the results of each of the aforementioned attributes.

Perceived relative advantage of WBDE. The perceived relative advantage of WBDE was measured based on the participating faculty members' responses to four statements. Frequencies and percentages were used to represent the results. As presented in Table 14, approximately 75% of respondents agreed or strongly agreed that using WBDE could help them to reach more students. More than 78% of respondents agreed or strongly agreed that a more flexible time schedule could be followed by using WBDE. About 77% of respondents agreed or strongly agreed that using WBDE could give them access to more teaching resources. While more than half of the respondents agreed or strongly agreed that WBDE could be provided economically, a third of the respondents chose a neutral attitude toward this statement. Overall,

the mean and standard deviation for perceived relative advantage of WBDE were *M* = 3.82 and *SD* = 0.82. Based on this result, faculty members at the two Saudi universities tended to agree with the existence of relative advantage of employing WBDE.

Table 14

Distribution of Respondents By Perceptions About Relative Advantage of WBDE (N = 115)

	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree	
Statement	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
Using Web-based distance education could reach more students.	4	3.5	7	6.0	18	15.7	63	54.8	23	20.0
A more flexible time schedule could be followed by using Web0based distance education.	4	3.5	5	4.3	16	13.9	62	54.0	28	24.3
Using Web-based distance education could give me access to more teaching resources.	3	2.6	6	5.2	18	15.7	55	47.8	33	28.7
Web-based distance education could be provided economically.	4	3.5	6	5.2	38	33.0	51	44.3	16	14.0

Note. Scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree; a mean relative advantage score was calculated by summing item responses (*M* = 3.82, *SD* = 0.82)

Perceived compatibility of WBDE. The perceived compatibility of WBDE was measured based on the participating faculty members' responses to four items. Frequencies and percentages were used to represent the results. As presented in Table 15, more than 40% of the participants agreed or strongly agreed that WBDE technologies were available to them. About 79% of participants agreed or strongly agreed that using WBDE technologies were acceptable for them. In addition, approximately 63% of participants agreed or strongly agreed that procedures used in WBDE would fit well with their teaching conditions. On the other hand, more than one-third of the participants disagreed or strongly disagreed that WBDE technologies were available to students and more than 44% of the respondents chose a neutral attitude toward this statement. Overall, the mean and standard deviation for perceived compatibility of WBDE were $M = 3.35$ and $SD = 0.88$. Based on this result, faculty members at the two Saudi universities had mixed perceptions of the compatibility of WBDE in the four posed factors.

Table 15

Distribution of Respondents By Perceptions About Compatibility of WBDE (N = 115)

	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree	
Statement	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
Web-based distance education technologies are available to me.	14	12.2	25	21.7	31	27.0	34	29.6	11	9.5
Using Web-based distance education technologies are acceptable to me.	7	6.1	7	6.1	11	9.6	51	44.3	39	33.9
Procedures used in Web-based distance education would fit well with my teaching conditions	4	3.5	11	9.6	28	24.3	48	41.7	24	20.9
Web-based distance education technologies are available to students.	17	14.8	25	21.7	51	44.3	14	12.2	8	7.0

Note. Scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree; a mean compatibility scores was calculated by summing item responses (M = 3.35, SD = 0.88)

Perceived complexity of WBDE. The perceived complexity of WBDE was measured based on the participating faculty members' responses to four items. Frequencies and percentages were used to represent the results. As Table 16 presents, more than 40% of respondents disagreed or strongly disagreed that WBDE technologies were readily available to them and about 34% of participants kept a neutral attitude toward this statement. On the other hand, approximately 62% of participants agreed or strongly agreed that WBDE technologies were easy to use. About 60% of participants agreed or strongly agreed that the changes in teaching methodology necessary to use WBDE were easy to understand. While more than 42%

of participants agreed or strongly agreed that changes in teaching methodology necessary to use WBDE would be easy for them to implement, about 28% reported a neutral attitude toward this statement. Overall, the mean and standard deviation for perceived complexity of WBDE were *M* = 3.27 and *SD* = 0.84. Based on this result, faculty members at the two Saudi universities had mixed perceptions concerning the complexity of WBDE.

Table 16

Distribution of Respondents By Percepts About Complexity of WBDE (N = 115)

	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree	
Statement	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
Web-based distance technologies are readily available to faculty.	18	15.7	29	25.2	39	33.9	24	20.9	5	4.3
Web-based distance education technologies are easy to use	4	3.5	13	11.3	27	23.5	49	42.6	22	19.1
The changes in teaching methodology necessary to use Web-based distance education are easy to understand	5	4.3	14	12.2	28	24.3	51	44.3	17	14.9
The changes in teaching methodology necessary to use Web-based distance education will be easy for me to implement.	6	5.2	28	24.3	32	27.9	36	31.3	13	11.3

Note. Scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree; a mean complexity score was calculated by summing item responses (*M* = 3.27, *SD* = 0.84)

Perceived trialability of WBDE. The perceived trialability of WBDE was measured based on the participating faculty members' responses to four items. Frequencies and percentages were used to represent the results. As Table 17 presents, about 47% of participants disagreed or strongly disagreed that it was possible for them to deliver selected portions of a course (a single lesson or unit) using WBDE prior to developing an entire course. About 43% of participants disagreed or strongly disagreed that it was possible for them currently to put selected teaching materials (e.g., readings, assignments) on the Web in support of their classes. About 45% of participants agreed or strongly agreed that it was possible for them currently to accomplish some teaching functions (e.g., reporting grades, communication with students) on the Web. About 49% of participants agreed or strongly agreed that it was possible for students to use WBDE tools (e.g., accessing Internet, downloading and uploading materials, watching video lessons, chat on-line, etc.). Overall, the mean and standard deviation for perceived complexity of WBDE were $M = 2.96$ and $SD = 1.04$. Based on this result, faculty members at the two Saudi universities had not decided on the existence of trialability of WBDE.

Table 17

Distribution of Respondents By Perceptions About Trialability of WBDE (N = 115)

	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree	
Statement	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
It is possible for me to deliver selected portions of a course (a single lesson or unit) using Web-based distance education prior to developing an entire course.	16	14.0	38	33.0	34	29.6	22	19.1	5	4.3

Table 17 (continued)

Statement	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree	
	f	%	*f*	%	*f*	%	*f*	%	*f*	%
It is possible for me to currently put selected teaching materials (e.g., readings, assignments) on the Web in support of my classes.	18	15.6	31	27.0	19	16.5	40	34.8	7	6.1
It is possible for me currently to accomplish some teaching functions (e.g., reporting grades, communication with students) on the Web.	16	13.9	25	21.7	23	20.0	33	28.7	18	15.7
It is possible for students to use Web-based distance education tools (e.g., Accessing Internet, downloading and uploading materials, watching video lessons, chat on-line, etc.).	14	12.1	21	18.3	24	20.9	44	38.3	12	10.4

Note. Scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree; a mean trialability score was calculated by summing item responses (M = 2.96, SD = 1.04)

Perceived observability of WBDE. The perceived observability of WBDE was measured based on the participating faculty members' responses to four items. Frequencies and percentages were used to represent the results. As Table 18 presents, about 60% of participants agreed or strongly agreed that they knew some faculty members who were using WBDE. Approximately 48% of participants disagreed or strongly disagreed that they had observed some WBDE courses on their campus. On the other hand, more than 70% of participants reported that they were aware of the benefits of WBDE programs for students. About half of the participants

agreed or strongly agreed that they were aware of the limitations of WBDE programs for students. Overall, the mean and standard deviation for perceived observability of WBDE were $M = 3.25$ and $SD = 0.80$. Based on this result, faculty members at the two Saudi universities had mixed perceptions of the observability of WBDE.

Table 18

Distribution of Respondents By Perceptions About Observability of WBDE (N = 115)

	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree	
Statement	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
I know some faculty members who are using Web-based distance education.	7	6.1	20	17.4	20	17.4	62	53.9	6	5.2
I have observed some Web-based distance education courses on my campus	17	14.8	38	33.0	33	28.7	23	20.0	4	3.5
I am aware of the benefits of Web-based distance education programs for students.	4	3.5	13	11.2	17	14.8	64	55.7	17	14.8
I am aware of the limitations of web-based distance education programs for students	5	4.3	18	15.7	35	30.4	47	40.9	10	8.7

Note. Scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree; a mean observability score was calculated by summing item responses ($M = 3.25$, $SD = 0.80$)

Table 19 summarizes the means, standard deviations, and overall scale for the five perceived attributes of WBDE. A summative cumulative mean was calculated for each attribute. Interpretations for faculty perceptions about attributes of online education were based on the

following scales: 1—1.50 = strongly disagree, 1.51—2.50 = disagree, 2.51—3.50 = neutral, 3.51—4.50 = agree, and 4.51—5 = strongly agree.

Table 19

Summary of Faculty Perspectives About Attributes

Attribute	*M*	*SD*	Scale
Relative Advantage	3.82	.82	Agree
Compatibility	3.35	.88	Neutral
Complexity	3.27	.84	Neutral
Observability	3.25	.80	Neutral
Trialability	2.96	1.04	Neutral

Note. Scale: 1 – 1.50 = Strongle Disagree, 1.51 – 2.50 = Disagree, 2.51 – 3.50 = Neutral, 3.51 = 4.50 = Agree, and 4.51 – 5 Strongly Agree.

Findings Related to Question Two

The second question was designed to describe participating faculty based on their perceptions about barriers to diffusion of WBDE. The barriers included in this study were: concerns about time, concerns about incentives, online program credibility, financial concerns, planning issues, conflict with traditional education, fear of technology, technical expertise, administrative support, and infrastructure. Following are the results for each of the aforementioned barriers.

Concerns about time as a perceived barrier to diffusion of WBDE. Respondents' perceptions of concerns about time as a barrier to diffusion of WBDE were measured based on their responses to four items. Frequencies and percentages were used to represent the results. As Table 20 presents, 40% of participants perceived "increased faculty time commitment for course

development" as no barrier or a weak barrier. On the other hand, about 36% of respondents thought it was a moderate barrier. More than half of the respondents perceived "increased faculty time for online communication with students" as a moderate or strong barrier. About 55% of respondents perceived "increased faculty time for getting feedback from students" was a moderate or strong barrier. Approximately 46% of participants perceived "increased faculty time to explore more information" was not or was a weak barrier. Overall, the mean and standard deviation for concerns about time as a perceived barrier to diffusion of WBDE were *M* = 2.73 and *SD* = 1.10. Based on this result, faculty members at the two Saudi universities tended to perceive concerns about time as a moderate barrier to the diffusion of WBDE.

Table 20

Distribution of Respondents By Perceptions of Concerns About Time as a Barrier to Diffusion of WBDE (N = 115)

	No Barrier		Weak Barrier		Moderate Barrier		Strong Barrier		Very Strong Barrier	
Statement	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
Increased faculty time commitment for course development	25	21.7	21	18.2	41	35.7	18	15.7	10	8.7
Increased faculty time for online communication with students.	25	21.7	23	20.0	39	33.9	19	16.5	9	7.9
Increased faculty time for getting feedback from students.	21	18.3	23	20.0	38	33.0	25	21.7	8	7.0

Table 20 (continued)

Statement	No Barrier		Weak Barrier		Moderate Barrier		Strong Barrier		Very Strong Barrier	
	f	%	*f*	%	*f*	%	*f*	%	*f*	%
Increased faculty time to explore more information.	30	26.1	22	19.1	25	21.7	24	20.9	14	12.2

Note. Scale: 1 = No Barrier, 2 = Weak Barrier, 3 = Moderate Barrier, 4 = Strong Barrier, 5 = Very Strong Barrier; a mean score for concerns about time was calculated by summing item responses (M = 2.73, SD = 1.10)

Concerns about incentives as a perceived barrier to diffusion of WBDE.

Respondents' perceptions of concerns about incentives as a barrier to diffusion of WBDE were measured based on their responses to four items. Frequencies and percentages were used to represent the results. As Table 21 presents, about 55% of respondents perceived the lack of "monetary compensation for adopting web-based distance education" as a strong or very strong barrier. More than half of the respondents perceived the lack of "incentives for adopting Web-based distance education" as a moderate or a strong barrier. Forty-seven percent of the respondents perceived the lack of "recognition for adopting Web-based distance" as a strong or very strong barrier. While 33% of the participants perceived the lack of "awards for adopting Web-based distance education" as a very strong barrier, about 34% of them perceived this statement as no barrier or a weak barrier. Overall, the mean and standard deviation for concerns about incentives as a perceived barrier to diffusion of WBDE were M = 3.23 and SD = 1.28. Based on this result, faculty members at the two Saudi universities tended to perceive concerns about incentives as a moderate barrier to the diffusion of WBDE.

Table 21

Distribution of Respondents By Perceptions of Concerns About Incentives as a Barrier to Diffusion of WBDE (N = 115)

	No Barrier		Weak Barrier		Moderate Barrier		Strong Barrier		Very Strong Barrier	
Statement	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
Monetary compensation for adopting web-based distance education	24	20.8	11	9.6	17	14.8	31	27.0	32	27.8
Incentives for adopting Web-based distance education.	21	18.3	16	13.9	28	24.3	30	26.1	20	17.4
Recognition for adopting Web-based distance education.	21	18.3	14	12.2	26	22.5	23	20.0	31	27.0
Awards for adopting Web-based distance education.	28	24.3	11	9.6	19	16.5	19	16.6	38	33.0

Note. Scale: 1 = No Barrier, 2 = Weak Barrier, 3 = Moderate Barrier, 4 = Strong Barrier, 5 = Very Strong Barrier; a mean score for concerns about incentives was calculated by summing item responses (M = 3.23, SD = 1.28)

WBDE program credibility as a perceived barrier to diffusion of WBDE.

Respondents' perceptions about WBDE program credibility as a barrier to diffusion of WBDE were measured based on their responses to four items. Frequencies and percentages were used to represent the results. As Table 22 presents, more than half the respondents perceived "concerns about evaluation of students' work" as a moderate to strong barrier. Similarly, more than half of the respondents perceived "concerns about testing of students' work" as a moderate or strong barrier. About 54% of respondents perceived "concerns that Web-based distance education

programs lower the quality of students who are admitted" as a moderate to strong barrier. Likewise, about 54% of respondents perceived "concerns that Web-based distance education programs lower the expectations for student learning" as a moderate or strong barrier. Overall, the mean and standard deviation for WBDE program credibility as a perceived barrier to diffusion of WBDE were $M = 3.06$ and $SD = 1.14$. Based on this result, faculty members at the two Saudi universities tended to perceive WBDE program credibility as a moderate barrier to the diffusion of WBDE.

Table 22

Distribution of Respondents By Perceptions About WBDE Program Credibility as a Barrier to Diffusion of WBDE (N = 115)

	No Barrier		Weak Barrier		Moderate Barrier		Strong Barrier		Very Strong Barrier	
Statement	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
Concerns about evaluation of students' work.	26	22.6	22	19.1	34	29.6	24	20.9	9	7.8
Concerns about testing of students' work.	23	20.0	20	17.4	30	26.1	28	24.3	14	12.2
Concerns that Web-based distance education programs lower the quality of students who are admitted.	18	15.7	17	14.8	27	23.5	34	29.5	19	16.5
Concerns that web-based distance education programs lower the expectations for student learning.	16	13.9	11	9.6	26	22.6	30	26.1	32	27.8

Note. Scale: 1 = No Barrier, 2 = Weak Barrier, 3 = Moderate Barrier, 4 = Strong Barrier, 5 = Very Strong Barrier; a mean score for program credibility was calculated by summing item responses ($M = 3.06$, $SD = 1.14$)

Financial concerns as a perceived barrier to diffusion of WBDE. Respondents' perceptions of financial concerns as a barrier to diffusion of WBDE were measured based on their responses to four items. Frequencies and percentages were used to represent the results. As Table 23 presents, about 55% of respondents perceived "increased tuition and fee rates" as a strong or very strong barrier. About 60% of respondents perceived "increased payment for cost technologies" as a strong or very strong barrier. While more than 58% of respondents perceived "sharing revenue with department or business units" as a moderate or strong barrier, about 36% of respondents thought it was no barrier or weak barrier. Approximately 61% of respondents perceived "lack of money to implement Web-based distance education programs" as a strong or very strong barrier. Overall, the mean and standard deviation for financial concerns as a perceived barrier to diffusion of WBDE were $M = 3.34$ and $SD = 1.24$. Based on this result, faculty members at the two Saudi universities tended to perceive financial concerns as a moderate barrier to the diffusion of WBDE.

Table 23

Distribution of Respondents By Perceptions About Financial Concerns as a Barrier to Diffusion of WBDE (N = 115)

	No Barrier		Weak Barrier		Moderate Barrier		Strong Barrier		Very Strong Barrier	
Statement	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
Increased tuition and fee rates.	21	18.3	14	12.2	17	14.8	28	24.3	35	30.4
Increased payment for cost technologies.	17	14.8	12	10.4	19	16.5	21	18.3	46	40.0

Table 23 (continued)

Statement	No Barrier		Weak Barrier		Moderate Barrier		Strong Barrier		Very Strong Barrier	
	f	%	*f*	%	*f*	%	*f*	%	*f*	%
Sharing revenue with department or business units.	21	18.3	20	17.3	35	30.4	31	27.0	8	7.0
Lack of money to implement Web-based distance education programs.	17	14.8	14	12.2	14	12.2	30	26.0	40	34.8

Note. Scale: 1 = No Barrier, 2 = Weak Barrier, 3 = Moderate Barrier, 4 = Strong Barrier, 5 = Very Strong Barrier; a mean score for financial concerns was calculated by summing item responses (M = 3.34, SD = 1.24)

Planning issues as a perceived barrier to diffusion of WBDE. Respondents' perceptions about planning issues as a barrier to diffusion of WBDE were measured based on their responses to four items. Frequencies and percentages were used to represent the results. As Table 24 presents, 60% of respondents perceived "lack of identified need (perceived or real) for Web-based distance education" as a strong or very strong barrier. More than 70% of respondents perceived "lack of shared vision for the role of Web-based distance education in the organization" as a strong or very strong barrier. In addition, 80% of respondents perceived "lack of strategic planning for Web-based distance education" as a strong or very strong barrier. More than 58% of respondents viewed the "lack of a champion for Web-based distance education in the departments within the university" as a strong or very strong barrier. Overall, the mean and standard deviation for planning issues as a perceived barrier to diffusion of WBDE were M =

3.83 and *SD* = 1.01. Based on this result, faculty members at the two Saudi universities tended to perceive planning issues as a strong barrier to the diffusion of WBDE.

Table 24

Distribution of Respondents By Perceptions of Planning Issues as a Barrier to Diffusion of WBDE (N = 115)

	No Barrier		Weak Barrier		Moderate Barrier		Strong Barrier		Very Strong Barrier	
Statement	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
Lack of identified need (perceived or real) for Web-based distance education.	8	7.0	11	9.5	27	23.5	43	37.4	26	22.6
Lack of shared vision for the role of Web-based distance education in the organization.	5	4.3	7	6.1	22	19.1	37	32.2	44	38.3
Lack of strategic planning for Web-based distance education.	5	4.3	8	7.0	10	8.7	35	30.4	57	49.6
Lack of a champion for Web-based distance education in the departments within the university.	10	8.7	12	10.4	26	22.6	29	25.3	38	33.0

Note. Scale: 1 = No Barrier, 2 = Weak Barrier, 3 = Moderate Barrier, 4 = Strong Barrier, 5 = Very Strong Barrier; a mean score for planning issues was calculated by summing item responses (*M* = 3.83, *SD* = 1.01)

Fear of technology as a perceived barrier to diffusion of WBDE. Respondents' perceptions of fear of technology as a barrier to diffusion of WBDE were measured based on their responses to four items. Frequencies and percentages were used to represent the results. As Table 25 presents, about 49% of respondents perceived "threat to instructors' sense of competence and authority" as no barrier or a weak barrier. While about 45% of respondents perceived "belief that job security is threatened" as a moderate or strong barrier, approximately 37% of participants thought it was no barrier or a weak barrier. About 57% of respondents perceived "concern for legal issues (e.g., computer crime, hackers, software piracy, and copyright)" as a strong or very strong barrier. In addition, 47% of respondents perceived "increased isolation of instructors" as a moderate or strong barrier. Overall, the mean and standard deviation for fear of technology as a perceived barrier to diffusion of WBDE were M = 3.12 and SD = 1.15. Based on this result, faculty members at the two Saudi universities tended to perceive fear of technology as a moderate barrier to the diffusion of WBDE.

Table 25

Distribution of Respondents By Perceptions of Concerns About Fear of Technology as a Barrier to Diffusion of WBDE (N = 115)

	No Barrier		Weak Barrier		Moderate Barrier		Strong Barrier		Very Strong Barrier	
Statement	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
Threat to instructors' sense of competence and authority.	32	27.8	24	21.0	22	19.1	22	19.1	15	13.0
Belief that job security is threatened.	18	15.7	24	20.9	26	22.6	25	21.7	22	19.1

Table 25 (continued)

Statement	No Barrier		Weak Barrier		Moderate Barrier		Strong Barrier		Very Strong Barrier	
	f	%	*f*	%	*f*	%	*f*	%	*f*	%
Concern for legal issues (e.g., computer crime, hackers, software piracy, and copyright).	15	13.0	11	9.5	24	20.9	24	20.9	41	35.7
Increased isolation of instructors	19	16.5	17	14.8	30	26.1	24	20.9	25	21.7

Note. Scale: 1 = No Barrier, 2 = Weak Barrier, 3 = Moderate Barrier, 4 = Strong Barrier, 5 = Very Strong Barrier; a mean score for fear of technology was calculated by summing item responses (M = 3.12, SD = 1.15)

Conflict with traditional education as a perceived barrier to diffusion of WBDE.

Respondents' perceptions about conflict with traditional education as a barrier to diffusion of WBDE were measured based on their responses to four items. Frequencies and percentages were used to represent the results. As Table 26 presents, about 64% of participants perceived "competition with on-campus offerings or competition for existing students" as no barrier or a weak barrier. Similarly, 67% of participants perceived "disruption of the classroom's traditional social organization" as no barrier or a weak barrier. In addition, 53% of participants perceived "traditional academic calendar/schedule" as no barrier or a weak barrier. About 49% of respondents perceived the "lack of person-to-person contact (i.e., lack of face-to-face interaction with students; difficulty building rapport with participants at a distance)" as a moderate or strong barrier. Overall, the mean and standard deviation for conflict with traditional education as a perceived barrier to diffusion of WBDE were M = 2.53 and SD = 1.10. Based on this result,

faculty members at the two Saudi universities tended to perceive conflict with traditional education as a moderate barrier to the diffusion of WBDE.

Table 26

Distribution of Respondents By Perceptions About Conflict With Traditional Education as a Barrier to Diffusion of WBDE (N = 115)

	No Barrier		Weak Barrier		Moderate Barrier		Strong Barrier		Very Strong Barrier	
Statement	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
Competition with on-campus offerings or competition for existing students	45	39.1	28	24.3	21	18.3	13	11.3	8	7.0
Disruption of the classroom's traditional social organization.	43	37.4	34	29.6	16	13.9	12	10.4	10	8.7
Traditional academic calendar/schedule hinders Web-based distance education.	26	22.6	35	30.4	29	25.2	16	14.0	9	7.8
Lack of person-to-person contact (i.e., lack of face-to-face interaction with students; difficulty building rapport with participants at a distance).	18	15.7	19	16.5	31	27.0	25	21.7	22	19.1

Note. Scale: 1 = No Barrier, 2 = Weak Barrier, 3 = Moderate Barrier, 4 = Strong Barrier, 5 = Very Strong Barrier; a mean score for conflicts with traditional education was calculated by summing item responses ($M = 2.53$, $SD = 1.10$)

Technical expertise as a perceived barrier to diffusion of WBDE. Respondents' perceptions about technical expertise as a barrier to diffusion of WBDE were measured based on their responses to four items. Frequencies and percentages were used to represent the results. As Table 27 presents, about 76% of participants perceived "lack of technical support" as a strong or very strong barrier. Likewise, 80% of participants perceived "lack of training programs for Web-based distance education" as a strong or very strong barrier. In addition, more than 71% of participants perceived "lack of knowledge about Web-based distance education" as a strong or very strong barrier. More than 83% of participants perceived "lack of the 'right' people to implement Web-based distance education" as a strong or very strong barrier. Overall, the mean and standard deviation for technical expertise as a perceived barrier to diffusion of WBDE were $M = 4.1$ and $SD = 0.89$. Based on this result, faculty members at the two Saudi universities tended to perceive technical expertise as a strong barrier to the diffusion of WBDE.

Table 27

Distribution of Respondents By Perceptions About Technical Expertise as a Barrier to Diffusion of WBDE (N = 115)

	No Barrier		Weak Barrier		Moderate Barrier		Strong Barrier		Very Strong Barrier	
Statement	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
Lack of technical support	4	3.5	6	5.2	18	15.7	35	30.4	52	45.2
Lack of training programs for Web-based distance education.	3	2.6	6	5.2	14	12.2	41	35.7	51	44.3
Lack of knowledge about Web-based distance education.	5	4.3	4	3.5	24	20.9	43	37.4	39	33.9

Table 27 (continued)

Statement	No Barrier		Weak Barrier		Moderate Barrier		Strong Barrier		Very Strong Barrier	
	f	%	*f*	%	*f*	%	*f*	%	*f*	%
Lack of the "right" people to implement Web-based distance education.	3	2.6	3	2.6	13	11.3	40	34.8	56	48.7

Note. Scale: 1 = No Barrier, 2 = Weak Barrier, 3 = Moderate Barrier, 4 = Strong Barrier, 5 = Very Strong Barrier; a mean score for technical expertise was calculated by summing item responses (M = 4.10, SD = 0.89)

Administrative support as a perceived barrier to diffusion of WBDE. Respondents' perceptions about administrative support as a barrier to diffusion of WBDE were measured based on their responses to four items. Frequencies and percentages were used to represent the results. As Table 28 presents, more than 76% of participants perceived "lack of support or encouragement from administrators" as a strong or very strong barrier. About 59% of participants perceived "copyright/fair use issues" as a moderate or strong barrier and about 22% thought it was a very strong barrier. Similarly, 53% of respondents perceived "difficulty in recruiting faculty" as a moderate or strong barrier. While about 29% perceived "difficulty in recruiting students" as a weak barrier, about 43% thought it was a moderate or strong barrier. Overall, the mean and standard deviation for administrative support as a perceived barrier to diffusion of WBDE were M = 3.50 and SD = 0.94. Based on this result, faculty members at the two Saudi universities tended to perceive administrative support as a moderate barrier to the diffusion of WBDE.

Table 28

Distribution of Respondents By Perceptions About Administrative Support as a Barrier to Diffusion of WBDE (N = 115)

	No Barrier		Weak Barrier		Moderate Barrier		Strong Barrier		Very Strong Barrier	
Statement	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
Lack of support or encouragement from administrators.	6	5.2	4	3.5	18	15.7	32	27.8	55	47.8
Copyright/fair use issues in using materials in Web-based distance education.	8	7.0	15	13.0	37	32.2	30	26.1	25	21.7
Difficulty in recruiting faculty.	7	6.1	25	21.8	32	27.8	29	25.2	22	19.1
Difficulty in recruiting students.	10	8.7	33	28.7	26	22.6	23	20.0	23	20.0

Note. Scale: 1 = No Barrier, 2 = Weak Barrier, 3 = Moderate Barrier, 4 = Strong Barrier, 5 = Very Strong Barrier; a mean score for administrative support was calculated by summing item responses (M = 3.50, SD = 0.94)

Infrastructure as a perceived barrier to diffusion of WBDE. Respondents' perceptions about infrastructure as a barrier to diffusion of WBDE were measured based on their responses to four items. Frequencies and percentages were used to represent the results. As Table 29 presents, more than 78% of participants perceived the "lack of adequate technology-enhanced classrooms, labs, or infrastructure" as a strong or very strong barrier. More than 65% of participants perceived the "lack of adequate student access to computers and Internet" as a strong or very strong barrier. About 59% of the participants perceived the "lack of adequate

instructor access to computers and Internet" as a strong or very strong barrier. Moreover, more than 71% of participants perceived the "lack of library access or delivery of materials and services" as a strong or very strong barrier. Overall, the mean and standard deviation for conflict with traditional education as a perceived barrier to diffusion of WBDE were $M = 3.90$ and $SD = 1.00$. Based on this result, faculty members at the two Saudi universities tended to perceive infrastructure as a strong barrier to the diffusion of WBDE.

Table 29

Distribution of Respondents By Perceptions About Infrastructure as a Barrier to Diffusion of WBDE (N = 115)

	No Barrier		Weak Barrier		Moderate Barrier		Strong Barrier		Very Strong Barrier	
Statement	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
Lack of adequate technology-enhanced classroom/labs/infrastructure	6	5.2	8	7.0	11	9.6	29	25.2	61	53.0
Lack of adequate student access to computers and Internet.	4	3.5	13	11.3	23	20.0	42	36.5	33	28.7
Lack of adequate instructor access to computers and Internet.	12	10.4	9	7.8	27	23.5	37	32.2	30	26.1
Lack of library access or delivery of materials and services.	6	5.2	8	7.0	19	16.5	32	27.8	50	43.5

Note. Scale: 1 = No Barrier, 2 = Weak Barrier, 3 = Moderate Barrier, 4 = Strong Barrier, 5 = Very Strong Barrier; a mean score for infrastructure was calculated by summing item responses ($M = 3.90$, $SD = 1.00$)

Table 30 summarizes the overall means, standard deviations, and scales of the 10 perceived barriers to WBDE. A summative cumulative mean was calculated for each barrier. Interpretations for faculty perceptions about barriers to diffusion of on-line education were based on the following scales: 1—1.50 = no barrier, 1.51—2.50 = weak barrier, 2.51—3.50 = moderate barrier, 3.51—4.50 = strong barrier, and 4.51—5 = very strong barrier.

Table 30

Summary of Faculty Perspectives About Barriers

Perceived Barriers to WBDE	*M*	*SD*	Scale
Technical Expertise	4.10	0.89	Strong
Infrastructure	3.90	1.00	Strong
Planning Issues	3.83	1.01	Strong
Administrative Support	3.50	0.94	Moderate
Financial Concerns	3.34	1.24	Moderate
Concerns About Incentives	3.23	1.28	Moderate
Fear of Technology	3.12	1.15	Moderate
WBDE Credibility	3.06	1.14	Moderate
Concerns About Time	2.73	1.10	Moderate
Conflict with Traditional Education	2.53	1.10	Moderate

Note. Scale: 1 – 1.50 = No Barrier, 1.51 – 2.50 = Weak Barrier, 2.51 = 3.50 = Moderate Barrier, 3.51 = 4.50 = Strong Barrier, and 4.51 = 5.0 = Very Strong Barrier.

Findings Related to Question Three

The third question was designed to describe participating faculty by their current stage in the innovation-decision process related to online education. As discussed earlier, six stages were

used in this study to describe the innovation-decision process. These were: no knowledge, knowledge, persuasion, decision, implementation, and confirmation. Table 31 presents the distribution of participants based on their stages in the innovation-decision process regarding WBDE. Among the 115 participants, 15 (13%) reported no knowledge in regard to WBDE. More than half the participants were in the stages of either "knowledge" (*n* = 30, 26.20%) or "persuasion" (*n* = 32, 27.80%). The remaining participants were in the stages of "decision" (*n* = 15, 13%), "implementation" (*n* = 12, 10.40) or "confirmation" (*n* = 11, 9.60%).

Table 31

Distribution of Respondents By Current Stage in the Innovation-Decision Process (N = 115)

Stage	Description	*f*	%
No knowledge	I have not used Web-based distance education programs and have no plans for doing it.	15	13.00
Knowledge	Web-based distance education *may be* a way to reach more students in Saudi higher education.	30	26.20
Persuasion	Web-based distance education *is* a way to reach more students in Saudi higher education.	32	27.80
Decision	I know the benefits of Web-based distance education. In the near future, I will try it in my own teaching	15	13.00
Implementation	I am currently using Web-based distance education and it helps me reach students that otherwise do not have access to higher education programs	12	10.40
Confirmation	I have used Web-based distance education for more than one semester and plan on continuing to do so.	11	9.60

Findings Related to Question Four

The purpose of the fourth question was to examine whether faculty's selected personal characteristics (including age, years of teaching, DE experience, gender, academic rank, nationality, and level of education) impacted their perceptions about attributes of online education. The relationship between each of the five attributes of online education (relative advantage, compatibility, complexity, trialability, and observability) and faculty's selected characteristics was analyzed and described using multiple regression procedures. Below are the results for each multiple regression analysis.

Predicting perceived relative advantage of WBDE from personal characteristics. A simultaneous multiple regression was performed to determine the accuracy of predicting perceived relative advantage of WBDE from faculty's personal characteristics (nationality, age, gender, academic rank, level of education, teaching experience, and distance education). Regression results indicated that the overall model significantly predicted perceived relative advantage, $R^2 = .15$, $R^2_{adj} = .09$, $F(7, 107) = 2.63$, $p < .05$. This model accounted for 15% of variance in perceived relative advantage. A summary of regression coefficients is presented in Table 32 and indicates that only one variable (DE experience) of the seven variables significantly contributed to the model, $\beta = .33$, $t(107) = 6.53$, $p < .05$. The size and direction of the relationship between DE experience and perceived relative advantage of WBDE suggested that faculty members who had teaching experience with DE reported higher perceived relative advantage than those who had no teaching experience with DE. More specifically, having DE experience led to a predicted increase in relative advantage of 0.33, all other predictors held constant.

To draw conclusions about a population based on a regression analysis done on a sample, several assumptions must be met (Tabachnick & Fidell, 1996). These include: (a) the linearity assumption (i.e., each predictor in the linear combination of predictors is linearly related to the criterion), (b) the independence of errors assumption (i.e., prediction errors are random and independent of one another), (c) the homoscedasticity assumption (i.e., prediction errors have the same variance across levels of the predictor), the normality of residuals assumption (i.e., prediction errors are normally distributed), and the assumption of no multicollinearity (i.e., no perfect linear relationship between two or more of the predictors). Each of these assumptions was investigated.

Table 32

Summary of Multiple Regression Analysis For Personal Variables Predicting Perceived Relative Advantage (N = 115)

Variable	*B*	*SE B*	*β*
Constant	3.79	0.26	
Nationality	-0.09	0.19	-0.06
Gender	0.09	0.17	0.06
Age	-0.14	0.09	-0.26
Academic Rank	0.08	0.11	0.12
Level of Education	-0.10	0.21	-0.10
Teaching Experience	0.14	0.09	0.21
DE Experience	0.57	0.17	0.33*

Note. $R^2 = .15$*; * Significant at* $p < .05$.

A scatterplot of residuals was created to check the assumptions of linearity, independence of errors, and homoscedasticity. These three assumptions were met since all residuals fall within ± 2 standard errors, errors in prediction happened randomly, and there was a constant scatter of residuals across all values of relative advantage. A normal histogram of the standardized residuals and a normal probability plot were created to check the assumption of normality of residuals. This assumption was also met since residuals were relatively close to the diagonal line. Finally, the assumption of no multicollinearity was checked using the tolerance values. The tolerance values of the seven predictors were all greater than .20. Thus, there was little multicollinearity in this model.

Predicting perceived compatibility of WBDE from personal characteristics. A simultaneous multiple regression was performed to determine the accuracy of predicting perceived compatibility of WBDE from faculty's personal characteristics (nationality, age, gender, academic rank, level of education, teaching experience, and distance education). Regression results indicated that the overall model significantly predicted perceived relative advantage, $R^2 = .15$, $R^2_{adj} = .09$, $F(7, 107) = 2.70$, $p < .05$. This model accounted for 15% of variance in perceived compatibility. A summary of regression coefficients is presented in Table 33 and indicates that only one variable (DE experience) of the seven variables significantly contributed to the model, $\beta = .32$, $t(107) = 3.34$, $p < .05$. The regression assumptions were checked using the same steps discussed earlier and all were defensible.

The size and direction of the relationship between DE experience and perceived compatibility of WBDE suggest that faculty members who had teaching experience with DE reported higher perceived compatibility of WBDE than those who had no teaching experience

with DE. More specifically, having DE experience led to a predicted increase in compatibility of 0.32, all other predictors held constant.

Table 33

Summary of Multiple Regression Analysis For Personal Variables Predicting Perceived Compatibility (N = 115)

Variable	*B*	*SE B*	*β*
Constant	3.24	0.28	
Nationality	-0.22	0.20	-0.13
Gender	-0.03	0.18	-0.02
Age	-0.09	0.10	-0.16
Academic Rank	0.16	0.12	0.23
Level of Education	-0.19	0.22	-0.18
Teaching Experience	0.15	0.10	0.21
DE Experience	0.59	0.18	0.32*

Note. R^2 = .15; * Significant at $p < .05$.

Predicting perceived trialability of WBDE from personal characteristics. A simultaneous multiple regression was performed to determine the accuracy of predicting perceived trialability of WBDE from faculty's personal characteristics (nationality, age, gender, academic rank, level of education, teaching experience, and distance education). Regression results indicated that the overall model did not significantly predict perceived trialability, R^2= .12, $F(7, 107) = 2.01$, $p > .05$. Table 34 presents a summary of regression coefficients.

Table 34

Summary of Multiple Regression Analysis for Personal Variables Predicting Perceived Trialability (N = 115)

Variable	*B*	*SE B*	*β*
Constant	3.29	0.34	
Nationality	0.11	0.24	0.06
Gender	-0.27	0.22	-0.12
Age	-0.06	0.12	-0.09
Academic Rank	-.39	0.15	0.49
Level of Education	-0.67	0.27	-0.53
Teaching Experience	0.14	0.12	0.17
DE Experience	0.33	0.21	0.15

Note. $R^2 = .12$.

Predicting perceived observability of WBDE from personal characteristics. A simultaneous multiple regression was performed to determine the accuracy of predicting perceived observability of WBDE from faculty's personal characteristics (nationality, age, gender, academic rank, level of education, teaching experience, and distance education). Regression results indicated that the overall model significantly predicted perceived observability, $R^2 = .26$, $R^2_{adj} = .21$, $F(7, 107) = 5.30$, $p < .05$. This model accounted for 26% of variance in perceived observability. A summary of regression coefficients is presented in Table 35 and indicates that only one variable (DE experience) of the seven variables significantly

contributed to the model, $\beta = .50$, $t(107) = 5.59$, $p < .001$. The regression assumptions were checked using the same steps discussed earlier and all were defensible.

The size and direction of the relationship between DE experience and perceived observability of WBDE suggested that faculty members who had teaching experience with DE reported higher perceived observability of WBDE than those who had no teaching experience with DE. More specifically, having DE experience led to a predicted increase in observability of 0.50, all other predictors held constant.

Table 35

Summary of Multiple Regression Analysis for Person Variables Predicting Perceived Observability (N = 115)

Variable	*B*	*SE B*	*β*
Constant	2.98	0.24	
Nationality	0.18	0.17	0.11
Gender	0.11	0.15	0.07
Age	0.04	0.08	0.08
Academic Rank	0.09	0.10	0.14
Level of Education	-0.17	0.19	-0.18
Teaching Experience	-0.04	0.08	-0.06
DE Experience	0.84	0.15	0.50*

Note. $R^2 = .26$; * Significant at $p < .05$.

Predicting perceived complexity of WBDE from personal characteristics. A simultaneous multiple regression was performed to determine the accuracy of predicting perceived complexity of WBDE from faculty's personal characteristics (nationality, age, gender, academic rank, level of education, teaching experience, and distance education). Regression results indicated that the overall model significantly predicted perceived complexity, $R^2 = .16$, $R^2_{adj} = .10$, $F(7, 107) = 2.81$, $p < .05$. This model accounted for 16% of variance in perceived complexity. A summary of regression coefficients is presented in Table 36 and indicates that only one variable (DE experience) of the seven variables significantly contributed to the model, $\beta = .28$, $t(107) = 2.92$, $p < .05$. The regression assumptions were checked using the same steps discussed earlier and all were defensible.

The size and direction of the relationship between DE experience and perceived observability of WBDE suggests that faculty members who had teaching experience with DE reported higher perceived complexity of WBDE than those who had not. More specifically, having DE experience led to a predicted increase in complexity of 0.28, all other predictors held constant.

Table 36

Summary of Multiple Regression Analysis for Personal Variables Predicting Perceived Complexity (N = 115)

Variable	*B*	*SE B*	*β*
Constant	3.37	0.27	
Nationality	-0.02	0.19	-0.01
Gender	-0.26	0.17	-0.15
Age	-0.14	0.99	-0.26

Table 36 (continued)

Variable	*B*	*SE B*	*β*
Academic Rank	0.15	0.15	0.23
Level of Education	-0.22	0.21	-0.21
Teaching Experience	0.17	0.10	0.26
DE Experience	0.49	0.17	0.28*

Note. $R^2 = .16$; * Significant at $p < .05$.

Findings Related to Question Five

The purpose of the fifth research question was to examine whether faculty's selected personal characteristics (including age, years of teaching, DE experience, gender, academic rank, nationality, and level of education) impacted their perceptions about barriers to diffusion of online education. The relationship between each of the 10 barriers to online education (concerns about time, concerns about incentives, online program credibility, financial concerns, planning issues, conflict with traditional education, fear of technology, technical expertise, administrative support, and infrastructure) and faculty's selected characteristics was analyzed and described using multiple regression procedures. Below are the results for each multiple regression analysis.

Predicting perceived concerns about time. A simultaneous multiple regression was performed to determine the accuracy of predicting perceived concerns about time from faculty's personal characteristics (nationality, age, gender, academic rank, level of education, teaching experience, and distance education). Regression results indicated that the overall model did not

significantly predict perceived concerns about time, $R^2 = .11$, $F(7, 107) = 1.82$, $p > .05$. Table 37 presents a summary of regression coefficients.

Table 37

Summary of Multiple Regression Analysis for Personal Variables Predicting Perceived Concerns About Time (N = 115)

Variable	*B*	*SE B*	*β*
Constant	2.83	0.36	
Nationality	0.31	0.25	0.14
Gender	-0.06	0.23	-0.03
Age	-0.19	0.13	-0.26
Academic Rank	0.43	0.16	0.50
Level of Education	-0.49	0.29	-0.37
Teaching Experience	0.20	0.13	0.24
DE Experience	-0.30	0.23	-0.13

Note. $R^2 = .11$.

Predicting perceived concerns about incentives. A simultaneous multiple regression was performed to determine the accuracy of predicting perceived concerns about incentives from faculty's personal characteristics (nationality, age, gender, academic rank, level of education, teaching experience, and distance education). Regression results indicated that the overall model did not significantly predict perceived concerns about incentives, $R^2 = .12$, $F(7, 107) = 1.99$, $p > .05$. Table 38 presents a summary of regression coefficients.

Table 38

Summary of Multiple Regression analysis for Personal Variables Predicting Perceived Concerns About Incentives (N=115)

Variable	*B*	*SE B*	*β*
Constant	4.10	0.42	
Nationality	0.26	0.30	0.10
Gender	-0.38	0.27	-0.14
Age	-0.31	0.15	-0.37
Academic Rank	0.49	0.18	0.50
Level of Education	-0.66	0.33	-0.43
Teaching Experience	0.14	0.15	0.14
DE Experience	0.04	0.26	0.02

Note. R^2 = .12.

Predicating perceived WBDE program credibility. A simultaneous multiple regression was performed to determine the accuracy of predicting perceived WBDE program credibility from faculty's personal characteristics (nationality, age, gender, academic rank, level of education, teaching experience, and distance education). Regression results indicated that the overall model did not significantly predict perceived WBDE program credibility, R^2= .04, F(7, 107) = 0.60, p > .05. Table 39 presents a summary of regression coefficients.

Table 39

Summary of Multiple Regression Analysis for Personal Variables Predicting Perceived WBDE Creditibility (N = 115)

Variable	*B*	*SE B*	*β*
Constant	3.45	0.39	
Nationality	0.23	0.28	0.10
Gender	-0.09	0.25	-0.04
Age	-0.04	0.14	-0.05
Academic Rank	0.18	0.17	0.20
Level of Education	-0.47	0.31	-0.34
Teaching Experience	0.15	0.14	0.17
DE Experience	-0.22	0.25	-0.09

Note. $R^2 =$ .04.

Predicting perceived financial concerns. A simultaneous multiple regression was performed to determine the accuracy of predicting perceived financial concerns from faculty's personal characteristics (nationality, age, gender, academic rank, level of education, teaching experience, and distance education). Regression results indicated that the overall model significantly predicted perceived financial concerns, $R^2 = .25$, $R^2_{adj} = .20$, $F(7, 107) = 5.15$, $p < .05$. This model accounted for 25% of variance in perceived financial concerns. Of the seven variables, four variables significantly contributed to the model: nationality $\beta = .26$, $t(107) = 2.50$, $p < .05$; age, $\beta = -.35$, $t(107) = -2.21$, $p < .05$, academic rank, $\beta = .74$, $t(107) = 4.40$; $p < .05$., and level of education, $\beta = -.73$, $t(107) = -3.72$, $p < .05$. A summary of regression coefficients is

presented in Table 40. The regression assumptions were checked using the same steps discussed earlier and all were defensible.

The size and direction of the relationships between perceived financial concerns and the four significant variables suggest that non-Saudi faculty members tended to view financial concerns as a barrier to WBDE significantly more so than Saudi faculty members. In addition, the regression results indicated that faculty perceptions of financial concerns decreased as their age and level of education increased. On the other hand, faculty perceptions of financial concerns increased as their academic rank increased.

Among the four significant variables, academic rank was the strongest predicator of facultys perceptions of financial concerns. More specifically, being a non-Saudi faculty member led to a predicted increase in financial concern of 0.26, all other predictors held constant. A one point increase in academic rank (i.e., from one rank to a higher one) was associated with a 0.74 increase in financial concerns, all other predictors held constant. On the other hand, a one point increase in level of education (i.e., from one level of education to a higher one) was associated with a 0.73 decrease in financial concerns, all other predictors held constant. A one point increase in age (i.e., from one age group to a higher one) led to a predicted decrease in financial concerns of 0.35, all other predictors held constant.

Table 40

Summary of Multiple Regression analysis for Personal Variables Predicting Perceived Financial Concerns (N = 115)

Variable	*B*	*SE B*	*β*
Constant	4.38	0.37	
Nationality	0.66	0.26	0.26*
Gender	0.25	0.24	0.10
Age	-0.29	0.13	-0.35*
Academic Rank	0.71	0.16	0.74*
Level of Education	-1.10	0.30	-0.73*
Teaching Experience	0.05	0.13	0.05
DE Experience	0.09	0.24	0.03

Note. $R^{2 =}$ .25; * Significant at $p < .05$.

Predicting perceived planning issues. A simultaneous multiple regression was performed to determine the accuracy of predicting perceived planning issues from faculty personal characteristics (nationality, age, gender, academic rank, level of education, teaching experience, and distance education). Regression results indicated that the overall model did not significantly predict perceived planning issues, $R^2 = .02$, $F(7, 107) = 0.26$, $p > .05$. Table 41 presents a summary of regression coefficients.

Table 41

Summary of Multiple Regression Analysis for Personal Variables Predicting Perceived Planning Issues (N = 115)

Variable	*B*	*SE B*	*β*
Constant	4.19	0.35	
Nationality	0.01	0.25	0.01
Gender	0.01	0.22	0.00
Age	0.06	0.12	0.08
Academic Rank	0.06	0.15	0.08
Level of Education	-0.25	0.28	-0.20
Teaching Experience	-0.06	0.12	-0.07
DE Experience	0.03	0.22	0.01

Note. $R^2 = .02$.

Predicting perceived fear of technology. A simultaneous multiple regression was performed to determine the accuracy of predicting perceived fear of technology from faculty's personal characteristics (nationality, age, gender, academic rank, level of education, teaching experience, and distance education). Regression results indicated that the overall model did not significantly predict perceived fear of technology, $R^2 = .07$, $F(7, 107) = 1.22$, $p > .05$. Table 42 presents a summary of regression coefficients.

Table 42

Summary of Multiple Regression Analysis for Personal Variables Predicting Perceived Fear of Technology (N = 115)

Variable	*B*	*SE B*	*β*
Constant	3.36	0.39	
Nationality	0.41	0.27	0.18
Gender	0.25	0.25	0.10
Age	0.10	0.13	0.14
Academic Rank	0.29	0.17	0.32
Level of Education	-0.46	0.31	-0.33
Teaching Experience	-0.20	0.14	-0.22
DE Experience	-0.21	0.24	-0.08

Note. R^2 = .07.

Predicting perceived conflict with traditional education. A simultaneous multiple regression was performed to determine the accuracy of predicting perceived conflict with traditional education from faculty's personal characteristics (nationality, age, gender, academic rank, level of education, teaching experience, and distance education). Regression results indicated that the overall model did not significantly predict perceived conflict with traditional education, R^2= .08, $F(7, 107) = 1.37$, $p > .05$. Table 43 presents a summary of regression coefficients.

Table 43

Summary of Multiple Regression Analysis for Personal Variables Predicting Perceived Conflict (N = 115)

Variable	*B*	*SE B*	*β*
Constant	2.47	0.36	
Nationality	0.42	0.26	0.19
Gender	0.08	0.23	0.03
Age	-0.03	0.13	-0.05
Academic Rank	0.07	0.16	0.08
Level of Education	-0.14	0.29	-0.11
Teaching Experience	0.12	0.13	0.14
DE Experience	-0.55	0.23	-0.24

Note. R^2 = .08.

Predicting perceived technical expertise. A simultaneous multiple regression was performed to determine the accuracy of predicting perceived technical expertise from faculty's personal characteristics (nationality, age, gender, academic rank, level of education, teaching experience, and distance education). Regression results indicated that the overall model did not significantly predict perceived technical expertise, R^2= .07, $F(7, 107) = 1.12$, $p > .05$. Table 44 presents a summary of regression coefficients.

Table 44

Summary of Multiple Regression Analysis for Personal Variables Predicting Perceived Technical Expertise (N = 115)

Variable	*B*	*SE B*	*β*
Constant	4.41	0.30	
Nationality	0.35	0.21	0.19
Gender	0.14	0.19	0.08
Age	0.00	0.10	0.00
Academic Rank	0.10	0.13	0.14
Level of Education	-0.24	0.24	-0.22
Teaching Experience-	-0.14	0.11	-0.20
DE Experience	0.26	0.19	0.14

Note. $R^2 = .07$.

Predicting perceived administrative support. A simultaneous multiple regression was performed to determine the accuracy of predicting perceived administrative support from faculty's personal characteristics (nationality, age, gender, academic rank, level of education, teaching experience, and distance education). Regression results indicated that the overall model did not significantly predict perceived administrative support, $R^2 = .04$, $F(7, 107) = 1.21$, $p > .05$. Table 45 presents a summary of regression coefficients.

Table 45

Summary of Multiple Regression Analysis for Personal Variables Predicting Perceived Administrative Support (N = 115)

Variable	*B*	*SE B*	*β*
Constant	3.59	0.31	
Nationality	0.25	0.22	0.13
Gender	0.04	0.20	0.02
Age	0.21	0.11	0.34
Academic Rank	-0.12	0.14	-0.17
Level of Education	0.01	0.25	0.01
Teaching Experience	-0.23	0.11	-0.31
DE Experience	-0.18	0.20	-0.09

Note. $R^2 = .07$.

Predicting perceived infrastructure. A simultaneous multiple regression was performed to determine the accuracy of predicting perceived infrastructure from faculty's personal characteristics (nationality, age, gender, academic rank, level of education, teaching experience, and distance education). Regression results indicated that the overall model did not significantly predict perceived infrastructure, $R^2 = .09$, $F(7, 107) = 1.54$, $p > .05$. Table 46 presents a summary of regression coefficients.

Table 46

Summary of Multiple Regression Analysis for Personal Variables Predicting Perceived Infrastructure (N = 115)

Variable	*B*	*SE B*	*β*
Constant	4.44	0.33	
Nationality	0.20	0.23	0.10
Gender	0.07	0.21	0.03
Age	-0.05	0.12	-0.07
Academic Rank	0.00	0.14	0.00
Level of Education	-0.07	0.26	-0.06
Teaching Experience	-0.19	0.12	-0.24
DE Experience	0.04	0.21	0.02

Note. R^2 = .09.

Findings Related to Question Six

The sixth question was designed to examine the relationship between faculty member's selected personal characteristics (including age, years of teaching, DE experience, gender, academic rank, professional area, nationality, and level of education) and their stage in the innovation-decision process (No knowledge, Knowledge, Persuasion, Decision, Implementation, and Confirmation). The relationship between each of the eight personal variables and faculty member's stage in the innovation-decision process was analyzed and described using two-way contingency tables and chi-square test of independence. Following are the results for each analysis.

Faculty's stage in the innovation-decision process by nationality. A two-way contingency table analysis was conducted to evaluate whether faculty of different nationalities had a significantly different response to the following statement: "Select the one statement that best reflects your current attitude toward distance education." The two variables were faculty's stage in the innovation-decision process regarding online education with six levels (No Knowledge, Knowledge, Persuasion, Decision, Implementation, and Confirmation) and nationality of faculty member with two levels (Saudi and Non-Saudi). Faculty's stage in the innovation-decision process and their nationality were found to be independent, Pearson X^2 (5, N= 115) = 5.22, p= .39, two-tailed. Table 47 presents the expected and observed frequencies for each combination of categories.

Table 47

Faculty's Stage in the Innovation-Decision Process By Nationality (N = 115)

	Nationality		
Stage	Saudi	Non-Saudi	Row Totals
No knowledge	10 (8.5)	5 (6.5)	15
Knowledge	13 (17.0)	17 (13.0)	30
Persuasion	21 (18.1)	11 (13.9)	32
Decision	10 (8.5)	5 (6.5)	15
Implementation	6 (6.8)	6 (5.2)	12
Confirmation	5 (6.2)	6 (4.8)	11
Column Totals	65	50	115

Note. Numbers in parentheses are expected frequencies.

Faculty's stage in the innovation-decision process by educational level. A two-way contingency table analysis was conducted to evaluate whether faculty with different educational levels had a significantly different rate of responses to the following statement: "Select the one statement that best reflects your current attitude toward distance education." The two variables were faculty's stage in the innovation-decision process in regard to online education with six levels (No Knowledge, Knowledge, Persuasion, Decision, Implementation, and Confirmation) and faculty's highest educational level obtained for three levels (Bachelor's, Master's, and Doctorate).

Since the majority of the expected frequencies fell below 5, two cells (Bachelor's and Master's) were combined to create a new table composed of fewer cells with larger frequencies as suggested by Harris (1995). Thus, the educational level variable was recoded to include two response categories (1= Bachelor's/Master's, and 2= Doctorate) rather than three.

Faculty's stage in the innovation-decision process and their educational level were found to be independent, Pearson X^2 (5, N= 115) = 6.93, p= .23, two-tailed. Table 48 presents the expected and observed frequencies for each combination of categories.

Table 48

Faculty's Stage in the Innovation-Decision Process By Education Level (N = 115)

	Education Level		
Stage	Bachelor's/Masters	Doctorate Level	Row Totals
No knowledge	8 (6.4)	7 (8.6)	15
Knowledge	10 (12.8)	20 (17.2)	30
Persuasion	18 (13.6)	14 (18.4)	32
Decision	6 (6.4)	9 (8.6)	15

Table 48 (continued)

	Education Level		
Stage	Bachelor's/Masters	Doctorate Level	Row Totals
Implementation	5 (5.1)	7 (6.9)	12
Confirmation	2 (4.7)	9 (6.3)	11
Column Totals	49	66	115

Note. Numbers in parentheses are expected frequencies.

Faculty's stage in the innovation-decision process by teaching experience. A two-way contingency table analysis was conducted to evaluate whether faculty by different teaching experience levels had a significantly different rate of responses to the following statement: "Select the one statement that best reflects your current attitude toward distance education." The two variables were faculty's stage in the innovation-decision process in regard to online education with six levels (No Knowledge, Knowledge, Persuasion, Decision, Implementation, and Confirmation) and faculty teaching experience with five levels (Less than 5 Years, 5 to 9 Years, 10 to 14 Years, 15 to 19 years, and More than 19 Years).

Since the majority of the expected frequencies fell below 5, some cells were combined to create a new table composed of fewer cells with larger frequencies as suggested by Harris (1995). Thus, the teaching experience level variable was recoded to include two response categories (1 = Less than 10 Years and 2 = 10 Years or more) rather than five.

Faculty's stage in the innovation-decision process and their teaching experience were found to be independent, Pearson X^2 (5, N= 115) = 1.56, p= .91, two-tailed. Table 49 presents the expected and observed frequencies for each combination of categories.

Table 49

Faculty's Stage in the Innovation-Decision Process By Teaching Experience (N= 115)

	Teaching Experience		
Stage	Less than 10 Years	More Than 10 Years	Row Totals
No knowledge	10 (9.8)	5 (5.2)	15
Knowledge	20 (19.6)	10 (10.4)	30
Persuasion	21 (20.9)	11 (11.1)	32
Decision	10 (9.8)	5 (5.2)	15
Implementation	6 (7.8)	6 (4.2)	12
Confirmation	8 (7.2)	3 (3.8)	11
Column Totals	75	40	115

Note. Numbers in parentheses are expected frequencies.

Faculty's stage in the innovation-decision process by distance education experience. A two-way contingency table analysis was conducted to evaluate whether faculty with different DE experience had a significantly different rate of responses to the following statement: "Select the one statement that best reflects your current attitude toward distance education." The two variables were faculty's stage in the innovation-decision process in regard to online education with six levels (No Knowledge, Knowledge, Persuasion, Decision, Implementation, and Confirmation) and faculty DE experience with two levels (Have no DE Experience, Have DE Experience). Faculty's stage in the innovation-decision process and their DE teaching experience were significantly related, Pearson X^2 (5, N= 115) = 41.73, $p < .001$, Cramer's V =

.60, two-tailed. Table 50 presents the expected and observed frequencies for each combination of categories.

Table 50

Faculty's Stage in the Innovation-Decision Process By DE Experience (N = 115)

	DE Experience		
Stage	No	Yes	Row Totals
No knowledge	14 (10)	1 (5)	15
Knowledge	21 (20.1)	9 (9.9)	30
Persuasion	25 (21.4)	7 (10.6)	32
Decision	14 (10)	1 (5)	15
Implementation	2 (8)	10 (4)	12
Confirmation	1 (7.4)	10 (3.6)	11
Column Totals	77	38	115

Note. Numbers in parentheses are expected frequencies

The significant chi-square test was broken down using standardized residuals. Of the 12 standardized residuals, four were significant at $p < .05$. At the implementation stage, the standardized residual was significant for both those who had teaching experience with DE (z = 3.0) and those who had no experience (z = -2.1). The expected and observed frequencies within the two cells indicated that at the implementation stage, more faculty members than expected had DE teaching experience and less faculty members than expected had no DE experience. Based on the odds ratio, the odds of faculty members at the implementation stage who had DE experience were five times higher than those who had no DE experience.

Likewise, at the confirmation stage, the standardized residual was significant for both those who had teaching experience with DE (z = 3.3) and those who had no DE experience (z = -2.3). The expected and observed frequencies within the two cells indicated that at the confirmation stage, more faculty members than expected had DE teaching experience and fewer faculty members than expected had no DE experience. Based on the odds ratio, the odds of faculty members at the confirmation stage who had DE experience were 10 times higher than those who had no DE experience.

Faculty's stage in the innovation-decision process by professional area. A two-way contingency table analysis was conducted to evaluate whether faculty by different professional areas had a significantly different rate of responses to the following statement: "Select the one statement that best reflects your current attitude toward distance education." The two variables were faculty's stage in the innovation-decision process in regard to online education with six levels (No Knowledge, Knowledge, Persuasion, Decision, Implementation, and Confirmation) and faculty's professional area with 10 levels (Education, Arts, Economic, Engineering, Science, Medicine, Computer Science, Applied Medical Sciences, Community, and Health Sciences). Since the majority of the expected frequencies fell below five, similar professional areas were combined to create a new table composed of fewer cells with larger frequencies as suggested by Harris (1995). Thus, the professional area variable was recoded to include two response categories (1 = Arts and Humanities Colleges and 2 = Science Colleges) rather than 10 categories. Faculty's stage in the innovation-decision process and their professional areas were found to be independent, Pearson X^2 (5, N= 115) = 5.76, p = .33, two-tailed. Table 51 presents the expected and observed frequencies for each combination of categories.

Table 51

Faculty's Stage in the Innovation-Decision Process By Professional Area (N = 115)

	Professional Area		
Stage	Humanities Colleges	Science Colleges	Row Totals
No knowledge	10 (8.5)	5 (6.5)	15
Knowledge	21 (17)	9 (13)	30
Persuasion	17 (18.1)	15 (13.9)	32
Decision	6 (8.5)	9 (6.5)	15
Implementation	5 (6.8)	7 (5.2)	12
Confirmation	6 (6.2)	5 (4.8)	11
Column Totals	65	50	115

Note. Numbers in parentheses are expected frequencies.

Faculty's stage in the innovation-decision process by age. A two-way contingency table analysis was conducted to evaluate whether faculty by different age groups had a significantly different rate of responses to the following statement: "Select the one statement that best reflects your current attitude toward distance education." The two variables were faculty's stage in the innovation-decision process in regard to online education with six levels (No Knowledge, Knowledge, Persuasion, Decision, Implementation, and Confirmation) and faculty's age group with seven levels (Less than 30 Years, 30 to 34 Years, 35 to 39 Years, 40 to 44 Years, 45 to 49 Years, 50 to 54 Years, and More than 54 Years). Since the majority of the expected frequencies fell below five, some age cells were combined to create a new table composed of fewer cells with larger frequencies as suggested by Harris (1995). Thus, the age variable was

recoded to include two response categories (1= Less than 40 Years, and 2= 40 or More) rather than seven categories. The age of 40 was chosen as the line of demarcation because the lowest expected frequencies were in the age groups above 40. Faculty's stage in the innovation-decision process and their age group were found to be independent, Pearson X^2 (5, N = 115) = 4.30, p = .51, two-tailed. Table 52 presents the expected and observed frequencies for each combination of categories.

Table 52

Faculty's Stage in the Innovation-Decision Process By Age (N = 115)

	Age Groups		
Stage	Less than 40	More than 40	Row Totals
No knowledge	11 (9.4)	4 (5.6)	15
Knowledge	17 (18.8)	13 (11.2)	30
Persuasion	21 (20)	11 (12)	32
Decision	11 (9.4)	4 (5.6)	15
Implementation	5 (7.5)	7 (4.5)	12
Confirmation	7 (6.9)	4 (4.1)	11
Column Totals	72	43	115

Note. Numbers in parentheses are expected frequencies.

Faculty's stage in the innovation-decision process by academic rank. A two-way contingency table analysis was conducted to evaluate whether faculty of different academic ranks had a significantly different rate of responses to the following statement: "Select the one statement that best reflects your current attitude toward distance education." The two variables

were faculty's stage in the innovation-decision process in regard to online education with six levels (No Knowledge, Knowledge, Persuasion, Decision, Implementation, and Confirmation) and faculty academic ranks with five levels (Instructor, Lecturer, Assistant Professor, Associate Professor, and Full Professor). Since the majority of the expected frequencies fell below five, some cells were combined to create a new table composed of fewer cells with larger frequencies as suggested by Harris (1995). Thus, the academic rank variable was recoded to include two response categories (1= Instructor/Lecturer, and 2= Assistant Professor/Associate Professor/Full Professor) rather than five. Thus, tenured faculty members were separated from untenured faculty members. Faculty's stage in the innovation-decision process and their academic rank were found to be independent, Pearson X^2 (5, N = 115) = 6.93, p = .23, two-tailed. Table 53 presents the expected and observed frequencies for each combination of categories.

Table 53

Faculty' Stage in the Innovation-Decision Process by Academic Rank (N = 115)

	Academic Rank		
Stage	Instructors & Lecturers	Assistant/Associate/Full Professors	Row Totals
No knowledge	8 (6.4)	7 (8.6)	15
Knowledge	10 (12.8)	20 (17.2)	30
Persuasion	18 (13.6)	14 (18.4)	32
Decision	6 (6.4)	9 (8.6)	15
Implementation	5 (5.1)	7 (6.9)	12
Confirmation	2 (4.7)	9 (6.3)	11
Column totals	49	66	115

Note. Numbers in parentheses are expected frequencies.

Faculty's stage in the innovation-decision process by gender. A two-way contingency table analysis was conducted to evaluate whether faculty by gender had a significantly different rate of responses to the following statement: "Select the one statement that best reflects your current attitude toward distance education." The two variables were faculty's stage in the innovation-decision process in regard to online education with six levels (No Knowledge, Knowledge, Persuasion, Decision, Implementation, and Confirmation) and faculty gender with two levels (Male and Female). Faculty's stage in the innovation-decision process and their gender were found to be independent, Pearson X^2 (5, N = 115) = 9.34, p = .09, two-tailed. Table 54 presents the expected and observed frequencies for each combination of categories.

Table 54

Faculty's Stage in the Innovation-Decision Process By Gender (N = 115)

	Gender		
Stage	Male	Female	Row Totals
No knowledge	10 (9.8)	5 (5.2)	15
Knowledge	18 (19.6)	12 (10.4)	30
Persuasion	18 (20.9)	14 (11.1)	32
Decision	8 (9.8)	7 (5.2)	15
Implementation	11 (7.8)	1 (4.2)	12
Confirmation	10 (7.2)	1 (3.8)	11
Column Totals	75	40	115

Note. Numbers in parentheses are expected frequencies.

Findings Related to Question Seven

The final question in this study examined the relationship between faculty attitudes toward the problem of limited access to higher education of students in Saudi Arabia and their stage in the innovation-decision process in regard to online education. The relationship between the two variables was analyzed and described using two-way contingency tables and chi-square test of independence.

A two-way contingency table analysis was conducted to evaluate whether faculty who had different attitudes towards the problem of limited access of higher education had a significantly different rate of responses to the following statement: "Select the one statement that best reflects your current attitude toward distance education." The two variables were faculty's stage in the innovation-decision process in regard to online education with six levels (No Knowledge, Knowledge, Persuasion, Decision, Implementation, and Confirmation) and faculty attitudes towards the problem of limited access to higher education with three levels (Agree, Disagree, and Not Sure).

Since some of the expected frequencies fell below five, two cells (Disagree and Not Sure) were combined to create a new table composed of fewer cells with larger frequencies as suggested by Harris (1995). Thus, the attitude variable was recoded to include two response categories (1= Agree, and 2= Disagree/Not Sure) rather than three response categories.

Faculty's stage in the innovation-decision process and their attitudes towards the problem of limited access of higher education were found to be independent, Pearson X^2 (5, N = 115) = 4.34, p = .50, two-tailed. Table 55 presents the expected and observed frequencies for each combination of categories.

Table 55

Faculty's Stage in the Innovation-Decision Process By Their Attitudes Towards the Problem of Limited Access (N = 115)

	Attitudes		
Stage	Agree	Disagree/Not Sure	Row Totals
No knowledge	8 (9.3)	7 (5.7)	15
Knowledge	15 (18.5	15 (11.5)	30
Persuasion	22 (19.8)	10 (12.2)	32
Decision	9 (9.3)	6 (5.7)	15
Implementation	9 (7.4)	3 (4.6)	12
Confirmation	8 (6.8)	3 (4.2)	11
Column Totals	71	44	115

Note. Numbers in parentheses are expected frequencies

Open-Ended Questions Results

The final part of the survey was open-ended questions. Participating faculty members were asked to respond to two open-ended questions. The collected data was categorized and ranked based on the highest frequency.

Question one. *Please give two primary reasons why you would use (or not use) Web-based distance education to deliver instruction.* Table 56 and Table 57 summarize the data analysis based on faculty responses to this question. Some of these attributes and barriers were mentioned in the survey of this study, but the researcher reported them to measure how

participants perceived the different attributes/barriers associated with the implementation of online education.

Faculty most frequently identified the attribute of online education as solving the problem of limited access to higher education institutions especially for graduate studies (n = 10), greater course flexibility especially for female students (n = 8), and a time-consuming mean for teaching a large number of students (n = 6). These three attributes represented more than 68% of the attributes mentioned. Other cited attributes including increasing student familiarity with technology, enabling students to take courses that do not exist in their face-to-face schools, practical and easy to use, favorable choice for the new generation of students, developing traditional teaching methods, and increasing time for student reflection had low frequencies.

Faculty most frequently identified barriers to online education as lack of infrastructure required for implementing WBDE such as computer labs, high speed Internet access, software (n = 10); lack of administrative support from deans and departments (n = 7); and lack of interaction between students and teachers, or student-to-student in online courses (n = 4). These three barriers represented more than 52% of the barriers mentioned. Other cited barriers including student's lack of focus and dedication for independent study, unavailability of Internet access or even computers in students' homes, incompatibility of WBDE with science classes such as medicine, lack of incentives for teaching WBDE, lack of credibility of WBDE programs, lack of technical support provided for both students and faculty members, increasing the cost associated with WBDE implementation, lack of students interest in this type of education, lack of faculty expertise in WBDE technologies, lack of knowledge about WBDE, lack of policies in regard to copyrighted materials, and lack of WBDE trialability had low frequencies.

Table 56

Frequency of Faculty Responses to Attributes of WBDE

Attributes of WBDE	Rank	Frequency
Solves the problem of limited access to higher education, especially for graduate work	1	10
Greater course flexibility, especially for female students	2	8
A time-saving mean for teaching a large number of students	3	6
Increases student familiarity with technology	4	2
Enables students to take courses that do not exist in their face-to-face schools	5	2
Practical and easy to use	5	2
Favorable choice for the new generation of students	7	2
Developing traditional teaching methods	8	2
Student will have time to reflect (i.e., to think over ideas, check learning resources, etc.)	9	1

Table 57

Frequency of Faculty Responses to Barriers of WBDE

Barriers of WBDE	Rank	Frequency
Lack of infrastructure (i.e., computer labs, high-speed Internet access, software, etc.)	1	10
Lack of administrative support	2	7
Lack of interaction between students and teachers, or student-to-student	3	4
Students may lack focus and dedication for independent study	4	3
Some students do not have Internet access or even computers in their homes	5	3
WBDE is not compatible with science classes such as medicine	6	2
Lack of incentives	7	2
Lack of credibility of WBDE programs	8	2
Lack of technical support	9	1
Increases the cost associated with WBDE implementation	10	1
Lack of students interested in this type of education	11	1
Lack of faculty expertise in WBDE technologies	12	1
Lack of knowledge about WBDE	13	1
Royalties on copyrighted materials	14	1
Lack of WBDE trialability	15	1

Question two. *Please specify what your university could do to encourage you to participate in online education in the future?* Table 58 summarizes the data analysis based on faculty responses to this question. Faculty most frequently identified type of institutional support needed for WBDE implementation as the availability of hardware, software, and networks infrastructure (n = 20), institutional training programs for faculty members in WBDE (n = 18), and monetary support for participation (n = 10). These three types of institutional support represented about 72% of the types mentioned. Other cited types of institutional support including administrative support from deans and departments, ongoing evaluation for WBDE from students and departments, reduced teaching load, effective plan and strategies for WBDE implementation, availability of online student services (e.g., registration, library services, advising, technical support, etc.), and counting teaching WBDE courses toward promotion and tenure had low frequencies.

Table 58

Frequency of Faculty Responses to Institutional Support

Institutional Support	Rank	Frequency
Hardware/software / Networks infrastructure availability	1	20
Training programs for faculty members in WBDE	2	18
Monetary support for participation (stipend, overload)	3	10
Administrative support from dean and department	4	6
Ongoing evaluation for WBDE from both students and departments	5	5
Reduced teaching load	6	3
Effective plan and strategies for WBDE implementation	7	3

Table 58 (continued)

Institutional Support	Rank	Frequency
Availability of online student services (e.g., registration, library services, advising, technical support, etc.	8	1
Credit toward promotion and tenure	9	1

Summary

This chapter discussed the results of statistical analysis of data collected from 115 faculty members at two Saudi universities to investigate their perceptions about attributes and barriers impacting the diffusion of online education. The results of the descriptive analyses indicated that participants were mostly males, in the 30-34 age range, assistant professors, and from the College of Education and Arts and Humanities.

The descriptive analysis showed that the most important attribute of WBDE was relative advantage and that the main barriers that prevented faculty members from adopting online education were technical expertise, infrastructure, and planning issues. The inferential analysis showed that DE experience was a significant predictor for faculty perceptions about relative advantage, compatibility, observability, and complexity. It also showed that age, academic rank, and level of education were significant predictors of faculty perceptions of financial concerns as a barrier to WBDE. Moreover, the relationship between DE experience and faculty's stage in the innovation-decision process was found to be statistically significant.

The last section of this chapter analyzed participants' responses to two open-ended questions. The collected data was categorized and ranked based on the highest frequency.

Chapter Five provides research discussion, recommendations, implications, and suggestions for future research.

CHAPTER 5

Summary, Conclusions, and Recommendations

This chapter presents an overview of the study and its purpose, followed by a summary of methodology, participants, summary of key findings, the implication of the study, and recommendation for professional practice as well as future studies.

Purpose of the Study

The primary goal of this study was to examine faculty perceptions about attributes and barriers impacting the diffusion of online education at two Saudi universities: Taif University and Tabuk University. More specifically, the study intended to (a) give an overview of faculty members' current stage in the innovation-decision process in regards to online education, (b) examine faculty perceptions about attributes (motivating factors) and barriers (inhibiting factors) impacting diffusion of online education, (c) investigate the relationship between faculty members' selected personal characteristics (including age, years of teaching, DE experience, gender, academic rank, nationality, and level of education) and their perceptions about attributes (motivating factors) and barriers (inhibiting factors) impacting diffusion of online education, (d) investigate the relationship between faculty members' selected personal characteristics (including age, years of teaching, DE experience, gender, academic rank, professional area, nationality, and level of education) and their stage in the innovation-decision process, and (e) demonstrate how these factors can be used to increase faculty adoption of online education to respond to the increasing demands for this kind of education.

The study was guided by the following research questions:

1. What are faculty perceptions about attributes influencing diffusion of online education in two Saudi universities?
2. What are faculty perceptions about barriers influencing diffusion of online education in two Saudi universities?
3. What are faculty current stages in the innovation-decision process related to online education?
4. Do faculty's different personal characteristics (including age, years of teaching, DE experience, gender, academic rank, nationality, and level of education) impact their perceptions about attributes of online education?
5. Do faculty's different personal characteristics (including age, years of teaching, DE experience, gender, academic rank, nationality, and level of education) impact their perceptions about barriers to diffusion of online education?
6. Is there a relationship between faculty members' selected personal characteristics (including age, years of teaching, DE experience, gender, academic rank, professional area, nationality, and level of education) and their stage in the innovation-decision process in regard to online education?
7. Is there a relationship between faculty attitudes toward the problem of limited access to higher education by students in Saudi Arabia and their stage in the innovation-decision process in regard to online education?

Theoretical Foundation

The theoretical framework for the study was based on the following: (1) Rogers' (1995) model of the innovation-decision process, (2) Rogers' attributes of innovation theory, (3) Moore

and Benbasat's (1991) measurements of the attributes of innovation, (4) Muilenburg and Berge's (2001) study about barriers to distance education, and Rogers' (1995) characteristics of adopter categories. Rogers defined diffusion as "the process by which an innovation is communicated through certain channels over time among the members of a social system" (p. 5) and an innovation as "an idea, practice or object that is perceived as new by an individual or other unit of adoption" (p. 11). According to Rogers, the perceived novelty of an idea, practice, or object for an individual is determined based on his/her reaction to it. If the idea seems to be new to the individual, then it can be considered an innovation. In other words, the newness of an idea is based on the subjective perception rather than the objective measurement.

According to Rogers (1995), the way individuals in a social system perceive the five attributes (characteristics) of an innovation help to explain their different rates of adoption. The five attributes are relative advantage, compatibility, complexity, trialability, and observability. Rogers explained that each of these five attributes is somewhat empirically related to the other four. However, they are conceptually separate.

An individual's decision of whether to adopt or reject an innovation is not an instantaneous act. Yet, it is a process that occurs over time and consists of a series of actions. Rogers' (1995) model of the innovation-decision process consists of five main steps: (1) knowledge, (2) persuasion, (3) decision, (4) implementation, and (5) confirmation.

Participants and Data Collection

Data was collected using a survey designed by Li (2004), who examined faculty perceptions about attributes and barriers impacting the diffusion of Web-based distance education (WBDE) at the China Agricultural University (CAU). The survey consisted of four

main subscales: Stages in the Innovation-Decision Process, Perceived Attributes of WBDE, Perceived Barriers to WBDE, and Demographic characteristics.

After receiving permission to conduct the study from Indiana State University's Institutional Review Board for Human Subjects (Appendix D) and the permissions of administrators in the two universities (Appendixes E and F), the survey was distributed to a random sample of 198 faculty members using two formats: hard copy and online. Since the selection of participants was random, it included those who had no experience with distance education and those who had had such experience.

Of the 198 randomly selected faculty members, a total of 127 responses were received within the predetermined response period. Of these responses, 115 were usable, resulting in a usable response rate of 58%. Among the 115 faculty members, 68 (59.1%) were from Taif University and 47 (40.9%) were from Tabuk University.

Collected data was analyzed using the Statistical Package for the Social Sciences (SPSS, v. 18). Alpha for all statistical procedures was set *a priori* at .05. A total of seven research questions were investigated.

Participant Characteristics

Faculty members from 10 colleges were represented in the study. The three highest number of responses were from the Education College, Taif University (n = 29, 25.20%), the Arts and Humanities College, Taif University (n = 17, 14.80%), and the Computers and Information Systems College, Tabuk University (n = 14, 12.20%). The majority of the participants (n = 75, 65.20%) identified their gender as male and the remaining (n = 40, 34.80%) were female. Nineteen participants (16.50%) were under 30 years old; 27 (23.50%) were in the 30 - 34 year old range; 26 (22.60%) were in the 35 - 39 year old range; 22 (19.10%) were in 40 -

44 year old range; 12 (10.40%) were in 45 - 49 year old range; 7 (6.10%) were in 50 - 54 year old range; and 2 (1.70%) were more than 54 years old. There were 65 (56.50%) Saudi participants and 50 (43.50%) were non-Saudi residents from other nations. Twenty- six participants (22.60%) had a bachelor's degree; 23 participants (20%) had a master's degree; and 66 had a doctoral degree.

Twenty-six participants (22.60%) were instructors; 23 (20%) were lecturers; 38 (33%) were assistant professors; 13 (11.30%) were associate professors; and 15 (13%) were full professors. Faculty teaching experience was divided into five ranges; the most reported experience range was less than five years (n = 45, 39.10%). Other participants reported 5 - 9 years of teaching experience (n = 30, 26.10%); 10 - 14 years of teaching experience (n = 23, 20%); 15 - 19 years of teaching experience (n = 6, 5.20%); and 11 (9.60%) participants reported more than 19 years of teaching experience. Of the 115 respondents, a third (n = 38, 33%) indicated that they had some experience with distance education. The 38 faculty members who had experience with distance education indicated the nature of their experience. About 87% of them (n = 33) had used WBDE; one participant (2.60%) had taught distance courses using radio and TV; one participant (2.60%) had taught correspondence-based distance courses; and three participants chose not to answer this question.

Results and Major Conclusions

The findings of this study were organized according to the seven research questions of the study. The results were based on responses obtained from 115 participants out of the 198 selected faculty members across the two universities included in the study.

Research question one key findings. The first question in this study was designed to describe participating faculty based on their perceptions about attributes of online education. The attributes included in this study were relative advantage, compatibility, complexity, trialability, and observability. Each of these attributes was measured by participants' responses to four survey items.

Approximately 75% of respondents agreed or strongly agreed that using WBDE could help them to reach more students. More than 78% of respondents agreed or strongly agreed that a more flexible time schedule could be followed by using WBDE. About 77% of respondents agreed or strongly agreed that using WBDE could give them access to more teaching resources. While more than half of the respondents agreed or strongly agreed that WBDE could be provided economically, a third of the respondents chose a neutral attitude toward this statement. Overall, the mean and standard deviation for perceived relative advantage of WBDE were $M = 3.82$ and $SD = 0.82$. Based on this result, faculty members at the two Saudi universities tended to agree that there was a relative advantage for employing WBDE.

The perceived compatibility of WBDE was measured based on the participating faculty members' responses to four items. More than 40% of the participants agreed or strongly agreed that WBDE technologies were available to them. About 79% of participants agreed or strongly agreed that using WBDE technologies were acceptable for them. In addition, approximately 63% of participants agreed or strongly agreed that procedures used in WBDE would fit well with their teaching conditions. On the other hand, more than one-third of the participants disagreed or strongly disagreed that WBDE technologies were available to students and more than 44% of the respondents chose a neutral attitude toward this statement. Overall, the mean and standard deviation for perceived compatibility of WBDE were $M = 3.35$ and $SD = 0.88$. Based on this

result, faculty members at the two Saudi universities had mixed perceptions of the compatibility of WBDE.

The perceived complexity of WBDE was measured based on the participating faculty members' responses to four items. More than 40% of respondents disagreed or strongly disagreed that WBDE technologies were readily available to them and about 34% of participants kept a neutral attitude toward this statement. On the other hand, approximately 62% of participants agreed or strongly agreed that WBDE technologies were easy to use. About 60% of participants agreed or strongly agreed that the changes in teaching methodology necessary to use WBDE were easy to understand. While more than 42% of participants agreed or strongly agreed that changes in teaching methodology necessary to use WBDE would be easy for them to implement, about 28% reported a neutral attitude toward this statement. Overall, the mean and standard deviation for perceived complexity of WBDE were $M = 3.27$ and $SD = 0.84$. Based on this result, faculty members at the two Saudi universities had mixed perceptions concerning the complexity of WBDE.

The perceived trialability of WBDE was measured based on the participating faculty members' responses to four items. About 47% of participants disagreed or strongly disagreed that it was possible for them to deliver selected portions of a course (a single lesson or unit) using WBDE prior to developing an entire course. About 43% of participants disagreed or strongly disagreed that it was possible for them currently to put selected teaching materials (e.g., readings, assignments) on the Web in support of their classes. About 45% of participants agreed or strongly agreed that it was possible for them currently to accomplish some teaching functions (e.g., reporting grades, communication with students) on the Web. About 49% of participants agreed or strongly agreed that it was possible for students to use WBDE tools (e.g., accessing

Internet, downloading and uploading materials, watching video lessons, chat on-line, etc.). Overall, the mean and standard deviation for perceived complexity of WBDE were *M* = 2.96 and *SD* = 1.04. Based on this result, faculty members at the two Saudi universities had not decided on the existence of trialability of WBDE.

The perceived observability of WBDE was measured based on the participating faculty members' responses to four items. About 60% of participants agreed or strongly agreed that they knew some faculty members who were using WBDE. Approximately 48% of participants disagreed or strongly disagreed that they had observed some WBDE courses on their campus. On the other hand, more than 70% of participants reported that they were aware of the benefits of WBDE programs for students. About half of the participants agreed or strongly agreed that they were aware of the limitations of WBDE programs for students. Overall, the mean and standard deviation for perceived observability of WBDE were *M* = 3.25 and *SD* = 0.80. Based on this result, faculty members at the two Saudi universities had mixed perceptions of the observability of WBDE.

Research question one discussion. According to Rogers (1995), the way individuals in a social system perceive the five attributes (characteristics) of an innovation help to explain their different rates of adoption. Rogers explained that relative advantages "is the degree to which an innovation is perceived as being better than the idea it supersedes" (p. 15). Rogers illustrated that researchers found relative advantage to be one of the best predictors of an innovation's rate of adoption. The degree of relative advantage can be measured using economic terms; however, other factors such as social prestige, convenience, and satisfaction are also important. According to Rogers, it does not matter so much if an innovation has many advantages; rather, what really matters is whether the potential adopter views the innovation as advantageous. Furthermore,

even though the nature of the innovation determines what specific type of relative advantage (e.g., economic, social, etc.) is important to potential adopters, the characteristics of adopters can also determine which sub-dimension of relative advantages are important.

According to Rogers (1995), when individuals or other decision-making units of adoption pass through the innovation-decision process, they usually seek information about the innovation in order to help them decrease uncertainty about the relative advantages of the innovation. During the innovation-decision process, potential adopters try to decide whether the degree to which the innovation (in the case of this study, the innovation refers to online education) is better than the existing practice (in the case of this study, existing practice refers to traditional face-to-face instruction). Therefore, relative advantage is often an important part of the message content about an innovation. Rogers explained that an innovation's relative advantage, as perceived by individuals of a social system, is positively correlated to the rate of adoption. Thus, the greater the perceived relative advantage of an innovation, the more rapid its rate of adoption will be.

The findings of this study indicated that participating faculty members perceived online education to have potential relative advantages. First, the majority of respondents agreed or strongly agreed that using WBDE could help them reach more students. This finding is compatible with previous studies (Betts, 1998b; Bolliger & Wasilik, 2009; Dooley & Murphrey, 2000; McKenzie, et al., 2000; Murphrey & Dooley, 2000; Rockwell et al., 2000; Schifter, 2000a; Wolcott & Betts, 1999) that indicated that faculty members seem to view online education as a means through which they can reach a new range of learners who cannot attend traditional face-to-face classes due to geographic distance or family and work obligations. Second, the majority of respondents agreed or strongly agreed that a more flexible time schedule could be followed by using WBDE. Previous researchers have reported similar results; that online education increased

flexibility in working conditions since faculty members were able to teach at any time and from any place (Betts, 1998a; McKenzie et al., 2000; Schifter, 2000b).

In addition, the majority of respondents agreed or strongly agreed that using WBDE could give them access to more teaching resources. The same result was found by previous researchers (Li, 2004; Surry, 1997). While more than half of the respondents agreed or strongly agreed that WBDE could be provided economically, a third of the respondents chose a neutral attitude toward this statement. This result mirrors the results found by Li (2004) and Yakah (1997).

The responses to the open-ended questions revealed more perceived relative advantage of online education. For example, some faculty members viewed online education as a potential solution to the problem of limited access to higher education institutions especially for graduate studies. Others reported that online education could provide greater course flexibility especially for female students and a time-saving means for teaching a large number of students. Other frequently cited relative advantages of online education included increasing student familiarity with technology, enabling students to take courses that do not exist in their face-to-face schools, practical and easy to use, favorable choice for the new generation of students, developing traditional teaching methods, and increasing time for student reflection.

Rogers (1995) defined compatibility as "the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters" (p. 15). That is, compatibility of an innovation is determined based on sociocultural values and beliefs, previously introduced ideas, or the potential adopter's needs for the innovation. This means that an innovation that is incompatible with the values or the existing norms of a social system will not be adopted as fast as an innovation that is compatible. According to Rogers, the

adoption of such incompatible idea requires the earlier adoption of a new value system which is a relatively slow process.

An innovation should not only be compatible with sociocultural norms of a social system, but it also needs to be compatible with previous practice or old ideas (in the case of this research, the old idea refers to teaching face-to-face of courses). According to Rogers (1995), these old ideas or practices serve as the mental tools that potential adopters use to assess new ideas. That is, previous practice (old ideas) provides familiar standards through which the new idea can be interpreted, and accordingly help in decreasing the potential adopter's uncertainty about the innovation.

The findings of this study indicated that the compatibility of WBDE with faculty values and their current teaching conditions were not problems for participating faculty members. These results are compatible with previous studies (Li, 2004; Surry, 1997). However, the majority of participants perceived the availability of WBDE technologies, for both students and faculty members, as a problem. This supports Alsaif's (2005), Albalawi's (2007), and Alsadoon's (2009) findings that even though faculty members in Saudi universities demonstrated positive attitudes toward using WBDE technologies, the lack of computer and the Internet access are significant factors that inhibit faculty use of WBDE. The responses to the open-ended questions also support this conclusion. Participants reported students limited access to computers and Internet connections as barriers to the development of WBDE in Saudi higher education institutions.

Rogers (1995) defined complexity as "the degree to which an innovation is perceived as difficult to understand and use" (p. 16). Some innovations are readily understood by most individuals in a social system, however, there are other innovations that are more complex and

their adoption will be relatively slow. According to Rogers, new ideas that are easy to understand are adopted more rapidly than those that require the adopter to develop new skills and understandings. According to Rogers, opposite to other attributes of innovation, complexity is negatively correlated with the rate of adoption.

The findings of this study showed that WBDE technologies were easy for participants to use and the changes in teaching methodology necessary to use WBDE were easy for them to understand. However, the perceived complexity of WBDE for the majority of participants was the *implementation* of the changes in teaching methodology necessary to use WBDE technologies. This finding is compatible with the findings of previous researchers (Albalawi, 2007; Alsadoon, 2009; Alsaif, 2005) who reported that faculty indicated that they were concerned with their lack of knowledge in regard to instructional design of WBDE. Several research studies stated instructional support as a major motivating factor for faculty adoption of distance education (Betts, 1998a; Dooley & Murphrey, 2000; Lee, 2002; McKenzie et al., 2000; Mwaura, 2004; Nichols, 2008; Rockwell et al., 2000; Schifter, 2000b; Wilson, 1998). According to Lee (2002), a small number of research studies have investigated instructional support in distance education learning environments which indicated that there is a need for instructional support specifically designed for distance education in higher education institutions.

WBDE necessitates a radical shift from traditional teaching methods toward a technological realm where teaching involves the use of computer and more specialized computer applications and learning management systems (Gibson, et al., 2008). Thus, effective online education requires faculty members to not only have knowledge about their own disciplines, but also to have interpersonal skills that would enable them to effectively communicate with their students online (Levy, 2003). Several research studies have reported that faculty perceived early

and appropriate training about distance education technologies and teaching methods as a motivator to teach at distance (Bruner, 2007; Haber & Mills, 2008).

Rogers (1995) defined trialability as "the degree to which an innovation may be experimented with on a limited basis" (p. 16). Rogers illustrated that innovations that can be tried on the installment plan are more likely to be adopted by members of a social system than those that are not divisible. Rogers explained that when potential adopters have the opportunity to try out an innovation, they will be able to give meaning to it and to understand how that innovation works under their own conditions. Moreover, this trial serves as a means to reduce the potential adopters' uncertainty about the innovation. Thus, the perceived trialability of an innovation is positively correlated to its rate of adoption.

The findings of this study revealed that most faculty members disagreed or strongly disagreed that it was possible for them to try WBDE before completely implementing this kind of education or to put selected teaching materials on the Web to support their traditional classes. On the other hand, most faculty members agreed or strongly agreed that it was possible for them to accomplish some teaching functions (e.g., reporting grades, communication with students) on the Web. Thus, faculty's lack of trialability of WBDE was evident in this study. Accordingly, it is recommended that higher educational institutions in Saudi Arabia provide faculty members with the opportunity to try WBDE before fully implementing this kind of education. The literature review revealed that first-hand experiences may be the best method for fostering positive attitudes toward distance education. Tabata and Johnsrud (2008) noted that when faculty members had the opportunity to try out distance education, the probability of participating in distance education increased by 13%. Therefore, trialability was considered to

have a very important impact on faculty decisions toward adopting or rejecting to teach via distance.

According to Rogers (1995), observability is "the degree to which the results of an innovation are visible to others" (p. 16). Rogers explained that some innovations are easily observed and communicated to others, while others innovations are difficult to observe or to be described to others. The easier it is for members of a social system to observe the results of an innovation, the more likely they are to adopt it. Thus, the perceived observability of an innovation is positively correlated to its rate of adoption.

The findings of this study showed that most participants were generally aware of the advantages and limitations of WBDE. However, most faculty reported that they did not have opportunities to observe WBDE courses taught by other faculty members in their campuses. Thus, faculty's lack of observability of WBDE courses was evident in this study. Accordingly, it is recommended that higher educational institutions in Saudi Arabia provide faculty members with the opportunity to observe other faculty activities related to WBDE. Previous research studies found that the experiences of early adopters had great value for other faculty following in their footsteps (Li, 2004; Mwaura, 2004; Wilson, 1998).

Research question one conclusions and recommendations. The findings of this study indicated that participating faculty members perceived WBDE to have potential relative advantages. Some of these advantages can be classified as personal (e.g., flexibility in time and location) and others can be classified as social relative advantages (e.g., providing greater course flexibility for female students). The open-ended questions allowed faculty to add some of the perceived advantages that were not initially included in the close-ended items. Thus, additional

research is needed to identify other relative advantages of WBDE as perceived by faculty members.

While more than half of the respondents agreed or strongly agreed that WBDE could be provided economically, a third of the respondents chose a neutral attitude toward this statement. Thus, additional detailed research about the economic feasibility of WBDE as an alternative to traditional face-to-face higher education is needed to assess the benefits of future governmental investments in WBDE-related infrastructure especially for newly established universities such as the ones included in this study.

In addition, higher education institutions interested in adopting WBDE should provide faculty members with the instructional training and support needed to implement the changes in teaching methodology necessary to use WBDE technologies. Moreover, since trialability and observability have a critical impact on faculty adoption of WBDE, it is recommended that higher educational institutions in Saudi Arabia provide faculty members with the opportunity to try WBDE before fully implementing this kind of education and allow them to observe other faculty members' activities related to WBDE.

Research question two key findings. The second question was designed to describe participant faculty based on their perceptions about barriers to diffusion of WBDE. The barriers included in this study were: concerns about time, concerns about incentives, online program credibility, financial concerns, planning issues, conflict with traditional education, fear of technology, technical expertise, administrative support, and infrastructure. Each of these barriers was measured by participant's responses to four survey items.

About 40% of participants perceived "increased faculty time commitment for course development" as no barrier or a weak barrier. On the other hand, about 36% of respondents

thought it was a moderate barrier. More than half of the respondents perceived "increased faculty time for online communication with students" as a moderate or strong barrier. About 55% of respondents perceived "increased faculty time for getting feedback from students" as a moderate or strong barrier. Approximately 46% of participants perceived "increased faculty time to explore more information" as no barrier or a weak barrier. Overall, the mean and standard deviation for concerns about time as a perceived barrier to diffusion of WBDE were *M* = 2.73 and *SD* = 1.10. Based on this result, faculty members at the two Saudi universities tended to perceive concerns about time as a moderate barrier to the diffusion of WBDE.

About 55% of the respondents perceived the lack of "monetary compensation for adopting web-based distance education" as a strong or very strong barrier. More than half of the respondents perceived the lack of "incentives for adopting Web-based distance education" as a moderate or a strong barrier. Forty-seven percent of the respondents perceived the lack of "recognition for adopting Web-based distance" as a strong or very strong barrier. While 33% of the participants perceived the lack of "awards for adopting Web-based distance education" as a very strong barrier, about 34% of them perceived this statement as no barrier or a weak barrier. Overall, the mean and standard deviation for concerns about incentives as a perceived barrier to diffusion of WBDE were *M* = 3.23 and *SD* = 1.28. Based on this result, faculty members at the two Saudi universities tended to perceive concerns about incentives as a moderate barrier to the diffusion of WBDE.

More than half of the respondents perceived "concerns about evaluation of students work" as a moderate to strong barrier. Similarly, more than half of the respondents perceived "concerns about testing of students' work" as a moderate or strong barrier. About 54% of respondents perceived "concerns that Web-based distance education programs lower the quality

of students who are admitted" as a moderate to strong barrier. Likewise, about 54% of respondents perceived "concerns that Web-based distance education programs lower the expectations for student learning" as a moderate or strong barrier. Overall, the mean and standard deviation for WBDE program credibility as a perceived barrier to diffusion of WBDE were $M = 3.06$ and $SD = 1.14$. Based on this result, faculty members at the two Saudi universities tended to perceive WBDE program credibility as a moderate barrier to the diffusion of WBDE.

About 55% of respondents perceived "increased tuition and fee rates" as a strong or very strong barrier. About 60% of respondents perceived "increased payment for cost technologies" as a strong or very strong barrier. While more than 58% of respondents perceived "sharing revenue with department or business units" as a moderate or strong barrier, about 36% of respondents thought it was no barrier or a weak barrier. Approximately 61% of respondents perceived "lack of money to implement Web-based distance education programs" as a strong or very strong barrier. Overall, the mean and standard deviation for financial concerns as a perceived barrier to diffusion of WBDE were $M = 3.34$ and $SD = 1.24$. Based on this result, faculty members at the two Saudi universities tended to perceive financial concerns as a moderate barrier to the diffusion of WBDE.

In regard to planning issues as a barrier to diffusion of WBDE, 60% of respondents perceived "lack of identified need (perceived or real) for Web-based distance education" as a strong or very strong barrier. More than 70% of respondents perceived "lack of shared vision for the role of Web-based distance education in the organization" as a strong or very strong barrier. In addition, 80% of respondents perceived "lack of strategic planning for Web-based distance education" as a strong or very strong barrier. More than 58% of respondents viewed the "lack of

a champion for Web-based distance education in the departments within the university" as a strong or very strong barrier. Overall, the mean and standard deviation for planning issues as a perceived barrier to diffusion of WBDE were $M = 3.83$ and $SD = 1.01$. Based on this result, faculty members at the two Saudi universities tended to perceive planning issues as a strong barrier to the diffusion of WBDE.

In regard to fear of technology as a barrier to diffusion of WBDE, about 49% of respondents perceived "threat to instructors' sense of competence and authority" as no barrier or a weak barrier. While about 45% of respondents perceived "belief that job security is threatened" as a moderate or strong barrier, approximately 37% of participants thought it was no barrier or a weak barrier. About 57% of respondents perceived "concern for legal issues (e.g., computer crime, hackers, software piracy, and copyright)" as a strong or very strong barrier. In addition, 47% of respondents perceived "increased isolation of instructors" as a moderate or strong barrier. Overall, the mean and standard deviation for fear of technology as a perceived barrier to diffusion of WBDE were $M = 3.12$ and $SD = 1.15$. Based on this result, faculty members at the two Saudi universities tended to perceive fear of technology as a moderate barrier to the diffusion of WBDE.

In regard to conflict with traditional education as a barrier to diffusion of WBDE, about 64% of participants perceived "competition with on-campus offerings or competition for existing students" as no barrier or a weak barrier. Similarly, 67% of participants perceived "disruption of the classroom's traditional social organization" as no barrier or a weak barrier. In addition, 53% of participants perceived "traditional academic calendar/schedule" as no barrier or weak barrier. About 49% of respondents perceived the "lack of person-to-person contact (i.e., lack of face-to-face interaction with students; difficulty building rapport with participants at a distance)" as a

moderate or strong barrier. Overall, the mean and standard deviation for conflict with traditional education as a perceived barrier to diffusion of WBDE were *M* = 2.53 and *SD* = 1.10. Based on this result, faculty members at the two Saudi universities tended to perceive conflict with traditional education as a moderate barrier to the diffusion of WBDE.

In regard to technical expertise as a barrier to diffusion of WBDE, about 76% of participants perceived "lack of technical support" as a strong or very strong barrier. Likewise, 80% of participants perceived "lack of training programs for Web-based distance education" as a strong or very strong barrier. In addition, more than 71% of participants perceived "lack of knowledge about Web-based distance education" as a strong or very strong barrier. More than 83% of participants perceived "lack of the 'right' people to implement Web-based distance education" as a strong or very strong barrier. Overall, the mean and standard deviation for technical expertise as a perceived barrier to diffusion of WBDE were *M* = 4.1 and *SD* = 0.89. Based on this result, faculty members at the two Saudi universities tended to perceive technical expertise as a strong barrier to the diffusion of WBDE.

In regard to administrative support as a barrier to diffusion of WBDE, more than 76% of participants perceived "lack of support or encouragement from administrators" as a strong or very strong barrier. About 59% of participants perceived "copyright/fair use issues" as a moderate or strong barrier and about 22% thought it was a very strong barrier. Similarly, 53% of respondents perceived "difficulty in recruiting faculty" as a moderate or strong barrier. While about 29% perceived "difficulty in recruiting students" as a weak barrier, about 43% thought it was a moderate or strong barrier. Overall, the mean and standard deviation for administrative support as a perceived barrier to diffusion of WBDE were *M* = 3.50 and *SD* = 0.94. Based on

this result, faculty members at the two Saudi universities tended to perceive administrative support education as a moderate barrier to the diffusion of WBDE.

In regard to infrastructure as a barrier to diffusion of WBDE, more than 78% of participants perceived the "lack of adequate technology-enhanced classrooms, labs, or infrastructure" as a strong or very strong barrier. More than 65% of participants perceived the "lack of adequate student access to computers and Internet" as strong or very strong barrier. About 59% of the participants perceived the "lack of adequate instructor access to computers and Internet" as a strong or very strong barrier. Moreover, more than 71% of participants perceived the "lack of library access or delivery of materials and services" as a strong or very strong barrier. Overall, the mean and standard deviation for conflict with traditional education as a perceived barrier to diffusion of WBDE were $M = 3.90$ and $SD = 1.00$. Based on this result, faculty members at the two Saudi universities tended to perceive infrastructure as a strong barrier to the diffusion of WBDE.

Research question two discussion. The findings of this study indicated that most faculty members agreed or strongly agreed with the existence of the 10 barriers included in this study and identified by previous researchers (Berge, 1998; Berge, Muilenberg, & Van Haneghan, 2002; Berge & Muilenburg, 2001; Betts, 1998a, 1998b; Muilenburg & Berge, 2001; Murphrey & Dooley, 2000; Schifter, 2000b). Three of the 10 barriers (technical expertise, infrastructure, and planning issues) were perceived as strong barriers to the diffusion of WBDE. The other seven barriers (concerns about time, concerns about incentives, online program credibility, financial concerns, conflict with traditional education, fear of technology, and administrative support) were perceived as moderate barriers to the diffusion of WBDE.

Technical expertise was perceived by participants as the biggest concern. Most of faculty members included in the study agreed or strongly agreed that lack of knowledge, lack of training programs in WBDE, and lack of capable personnel for WBDE implementation were barriers for their adoption of WBDE. These findings are consistent with the results of previous researchers ((Al-Erieni, 1999; Albalawi, 2007; Alsadoon, 2009; Alsaif, 2005; Berge, 1998; Berge, et al., 2002; Betts, 1998b; McKenzie, et al., 2000; Mwaura, 2004; Rockwell, et al., 2000; Schifter, 2000a; Shea, et al., 2005; Wilson, 1998) who found that technical support for both distance faculty members and students was recognized as a critical factor in the diffusion of distance education. Such support usually includes providing faculty members with the necessary hardware and software for delivering instruction, helping faculty to solve any technical problems either via phone or e-mail, assisting faculty to develop and maintain online courses, and any other operating support. Shea et al. (2005) asserted that "the continued diffusion of this innovation [distance education] may rest upon the ability to persuade faculty that adequate technical support will be available as they decide whether to participate" (p. 17).

Previous research studies have also indicated that lack of early and appropriate training was perceived by faculty as a major barrier for the diffusion of WBDE (Betts, 1998a; Mitchell & Geva-May, 2009; Muilenburg & Berge, 2001; Pajo & Wallace, 2001; Rockwell, et al., 2000; Schifter, 2000a; Shannon & Doube, 2004). Moreover, several studies have reported that faculty opinion about designing and implementing instructional support are usually neglected (Lee, 2002; Mwaura, 2004). Lee (2002) asserted that "lack of faculty involvement implies that higher education institutions may not provide faculty members with appropriate kind of instructional support" (p. 29). Thus, it is recommended that higher education institutions that are interested in

implementing this kind of education build their own training programs based on a detailed assessment of their faculty members' instructional needs and expectations.

Infrastructure was perceived by participants as the second largest barrier to the diffusion of WBDE. This finding supports Alsaif's (2005), Alaugab's (2007), and Alsadoon's (2009) findings that inadequate infrastructure represents a critical challenge to WBDE development in Saudi universities. This finding is also supported by the results of the open-ended questions. When asked about the most important barriers to the diffusion of WBDE, faculty most frequently identified barrier was lack of infrastructure required for implementing WBDE such as computer labs, high speed Internet access, software. In addition, faculty most frequently identified type of institutional support needed for WBDE implementation was the availability of hardware, software, and networks infrastructure.

Planning issues were perceived by participants as the third largest barrier to the diffusion of WBDE. The findings of this study indicated that faculty members perceived the lack of identified needs, shared vision, and strategic planning for WBDE as important barriers to the diffusion of WBDE. This finding is compatible with the findings of previous researchers (Al-Erieni, 1999; Albalawi, 2007; Alsaif, 2005).

In this regard, Wolcott (1997) suggested three important institutional implications. First, distance education should be clearly integrated into the institution's goals and aligned with the university's mission. Second, universities should review their current practices and policies, and when appropriate, adjust them to reflect the changing nature of higher education and faculty work. Finally, since new faculty may be more motivated to teach at a distance than older faculty members, institutions should provide assurances that faculty future careers will not be negatively affected by their involvement in distance education programs.

Administrative support was perceived by participants as the fourth biggest barrier to the diffusion of WBDE. This result supports Alsaif's (2005), Alaugab's (2007), and Alsadoon's (2009) conclusions that organizational factors (e.g., lack of administrative support, lack of clear WBDE policies, and lack of clear course ownership policies) are among the most inhibiting factors for WBDE use. This finding also confirms Moore's (1999) claim that the barriers impeding the development of distance education programs are neither technological nor pedagogical, but an organizational change. The majority of participants perceived "lack of support or encouragement from administrators" as a strong or very strong barrier. This finding is consistent with the findings of previous researchers (Alaugab, 2007; Albalawi, 2007; Alsadoon, 2009). Faculty members view administrative recognition and encouragement for distance education efforts as an important motivator for adopting distance education (Betts, 1998a; Schifter, 2000b; Wilson, 1998). According to a study conducted by Lee (2001), faculty motivation, dedication, and satisfaction increase when they feel that they are well-supported by their schools. Wolcott and Betts (1999) argued that even though incentives encourage faculty participation, rewards can provide the formal means by which the institution recognizes faculty for good performance.

Most participants also perceived "copyright/fair use issues" as a moderate or strong barrier. This finding is also supported by previous studies (Bolliger & Wasilik, 2009; Levy, 2003; Muilenburg & Berge, 2001; Murphrey & Dooley, 2000; NEA, 2000). According to the American Council on Education (ACE) (2000), one of the most important steps that an institution should take when developing distance education policy is to review its existing intellectual property policies to determine whether these policies need further revision as the institution moves toward offering distance education.

Nichols (2008) indicated that the existence of ownership and intellectual property policy was an important and common success factor in higher education institutions. He also asserted that "most successful stories of diffusion came from those institutions that either already had systems and policies aligned with e-learning in place, or had them under official development" (p. 603). Thus, it is recommended that higher education institutions in Saudi Arabia review their policies in regard to copyright issues before adopting WBDE. Having clear policies in regard to copyright and fair use issues will affect the adoption rate of this type of education.

Financial concerns were perceived by participants as the fifth largest barrier to the diffusion of WBDE. The majority of respondents perceived "increased payment for cost technologies" and "lack of money to implement Web-based distance education programs" as strong or very strong barriers. This finding is consistent with the findings of previous studies (Li, 2004; Surry, 1997). It also supports Alaugab's (2007) conclusion that the lack of government funds is a critical barrier to the diffusion of WBDE. Thus, it is recommended that policy-makers in the Ministry of Higher Education and administrators in Saudi higher education institutions collaborate to study the potential benefits of WBDE implementation as well as the economic feasibility of this kind of education.

Concerns about incentives were perceived by participants as the sixth largest barrier to the diffusion of WBDE. The majority of participants perceived the lack of monetary compensation for adopting web-based distance education and lack of incentives for adopting Web-based distance education as important barriers to WBDE. These findings are consistent with the findings of previous researchers that lack of incentives either in the form of monetary compensation, awards, recognition, reduced class loads, or credits toward promotion/tenure was perceived as a moderate barrier to the diffusion of WBDE (Albalawi, 2007; Alsaif, 2005; Birch

& Burnett, 2009; Bolliger & Wasilik, 2009; Conceicao, 2006; Haber & Mills, 2008; Muilenburg & Berge, 2001; Murphrey & Dooley, 2000; NEA, 2000; Seaman, 2009; Wolcott & Betts, 1999). Thus, external rewards such as monetary compensation can be used to motivate faculty to adopt WBDE. For instance, some research studies have reported that momentary support, either in the form of stipends, overload pay, or raised salaries, would motivate faculty members to adopt distance education (Betts, 1998a; Bruner, 2007; Giannoni & Tesone, 2003; Lee, 2002; Mwaura, 2004; Rockwell et al., 2000).

In addition to monetary incentives, most participants perceived the lack of recognition and awards for adopting Web-based distance as a strong barrier to WBDE. This is also consistent with the results of previous studies (Betts, 1998a; Schifter, 2000b; Wilson, 1998) that found that faculty members viewed administrative recognition and encouragement for distance education efforts as an important motivator for adopting distance education. According to a study conducted by Lee (2001), faculty motivation, dedication, and satisfaction increase when they feel that they are well-supported by their schools. According to Wolcott and Betts (1999), even though incentives encourage faculty participation, rewards can provide the formal means by which the institution recognizes faculty for good performance. Thus, to increase the diffusion of WBDE among faculty members, it is recommended that Saudi higher education institutions employ some of the aforementioned incentives to increase their faculty's perceived relative advantage of WBDE, and accordingly, attract more faculty members to try and adopt this kind of education.

Participants perceived fear of technology as the seventh barrier to the diffusion of WBDE. Most of participants did not agree that WBDE would be a threat to instructor's sense of competence and authority or to their job security. This finding is compatible with the results of

previous studies (Albalawi, 2007; Li, 2004). However, most participants perceived legal issues (e.g., computer crime, hackers, software piracy, and copyright) and increased isolation brought by technology as strong barriers to WBDE. This supports the findings of Li's (2004) and Yakah's (2005). According to Howell et al. (2004), even more experienced distance educators can feel isolated which may affect their satisfaction, motivation, and their future decision regarding involvement in distance education. Thus, Saudi higher education institutions that are interested in the implementation of WBDE should consider and eliminate the effects of these factors to increase the adoption rate of this kind of education.

WBDE program credibility was perceived by participants as the eighth largest barrier to WBDE. This finding is consistent with the conclusions of previous research studies that faculty members had concerns about the quality of distance (Betts, 1998a; Bolliger & Wasilik, 2009; Dooley & Murphrey, 2000; Haber & Mills, 2008; Muilenburg & Berge, 2001; Murphrey & Dooley, 2000; NEA, 2000; Schifter, 2000a, 2000b; Seaman, 2009; Shannon & Doube, 2004). A recent report published by Babson Survey Research Group revealed that faculty participation status in WBDE is largely influenced by their concerns about the quality of this kind of education (Seaman, 2009).

Thus, it is obvious that the quality of WBDE programs is a very essential factor that should be given additional attention from educational institutions in Saudi Arabia. Since the National Center of Distance Education and E-learning (2010) is the only organization responsible for distance education in Saudi Arabia, it should establish and adopt a common platform that illustrates the standards that all Saudi higher education institutions should follow. It is also important that the National Center of Distance Education conducts ongoing evaluation

for WBDE programs offered by Saudi universities and colleges to decrease faculty uncertainty about the quality of this kind of education.

Concerns about time were perceived by participants as the ninth largest barrier to the diffusion of WBDE. More time was needed for participants to develop online course and to communicate with students. These finding are consistent with the results of previous studies (Bender, Wood, & Vredevoogd, 2004; Li, 2004; Surry, 1997). Thus, the findings of this study indicate that workload adjustment and recognition of extra time and effort are also essential to encourage faculty to adopt this kind of education.

Participants perceived conflict with traditional education as the least moderate barrier to the diffusion of WBDE. Most respondents did not view competition with on-campus offerings, disruption of the classroom's traditional social organization, and traditional academic calendar/schedule as barriers to WBDE. However, the majority of respondents perceived the lack of person-to-person contact (i.e., lack of face-to-face interaction with students; difficulty building rapport with participants at a distance) as a moderate or strong barrier. This finding confirms the findings of previous studies (Bruner, 2007; Haber & Mills, 2008; Li, 2004; Surry, 1997; Ulmer, et al., 2007) that some faculty inhibition comes from the perceived lack of face-to-face interaction with students and the preference for traditional student-teacher interaction (Bruner, 2007; Haber & Mills, 2008; Ulmer, et al., 2007).

Question two conclusions and recommendations. It is recommended that higher education institutions that are interested in implementing WBDE build their own training programs based on a detailed assessment of their faculty member's instructional needs and expectations. In addition, it is recommended that higher education institutions in Saudi Arabia review their policies in regard to copyright issues before adopting WBDE. Having clear policies

in regard to copyright and fair use issues will affect the adoption rate of this type of education. More studies are also recommended about the economic feasibility of WBDE for Saudi universities, especially the newly established ones such as those included in this study. It is also recommended that Saudi higher education institutions employ some favorable incentives to increase their faculty's perceived relative advantage of WBDE, and accordingly, attract more faculty members to try and adopt this kind of education.

Since most participants had concerns about WBDE program credibility, it is recommended that the Saudi National Center of Distance Education establish and adopt a common platform that illustrates the quality assurances and standards that all Saudi higher education institutions should follow. It is also important that the National Center of Distance Education conduct ongoing evaluation for WBDE programs offered by Saudi universities and colleges to decrease faculty uncertainty about the quality of this kind of education. Finally, the findings of this study indicate that workload adjustment and recognition of extra time and effort are also essential to encourage faculty to adopt this kind of education.

Research question three key findings. The third question was designed to describe participant faculty by their current stage in the innovation-decision process related to online education. As discussed earlier, six stages were used in this study to describe the innovation-decision process. These are no knowledge, knowledge, persuasion, decision, implementation, and confirmation.

Among the 115 participants, 15 (13%) reported no knowledge in regard to WBDE. More than half of the participants were in the stages of either "knowledge" (n = 30, 26.20%) or "persuasion" (n = 32, 27.80%). The remaining participants were in the stages of "decision" (n = 15, 13%), "implementation" (n = 12, 10.40) or "confirmation" (n = 11, 9.60%).

Research question three discussion. The findings of this study indicated that most faculty members were at the early stages (no knowledge, knowledge, or persuasion) of the innovation-decision process. This finding is consistent with previous research studies (Li, 2004; Surry, 1997) and is in accordance with the fact that WBDE, which started in 2005, is a new innovation at all Saudi universities.

According to Rogers (1995), an individual's decision of whether to adopt or reject an innovation is not an instantaneous act. Yet, it is a process that occurs over time and consists of a series of actions. Rogers's model of the innovation-decision process consists of five main steps: (1) knowledge, (2) persuasion, (3) decision, (4) implementation, and (5) confirmation. The model was expanded by Li (2004) who added "no knowledge" stage at the beginning of the process.

Rogers' (1995) model proposes that the innovation-decision process start with the knowledge stage which occurs when potential adopters (individuals or other units of adopters) are exposed to an innovation's existence and gain some understanding if how it works. Three types of knowledge about an innovation are identified by Rogers (1995): *awareness-knowledge* (information about an innovation's existence), *how-to-do knowledge* (information that a potential adopter needs to use the innovation properly), and *principles knowledge* (information about the functioning principles that illustrates how an innovation works).

Thus, it is recommended that these institutions utilize the potential of communication channels including mass media, interpersonal communication, and interactive channels to provide faculty members with the three aforementioned types of knowledge necessary during the early stages of the innovation-decision process. For example, mass media (e.g., the university's newspaper) or interactive channels (e.g., the university's website and e-newsletters) can be used

to inform faculty members of the existence of WBDE. This will create *awareness knowledge*, and is not intended to persuade faculty members to adopt WBDE.

Since interpersonal channels (i.e., face-to-face and online interactions) are more effective in convincing an individual to adopt an innovation (Rogers, 1995), it is recommended that higher education institutions in Saudi Arabia use this type of communication channels to help faculty members gain the other types of knowledge defined by Rogers: how-to-do knowledge and principles knowledge. This can be done formally by offering formal training sessions, either face-to-face or online, for faculty members. This would help them to gain accurate information about WBDE, how it works, and how to develop their own WBDE courses. These training sessions may be conducted by experts in WBDE; however, Rogers (1995) explained that interpersonal channels are especially effective if the change agents and potential adopters have similar education, socio-economic status, culture, and language.

Rogers (1995) argued that knowledge about an innovation is very different than using it. Most people know about many innovations that they have not actually adopted. This occurs when an individual does not regard an innovation as relevant or potentially useful. Thus, perceived attributes of the innovation such as relative advantage, compatibility, complexity, trialability, and observability, are especially important at the persuasion stage. Rogers explained that the persuasion stage, and particularly at the decision stage, potential adopters seek *innovation-evaluation* information to reduce uncertainty about the innovation's expected consequences. During these two stages, an individual asks questions such as "What are the innovation's consequences?" and "What will its advantages and disadvantages be in my situation?" While scientific evaluations of an innovation are often easily accessible, most individuals form their attitudes toward the innovation based on their *near-peer* (in the case of

this study, other faculty member who has WBDE experience) whose subjective opinions of the innovation, based on their personal experience with adoption of the innovation, is most convincing. Thus, it is recommended that these training sessions be conducted by other faculty members who have experiences in WBDE and understand the needs of their peers. It is also recommended that each department have its own change agent (a faculty member with WBDE experience) whom potential adopters can easily ask about WBDE and discuss with him/her any uncertainties they may have about this kind of education.

Research question three conclusion and recommendations. Additional *qualitative* studies are recommended in these areas: (1) WBDE attributes that play a major role in the innovation-decision process; (2) the social learning aspects of the diffusion of innovations theory (Rogers, 1995) in regard to faculty discussions about teaching online. More specifically, how, why, and with whom faculty discuss teaching online, and how those discussions influence their perceptions and decisions regarding WBDE.

Research question four key findings. The purpose of the fourth question was to examine whether faculty's selected personal characteristics (including age, years of teaching, DE experience, gender, academic rank, nationality, and level of education) impacted their perceptions concerning attributes of online education. The relationship between each of the five attributes of online education (relative advantage, compatibility, complexity, trialability, and observability) and faculty's selected characteristics was analyzed and described using multiple regression procedures.

A simultaneous multiple regression was performed to determine the accuracy of predicting perceived relative advantage of WBDE from faculty's personal characteristics (nationality, age, gender, academic rank, level of education, teaching experience, and distance

education). Regression results indicated that the overall model significantly predicted perceived relative advantage, $R^2 = .15$, $R^2_{adj} = .09$, $F(7, 107) = 2.63$, $p < .05$. This model accounted for 15% of variance in perceived relative advantage. Only one variable (DE experience) of the seven variables significantly contributed to the model, $\beta = .33$, $t(107) = 6.53$, $p < .05$. The size and direction of the relationship between DE experience and perceived relative advantage of WBDE suggested that faculty members who had teaching experience with DE had reported higher perceived relative advantage than those who had no DE teaching experience. More specifically, having DE experience led to a predicted increase in relative advantage of 0.33, all other predictors held constant.

A simultaneous multiple regression was performed to determine the accuracy of predicting perceived compatibility of WBDE from faculty's personal characteristics (nationality, age, gender, academic rank, level of education, teaching experience, and distance education). Regression results indicated that the overall model significantly predicted perceived relative advantage, $R^2 = .15$, $R^2_{adj} = .09$, $F(7, 107) = 2.70$, $p < .05$. This model accounted for 15% of variance in perceived compatibility. Only one variable (DE experience) of the seven variables significantly contributed to the model, $\beta = .32$, $t(107) = 3.34$, $p < .05$. The size and direction of the relationship between DE experience and perceived compatibility of WBDE suggested that faculty members who had teaching experience with DE reported higher perceived compatibility of WBDE than those who had no DE teaching experience. More specifically, having DE experience led to a predicted increase in compatibility of 0.32, all other predictors held constant.

A simultaneous multiple regression was performed to determine the accuracy of predicting perceived trialability of WBDE from faculty's personal characteristics (nationality, age, gender, academic rank, level of education, teaching experience, and distance education).

Regression results indicated that the overall model did not significantly predict perceived trialability, $R^2 = .12$, $F(7, 107) = 2.01$, $p > .05$. Table 34 presented a summary of regression coefficients.

A simultaneous multiple regression was performed to determine the accuracy of predicting perceived observability of WBDE from faculty's personal characteristics (nationality, age, gender, academic rank, level of education, teaching experience, and distance education). Regression results indicated that the overall model significantly predicted perceived observability, $R^2 = .26$, $R^2_{adj} = .21$, $F(7, 107) = 5.30$, $p < .05$. This model accounted for 26% of variance in perceived observability. Only one variable (DE experience) of the seven variables significantly contributed to the model, $\beta = .50$, $t(107) = 5.59$, $p < .001$. The size and direction of the relationship between DE experience and perceived observability of WBDE suggested that faculty members who had teaching experience with DE reported higher perceived observability of WBDE than those who had no DE teaching experience. More specifically, having DE experience led to a predicted increase in observability of 0.50, all other predictors held constant.

A simultaneous multiple regression was performed to determine the accuracy of predicting perceived complexity of WBDE from faculty's personal characteristics (nationality, age, gender, academic rank, level of education, teaching experience, and distance education). Regression results indicated that the overall model significantly predicted perceived complexity, $R^2 = .16$, $R^2_{adj} = .10$, $F(7, 107) = 2.81$, $p < .05$. This model accounted for 16% of variance in perceived complexity. Only one variable (DE experience) of the seven variables significantly contributed to the model, $\beta = .28$, $t(107) = 2.92$, $p < .05$. The size and direction of the relationship between DE experience and perceived observability of WBDE suggested that faculty members who had teaching experience with DE reported higher perceived complexity of

WBDE than those who had no DE teaching experience. More specifically, having DE experience led to a predicted increase in complexity of 0.28, all other predictors held constant.

Research question four discussion. Participants' personal characteristics including nationality, age, gender, academic rank, level of education, and teaching experience were not significant predictors of their perceptions about the five attributes of WBDE. This finding was consistent with the findings of Li (2004).

Distance education teaching experience was a significant predictor of faculty perceptions about four of the five attributes of WBDE (relative advantage, compatibility, trialability, and observability). However, it was not a significant predictor of faculty member's perceived complexity of WBDE. Thus, faculty with distance education experience tended to agree with the existence of the attributes (relative advantage, compatibility, trialability, and observability) of WBDE more than faculty without distance education experience.

Research question four conclusions and recommendations. Nationality, age, gender, academic rank, level of education, and teaching experience do not have to be taken into account when considering faculty perceptions about the five attributes of WBDE. Distance education teaching experience should also not be taken into account when considering faculty member's perceived complexity of WBDE. However, it needs to be taken into account when considering faculty members' perceived relative advantage, compatibility, trialability, and observability of WBDE.

This finding implied that the more distance education experience faculty had, the more they felt that WBDE had relative advantages (e.g., social, personal, economic, etc.); was compatible with their existing values, past experiences, and needs; and could be experimented with and observed on a limited basis. This finding was consistent with the conclusions of

previous researchers (Born & Miller, 1999; Li, 2004) who indicated that faculty member's distance education experience would significantly impact their perceptions about WBDE.

Research question five key findings. The purpose of the fifth research question was to examine whether faculty's selected personal characteristics (including age, years of teaching, DE experience, gender, academic rank, nationality, and level of education) impacted their perceptions of barriers to diffusion of online education. The relationship between each of the 10 barriers to online education (concerns about time, concerns about incentives, online program credibility, financial concerns, planning issues, conflict with traditional education, fear of technology, technical expertise, administrative support, and infrastructure) and faculty's selected characteristics was analyzed and described using multiple regression procedures.

A simultaneous multiple regression analysis was performed to determine the accuracy of predicting perceived concerns about time from faculty's personal characteristics. Regression results indicated that the overall model did not significantly predict perceived concerns about time, $R^2 = .11$, $F(7, 107) = 1.82$, $p > .05$.

A simultaneous multiple regression analysis was performed to determine the accuracy of predicting perceived concerns about incentives from faculty's personal characteristics. Regression results indicated that the overall model did not significantly predict perceived concerns about incentives, $R^2 = .12$, $F(7, 107) = 1.99$, $p > .05$.

A simultaneous multiple regression analysis was performed to determine the accuracy of predicting perceived WBDE program credibility from faculty's personal characteristics. Regression results indicated that the overall model did not significantly predict perceived WBDE program credibility, $R^2 = .04$, $F(7, 107) = 0.60$, $p > .05$.

A simultaneous multiple regression was performed to determine the accuracy of predicting perceived financial concerns from faculty's personal characteristics (nationality, age, gender, academic rank, level of education, teaching experience, and distance education). Regression results indicated that the overall model significantly predicted perceived financial concerns, $R^2 = .25$, $R^2_{adj} = .20$, $F(7, 107) = 5.15$, $p < .05$. This model accounted for 25% of variance in perceived financial concerns. Of the seven variables, four variables significantly contributed to the model: nationality $\beta = .26$, $t(107) = 2.50$, $p < .05$; age, $\beta = -.35$, $t(107) = -2.21$, $p < .05$, academic rank, $\beta = .74$, $t(107) = 4.40$; $p < .05$., and level of education, $\beta = -.73$, $t(107) = -3.72$, $p < .05$. A summary of regression coefficients was presented in Table 40. The regression assumptions were checked using the same steps discussed earlier and all were defensible.

The size and direction of the relationships between perceived financial concerns and the four significant variables suggested that non-Saudi faculty members tended to view financial concerns as a barrier to WBDE significantly more so than Saudi faculty members. In addition, the regression results indicated that faculty's perceptions of financial concerns decreased as their age and level of education increased. On the other hand, faculty perceptions of financial concerns increased as their academic rank increased.

Among the four significant variables, academic rank was the strongest predicator of faculty perceptions of financial concerns. More specifically, being a non-Saudi faculty member led to a predicted increase in financial concerns of 0.26, all other predictors held constant. A one-point increase in academic rank (i.e., from one rank to a higher one) was associated with a 0.74 increase in financial concerns, all other predictors held constant. On the other hand, a one-point increase in level of education (i.e., from one level of education to a higher one) was

associated with a 0.73 decrease in financial concerns, all other predictors held constant. A one-point increase in age (i.e., from one age group to a higher one) led to a predicted decrease in financial concerns of 0.35, all other predictors held constant.

A simultaneous multiple regression analysis was performed to determine the accuracy of predicting perceived planning issues from faculty's personal characteristics. Regression results indicated that the overall model did not significantly predict perceived planning issues, $R^2 = .02$, $F(7, 107) = 0.26$, $p > .05$.

A simultaneous multiple regression analysis was performed to determine the accuracy of predicting perceived fear of technology from faculty's personal characteristics. Regression results indicated that the overall model did not significantly predict perceived fear of technology, $R^2 = .07$, $F(7, 107) = 1.22$, $p > .05$.

A simultaneous multiple regression analysis was performed to determine the accuracy of predicting perceived conflict with traditional education from faculty's personal characteristics (nationality, age, gender, academic rank, level of education, teaching experience, and distance education). Regression results indicated that the overall model did not significantly predict perceived conflict with traditional education, $R^2 = .08$, $F(7, 107) = 1.37$, $p > .05$.

A simultaneous multiple regression analysis was performed to determine the accuracy of predicting perceived technical expertise from faculty's personal characteristics. Regression results indicated that the overall model did not significantly predict perceived technical expertise, $R^2 = .07$, $F(7, 107) = 1.12$, $p > .05$.

A simultaneous multiple regression analysis was performed to determine the accuracy of predicting perceived administrative support from faculty's personal characteristics (nationality, age, gender, academic rank, level of education, teaching experience, and distance education).

Regression results indicated that the overall model did not significantly predict perceived administrative support, $R^2 = .04$, $F(7, 107) = 1.21$, $p > .05$.

A simultaneous multiple regression analysis was performed to determine the accuracy of predicting perceived infrastructure from faculty's personal characteristics (nationality, age, gender, academic rank, level of education, teaching experience, and distance education). Regression results indicated that the overall model did not significantly predict perceived infrastructure, $R^2 = .09$, $F(7, 107) = 1.54$, $p > .05$.

Research question five discussion. Gender, teaching experience, and DE experience did not significantly predict faculty perceptions for the 10 barriers of WBDE (concerns about time, concerns about incentives, online program credibility, financial concerns, planning issues, conflict with traditional education, fear of technology, technical expertise, administrative support, and infrastructure). Nationality, age, academic rank, and level of education did not significantly predict faculty perceptions for nine of the 10 barriers to the diffusion of WBDE. These barriers were concerns about time, concerns about incentives, online program credibility, planning issues, conflict with traditional education, fear of technology, technical expertise, administrative support, and infrastructure. However, they significantly predicted faculty perceptions about financial concerns.

Research question five conclusions and recommendations. Factors such as gender, teaching experience, and DE experience did not have to be taken into account when considering faculty perceptions for concerns about time, concerns about incentives, WBDE program credibility, financial concerns, planning issues, conflict with traditional education, fear of technology, technical expertise, administrative support, and infrastructure as barriers to the diffusion of WBDE. These results were compatible with Li's (2004) findings except for gender.

Li found that gender was a significant predictor of faculty perceptions about time as a barrier to the diffusion of WBDE.

Nationality, age, academic rank, and level of education did not need to be taken into account when considering faculty perceptions regarding concerns about time, concerns about incentives, online program credibility, planning issues, conflict with traditional education, fear of technology, technical expertise, administrative support, and infrastructure. However, these variables needed to be taken into account when considering faculty perceptions for financial concerns as a barrier to the diffusion of WBDE. The size and direction of the relationships between perceived financial concerns and the four significant variables suggested that non-Saudi faculty members tended to view financial concerns as a barrier to WBDE significantly more than Saudi faculty members. In addition, the regression results indicated that faculty's perceptions of financial concerns decreased as their age and level of education increased. On the other hand, faculty's perceptions of financial concerns increased as their academic rank increased. Among the four significant variables, academic rank was the strongest predicator of faculty's perceptions of financial concerns.

Research question six key findings. The sixth question was designed to examine the relationship between faculty members selected personal characteristics (including age, years of teaching, DE experience, gender, academic rank, professional area, nationality, and level of education) and their stage in the innovation-decision process (no knowledge, knowledge, persuasion, decision, implementation, and confirmation). Specific relationships are listed below:

- Stage in the Innovation-Decision by Nationality

  Faculty's stage in the innovation-decision process and their nationality were found to be independent, Pearson X^2 (5, N = 115) = 5.22, p = .39, two-tailed.

- Stage in the Innovation-Decision by Educational Level

  Faculty's stage in the innovation-decision process and their educational level were found to be independent, Pearson X^2 (5, N = 115) = 6.93, p = .23, two-tailed.

- Stage in the Innovation-Decision by Teaching Experience

  Faculty's stage in the innovation-decision process and their teaching experience were found to be independent, Pearson X^2 (5, N = 115) = 1.56, p = .91, two-tailed.

- Stage in the Innovation-Decision by DE Teaching Experience

  Faculty's stage in the innovation-decision process and their distance education teaching experience were significantly related, Pearson X^2 (5, N = 115) = 41.73, p < .001, Cramer's V = .60, two-tailed. The expected and observed frequencies within the two cells indicated that at the confirmation stage, more faculty members than expected had DE teaching experience and fewer faculty members than expected had no DE experience. Based on the odds ratio, the odds of faculty members at the confirmation stage who had DE experience were 10 times higher than those who had no DE experience.

- Stage in the Innovation-Decision by Professional Area

  Faculty's stage in the innovation-decision process and their professional area were found to be independent, Pearson X^2 (5, N = 115) = 5.76, p = .33, two-tailed.

- Stage in the Innovation-Decision by Age

  Faculty's stage in the innovation-decision process and their age group were found to be independent, Pearson X^2 (5, N = 115) = 4.30, p = .51, two-tailed. Table 52 presented the expected and observed frequencies for each combination of categories.

- Stage in the Innovation-Decision by Academic Rank

  Faculty's stage in the innovation-decision process and their academic rank were found to be independent, Pearson X^2 (5, N = 115) = 6.93, p = .23, two-tailed.

- Stage in the Innovation-Decision by Gender

  Faculty's stage in the innovation-decision process and their gender were found to be independent, Pearson X^2 (5, N = 115) = 9.34, p = .09, two-tailed.

Research question six discussion. Age, years of teaching, gender, academic rank, professional area, nationality, and level of education were not significantly related to faculty's stage in the innovation-decision process. However, faculty member's stage in the innovation-decision process was significantly related to their DE teaching experience. This finding was consistent with Yakah's (1997) conclusion that only prior experience with or exposure to WBDE was of any relevance to their stage in the innovation-decision process.

The findings of this study indicated that at the implementation stage, faculty members who had DE experience were five times higher than those who had no DE experience. Likewise, at the confirmation stage, faculty members who had DE experience were 10 times higher than those who had no DE experience.

Research question six conclusions and recommendations. Rogers (1995) argued that individuals' socioeconomic characteristics and previous experiences would influence their stage in the innovation-decision process. Rogers concluded that earlier adopters in a social system had the highest degree of opinion leadership among the other adopter categories, are younger in age, had a higher social status, had more advanced education, and were more socially forward than late adopters.

However, the findings of this study indicated no significant relationship between faculty's stage in the innovation-decision process and their age, academic rank (social status), and educational level. These findings are consistent with previous studies (Li, 2004; Schifter, 2000a; Surry, 1997). In addition, this study indicated that faculty's teaching experience, their professional areas, and gender were not related to faculty's stage in the innovation-decision process. This finding is consistent with Yakah's (1997) conclusion. Nationality was also found to be unrelated to faculty's stage in the innovation-decision process.

On the other hand, the findings of this study confirmed Rogers' (1995) assumption about previous experience or practice as an important factor impacting one's position in the innovation-decision process by finding that distance education experience is significantly related to faculty's stage in the innovation-decision process. This finding is consistent with Yakah's (1997) and Li's (2004) conclusions that faculty's prior experience with or exposure to WBDE is related to their stage in the innovation-decision process.

These findings imply that age, years of teaching, gender, academic rank, professional area, nationality, and level of education do not have to be taken into account when considering faculty members stage in the innovation-decision process. However, the impact of DE teaching experience needs to be taken into account when considering faculty member's stage in the innovation-decision process.

Research question seven key findings. The final question in this study examined the relationship between faculty attitudes toward the problem of limited access to higher education by students in Saudi Arabia and their stage in the innovation-decision process in regard to WBDE. When asked about their attitudes toward the statement "Limited access to higher education by students is a big problem for Saudi institutions of higher education," 71 faculty

members (61.80%) agreed with the statement, 22 (19.10%) disagreed with it, and 22 (19.10%) were not sure. Faculty's stage in the innovation-decision process and their attitudes towards the problem of limited access of higher education were found to be independent, Pearson X^2 (5, N = 115) = 4.34, p = .50, two-tailed.

Research question seven discussion. The majority of participants agreed that limited access to higher education by students was a large problem for Saudi institutions of higher education and that WBDE would be a favorable solution to this problem. However, more than one-third of faculty members disagreed or felt not sure about the problem. These findings were compatible with the findings of Li (2004).

Faculty's attitude toward the problem of limited access to higher education was not significantly related to their stage in the innovation-decision process. This finding was consistent with Yakah's (1997) conclusion that there was no statistically significant correlation between faculty stage in the innovation-decision process and their level of agreement or awareness of the problem of limited access.

Research question seven conclusions and recommendations. According to Rogers' (1995) model of innovation-decision process, potential adopters perceived needs or problems are critical prior conditions for their adoption behavior. Accordingly, the stronger potential adopters feel the existence of a problem, the more likely they seek information about the innovation that could solve the perceived problem. Even though WBDE was perceived by the majority of faculty members as a potential solution to the problem of access to higher education institutions in Saudi Arabia, most of them were in the early stages in the innovation-decision process in regard to WBDE. Thus, additional research is needed to understand why faculty's perceptions of

the problem of limited access to higher education did not impact their stage in the innovation-decision process.

Limitations of the Study

There were limitations that might affect the results of this study. The possible limitations were:

1. The participants of this study came from two universities in Saudi Arabia. It was determined for the purpose of this study that the study be limited to the faculty of these two universities; administrators and students were not included.
2. This study did not cover all of the factors affecting the diffusion of WBDE in Saudi higher education institutions.

Recommendations for Practice

Based on the conclusions of this study, the following recommendations are offered to the administrators in the Saudi universities:

1. It is recommended that each Saudi university establish/develop a WBDE central unit to serve as a clearinghouse for information and projects regarding WBDE. The establishment of such a unit would consolidate and more efficiently coordinate each university's WBDE efforts by unifying the faculty and administrators involved in WBDE within its different colleges. In addition, such a unit could provide faculty members with information about the availability of WBDE technologies, instructional training and support needed to implement the changes in teaching methodology necessary to use WBDE technologies. This unit should also provide sufficient and reliable technical support for WBDE faculty members and students.

2. It is recommended that training programs be conducted throughout the academic year. These programs should be provided by the central unit of WBDE and designed to provide faculty members with “hand-on” workshops and seminars on WBDE. As discussed earlier, it is recommended that these training sessions include not only workshops and tutorials, but also include collaboration between experienced and non-experienced faculty. Thus, Saudi universities should encourage experienced faculty members to demonstrate to their peers how they are effectively using WBDE based on their philosophy and pedagogy. This can be done through face-to-face showcases or conferences in which faculty members are given the opportunity to demonstrate innovative learning-centered pedagogies that they had successfully implemented.
3. Training sessions should cover a variety of topics such as course development, best practices, online interaction, technology training (e.g., online conferences, LMS such as Blackboard and WebCT), and the most current literature and research on WBDE. It is also recommended that higher education institutions build their own training programs based on a detailed assessment for their faculty members’ instructional needs and expectations. This requires a needs analysis before launching any training programs.
4. It is recommended that higher education institutions in Saudi Arabia establish university-level WBDE policies to ensure that faculty members interested in adopting WBDE would be supported by the administration and provided with the technology needed to support WBDE courses, research, and projects. These university-level WBDE policies should cover policies in regard to incentives (e.g., monetary support and rewards) copyright issues, promotion and tenure.

5. Since trialability and observability have critical impact on faculty adoption of WBDE, it is recommended that higher educational institutions in Saudi Arabia provide faculty members with the opportunity to try WBDE before fully implementing this kind of education and to allow faculty members to observe other faculty members' activities related to WBDE.
6. To increase the diffusion of WBDE among faculty members, it is recommended that Saudi higher education institutions employ some favorable incentives to increase their faculty's perceived relative advantage of WBDE, and accordingly, attract more faculty members to try and adopt this kind of education.
7. Since most participants had concerns about WBDE program credibility, it is recommended that the Saudi National Center of Distance Education and E-Learning establishes and adopts a common platform that illustrates the quality assurances and standards that all Saudi higher education institutions should follow. It is also important that the National Center of Distance Education conducts ongoing evaluation for WBDE programs offered by Saudi universities to decrease faculty uncertainty about the quality of this kind of education.
8. The findings of this study imply that workload adjustment and recognition of extra time and effort are also essential to encourage faculty to adopt this mode of education.
9. Departments and colleges should be provided with hardware and software necessary for the implementation of WBDE such as computer labs, high speed Internet access, and learning management systems (e.g., Blackboard or WebCT).

10. It is recommended that Saudi universities start WBDE courses by targeting the graduate students and elective courses before applying it to the whole institution.

Recommendations for Future Research

In light of the findings of this study, the researcher recommends the following areas for future research.

1. While extensive research has been done in the United States and other countries on faculty perceptions about the use of technology in education, very little is available on faculty members at Saudi institutions of higher education. Since many factors can influence faculty perceptions about the use of educational technology; it is recommended that further research be conducted that includes a larger number of faculty members to reach more conclusive results. This would not only support the findings of this study, but also extend the knowledge base available for administrators.
2. Additional *qualitative* studies are recommended in the following areas: (a) WBDE attributes that play a major role in the innovation-decision process; (b) the social learning aspects of the diffusion of innovations theory (Rogers, 1995) in regard to faculty discussions about teaching online. More specifically, how, why, and with whom faculty discuss teaching online, and how those discussions influence their perceptions and decisions regarding WBDE.
3. Additional research is needed to understand why faculty perceptions of the problem of limited access to higher education did not impact their stage in the innovation-decision process.

4. A detailed study of the economic feasibility of WBDE as an alternative to traditional face-to-face higher education is needed to assess the benefits of future governmental investments in WBDE-related infrastructure, especially for newly established universities such as the ones included in this study.
5. This study focused on the perceptions of faculty members toward WBDE. Future studies should extend this work and focus on how students as well as administrators view WBDE.
6. Future research should focus on the diffusion of WBDE over time to identify adopter categories among the faculty members in relation to the use of WBDE. This would be helpful in understanding how to provide support that is effective for different categories of faculty members (i.e., early adopters vs. late adopters).
7. This study should be replicated in additional Saudi universities as well as two-year colleges.
8. In this study, some of the cells used for analysis had to be collapsed to yield a large enough number to provide reliable results (e.g., age groups were collapsed into two categories rather than seven). Future replication of this study with a larger population would allow insights to be drawn based on the original cells.

Summary

The primary goal of this study was to examine faculty perceptions about attributes and barriers impacting diffusion of WBDE at two Saudi universities: Taif University and Tabuk University. This chapter presented a summary of the key findings, the implication of the study, and recommendation for professional practice as well as future studies.

The findings of this study indicated that participating faculty members perceived WBDE to have potential relative advantages. Some of these advantages can be classified as personal (e.g., flexibility in time and location) and others can be classified as social relative advantages (e.g., providing greater course flexibility for female students). Since trialability and observability have a critical impact on faculty's adoption of WBDE, it is recommended that higher educational institutions in Saudi Arabia provide faculty members with the opportunity to try WBDE before fully implementing this kind of education and allow them to observe other faculty members' activities related to WBDE.

It is recommended that higher education institutions that are interested in implementing WBDE (a) build their own training programs based on a detailed assessment of their faculty members' instructional needs and expectations, (b) review their policies in regard to copyright issues before adopting WBDE, (c) employ some favorable incentives to increase their faculty's perceived relative advantage of WBDE, and (d) do workload adjustment.

Since most participants had concerns about WBDE program credibility, it is recommended that the Saudi National Center of Distance Education (a) establishes and adopts a common platform that illustrates the quality assurances and standards that all Saudi higher education institutions should follow and (b) conducts ongoing evaluation for WBDE programs offered by Saudi universities and colleges to decrease faculty uncertainty about the quality of this kind of education.

Factors such as gender, teaching experience, and DE experience do not have to be taken into account when considering faculty perceptions about concerns about time, concerns about incentives, WBDE program credibility, financial concerns, planning issues, conflict with

traditional education, fear of technology, technical expertise, administrative support, and infrastructure as barriers to the diffusion of WBDE.

Nationality, age, academic rank, and level of education do not need to be taken into account when considering faculty perceptions regarding concerns about time, concerns about incentives, online program credibility, planning issues, conflict with traditional education, fear of technology, technical expertise, administrative support, and infrastructure. However, these variables need to be taken into account when considering faculty perceptions about financial concerns as a barrier to the diffusion of WBDE.

The findings of this study indicated no significant relationship between faculty's stage in the innovation-decision process and their age, academic rank (social status), and educational level. In addition, this study indicated that faculty's teaching experience, their professional areas, gender, and nationality were not related to faculty's stage in the innovation-decision process. On the other hand, the findings of this study confirmed Rogers' (1995) assumption about previous experience or practice as an important factor impacting one's position in the innovation-decision process by finding that distance education experience is significantly related to faculty's stage in the innovation-decision process.

These findings imply that age, years of teaching, gender, academic rank, professional area, nationality, and level of education do not have to be taken into account when considering faculty member's stage in the innovation-decision process. However, the impact of DE teaching experience needs to be taken into account when considering faculty member's stage in the innovation-decision process.

Even though WBDE was perceived by the majority of faculty members as a potential solution to the problem of access to higher education institutions in Saudi Arabia, most of them

were in the early stages in the innovation-decision process in regard to WBDE. Thus, additional research is needed to understand why faculty perceptions of the problem of limited access to higher education did not impact their stage in the innovation-decision process.

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APPENDIX A: SURVEY (ENGLISH VERSION)

PART I: STAGES OF THE INNOVATION-DECISION PROCESS

1. Please indicate your attitude toward the statement described below.

   Limited access to higher education by students is a big problem for Saudi institutions of higher education.

   _____ I agree.
   _____ I disagree.
   _____ I am not sure.

2. Select the ONE statement that best reflects your current attitude toward distance education.

√ Check One	Statement
_____	I have not used Web-based distance education programs and have no plans for doing it.
_____	Web-based distance education may be a way to reach more students in Saudi higher education.
_____	Web-based distance education is a way to reach more students in Saudi higher education.
_____	I know the benefits of Web-based distance education. In the near future, I will try it in my own teaching.
_____	I am currently using Web-based distance education and it helps me reach students that otherwise do not have access to higher education programs.
_____	I have used Web-based distance education for more than one semester and plan on continuing to do so.

PART II: ATTRIBUTES IMPACTING DIFFUSION OF WEB-BASED DISTANCE EDUCATION

Below is a list of attributes that may impact the diffusion of Web-based distance education. Please read each item carefully and indicate your perception about the influence of each item on the development of Web-based distance education programs.

Use the following scales to indicate your response. Circle the best response.

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

Items	SD	D	N	A	SA
1. Relative Advantages					
Using Web-based distance education could reach more students.	1	2	3	4	5
A more flexible time scheduled could be followed by using Web-based distance education.	1	2	3	4	5
Using Web-based distance education could give me access to more teaching resources.	1	2	3	4	5
Web-based distance education could be provided economically.	1	2	3	4	5
2. Compatibility					
Web-based distance education technologies are available to me.	1	2	3	4	5
Using Web-based distance education technologies are acceptable to me.	1	2	3	4	5
Procedures used in Web-based distance education would fit well with my teaching conditions.	1	2	3	4	5
Web-based distance education technologies are available to students.	1	2	3	4	5
Continues on Next Page					

Items (cont')	SD	D	N	A	SA
3. Complexity					
Web-based distance technologies are readily available to faculty.	1	2	3	4	5
Web-based distance education technologies are easy to use.	1	2	3	4	5
The changes in teaching methodology necessary to use Web-based distance education are easy to understand.	1	2	3	4	5
The changes in teaching methodology necessary to use Web-based distance education will be easy for me to implement.	1	2	3	4	5
4. Trialability					
It is possible for me to deliver selected portions of a course (a single lesson or unit) using Web-based distance education prior to developing an entire course.	1	2	3	4	5
It is possible for me currently to put selected teaching materials (e.g., readings, assignments) on the Web in support of my classes.	1	2	3	4	5
It is possible for me currently to accomplish some teaching functions (e.g., reporting grades, communication with students) on the Web.	1	2	3	4	5
It is possible for students to use Web-based distance education tools (e.g., Accessing Internet, downloading and uploading materials, watching video lessons, chat on-line, etc.).	1	2	3	4	5
5. Observability					
I know some of faculty members who are using Web-based distance education.	1	2	3	4	5
I have observed some Web-based distance education courses on my campus.	1	2	3	4	5
I am aware of the benefits of Web-based distance education programs for students.	1	2	3	4	5
I am aware of the limitations of Web-based distance education programs for students.	1	2	3	4	5
Continues on Next Page →					

PART III: BARRIERS TO DIFFUSION OF WEB-BASED DISTANCE EDUCATION

Below is a list of possible barriers to Web-based distance education. Please read each item under each group carefully and indicate your perception about the influence of each item on the development of Web-based distance education programs.

Use the following scales to indicate your response. Circle the best response.

1= No Barrier (NB)
2= Weak Barrier (WB)
3= Moderate Barrier (MB)
4= Strong Barrier (SB)
5= Very Strong Barrier (VSB)

Items	NB	WB	MB	SB	VSB
1. Concerns about time					
Increased faculty time commitment for course development.	1	2	3	4	5
Increased faculty time for online communication with students.	1	2	3	4	5
Increased faculty time for getting feedback from students.	1	2	3	4	5
Increased faculty time to explore more information.	1	2	3	4	5
2. Concerns about incentives					
Monetary compensation for adopting web-based distance education.	1	2	3	4	5
Incentives for adopting Web-based distance education.	1	2	3	4	5
Recognition for adopting Web-based distance.	1	2	3	4	5
Awards for adopting Web-based distance education.	1	2	3	4	5
Continues on Next Page					

Items (cont')	NB	WB	MB	SB	VSB
3. Web-based distance education program credibility					
Concerns about evaluation of students' works.	1	2	3	4	5
Concerns about testing of students' work.	1	2	3	4	5
Concerns that Web-based distance education programs lower the quality of students who are admitted.	1	2	3	4	5
Concerns that Web-based distance education programs lower the expectations for student learning.	1	2	3	4	5
4. Financial concerns					
Increased tuition and fee rates.	1	2	3	4	5
Increased payment for cost technologies.	1	2	3	4	5
Sharing revenue with department or business units.	1	2	3	4	5
Lack of money to implement Web-based distance education programs.	1	2	3	4	5
5. Planning issues					
Lack of identified need (perceived or real) for Web-based distance education.	1	2	3	4	5
Lack of shared vision for the role of Web-based distance education in the organization.	1	2	3	4	5
Lack of strategic planning for Web-based distance education.	1	2	3	4	5
Lack of a champion for Web-based distance education in the departments within the university.	1	2	3	4	5
6. Fear of technology					
Threat to instructors' sense of competence and authority.	1	2	3	4	5
Belief that job security is threatened.	1	2	3	4	5
Concern for legal issues (e.g., computer crime, hackers, software piracy, copyright).	1	2	3	4	5
Increased isolation of instructors.	1	2	3	4	5
Continues on Next Page					

Items (cont')	NB	WB	MB	SB	VSB
7. Conflict with traditional education					
Competition with on-campus offerings or competition for existing students.	1	2	3	4	5
Disruption of the classroom's traditional social organization.	1	2	3	4	5
Traditional academic calendar/schedule hinders Web-based distance education.	1	2	3	4	5
Lack of person-to-person contact (i.e., lack of face-to-face interaction with students; difficulty building rapport with participants at a distance).	1	2	3	4	5
8. Technical expertise					
Lack of technical support.	1	2	3	4	5
Lack of training programs for Web-based distance education.	1	2	3	4	5
Lack of knowledge about Web-based distance education.	1	2	3	4	5
Lack of the "right" people to implement Web-based distance education.	1	2	3	4	5
9. Administrative support					
Lack of support or encouragement from administrators.	1	2	3	4	5
Copyright/fair use issues in using materials in Web-based distance education.	1	2	3	4	5
Difficulty in recruiting faculty.	1	2	3	4	5
Difficulty in recruiting students.	1	2	3	4	5
10. Infrastructure					
Lack of adequate technology-enhanced classrooms/labs/ infrastructure.	1	2	3	4	5
Lack of adequate student access to computers and internet.	1	2	3	4	5
Lack of adequate instructor access to computers and internet.	1	2	3	4	5
Lack of library access or delivery of materials and services.	1	2	3	4	5

Continues on Next Page

PART IV: PERSONAL CHARACTERISTICS

Please indicate your responses to the following questions:

1. What is your university?

   ( ) Taif University ( ) Tabuk University

2. Which college are you from?

   ( ) College of Arts & Humanities ( ) College of Education
   ( ) College of Economics & Administration ( ) College of Science
   ( ) College of Engineering ( ) College of Medicine
   ( ) College of Computers & Info. Systems ( ) Community College
   ( ) College of Applied Medical Sciences ( ) College of Health Sciences

3. Please indicate your gender? ( ) Male ( ) Female

4. What is your age?

   ( ) Under 30 years old ( ) 30-34 years old ( ) 35-39 years old
   ( ) 40-44 years old ( ) 45-49 years old ( ) 50-54 years old
   ( ) +54 years old

5. What is your position title at your university?

   ( ) Instructor ( ) Lecturer ( ) Assistant professor
   ( ) Associate professor ( ) Full professor

6. What is your nationality? ( ) Saudi ( ) Non-Saudi

7. What is the highest academic degree you have earned?

   ( ) Bachelor's ( ) Mater's ( ) Doctorate

8. How many years in teaching experiences do you have at the university/college level?

   ( ) Less than 5 years ( ) 5-9 years ( ) 10-14 years
   ( ) 15-19 years ( ) Over 19 years

9. Have you taught courses using distance education? ( ) Yes ( ) No

   If yes, please indicate the type and duration of distance education programs have you used (select all appropriate).

   _____ Web-based distance education program _____ Years
   _____ TV or radio broadcasting program _____ Years
   _____ Correspondence program _____ Years
   _____ Other (please list) _____ _____ Years

10. Please give two primary reasons why you would use (or not to use) Web-based distance education to deliver instruction?

    _____
    _____
    _____

11. Please specify what your university could do to encourage you to participate in online education in the future?

    _____
    _____
    _____

    In the space below, provide any additional comments you wish to share:

    _____
    _____
    _____

Please return the completed questionnaire in the prepared return envelope.

THANK YOU FOR YOUR TIME AND HELP!

APPENDIX B: PERMISSION TO USE AND MODIFY SURVEY INSTRUMENT ITEMS

From: yanli [yanli@zju.edu.cn]
To: Mohammed Al-Hawiti
Subject: Re:Instrument Petition

Hi, Mohammed Al-Hawiti, you are welcome to use the instrument and revise it!

Good luck on your dissertation!

Yan Li

From: Mohammed Al-Hawiti <malhawiti@indstate.edu>
To: “yanli@zju.edu.cn"
Subject: Instrument Petition

Hello Dr. Yan Li,

I'm Mohammed M. Alhawiti, a Ph.D. candidate at Indiana State University. I have recently read your doctoral dissertation titled, "Faculty Perceptions about Attributes and Barriers Impacting Diffusion of Web-Based Distance Education at the China Agricultural University." I'm highly interested in your scholar research, especially your research in the implementation of DE in higher education.

I'm currently working on my dissertation. I'm specifically interested in investigating factors that influence faculty adoption of web-based instruction in Saudi higher education institutions.

Could I use your instrument to collect the data of my dissertation? Please note that I will modify some of the items to match my target population.

I'm looking to hear from you soon.

With my best regards,

Mohammed Alhawiti

APPENDIX C: SURVEY (ARABIC VERSION)

القسم الأول: مراحل اتخاذ قرار ابتكاري

الرجاء وضع علامة (√) أمام الخيار الذي يمثل رأيك في العبارة التالية.

1)) محدودية فرص حصول الطلاب السعوديين على قبول لمرحلة التعليم الجامعي تمثل مشكلة كبيرة.

أوافق _____.
لا أوافق _____.
غير متأكد _____.

2) الرجاء اختيار العبارة الأفضل التي تمثل رأيك الحالي في التعليم عن بعد.

العبارة	اختار عبارة واحدة √
أنا لم أستخدم التعليم عن بعد عبر الإنترنت من قبل ولن أقوم باستخدامه في المستقبل.	
التعليم عن بعد عبر الإنترنت **قد** يوفر فرص لعدد أكبر من الطلاب السعوديين للحصول على التعليم الجامعي.	
التعليم عن بعد عبر الإنترنت **يوفر** فرص لعدد أكبر من الطلاب السعوديين للحصول على التعليم الجامعي.	
لديّ معلومات عن مميزات التعليم عن بعد عبر الإنترنت و أخطط لاستخدامه في المستقبل القريب.	
أنا استخدم التعليم عن بعد عبر الإنترنت حاليا" وأعتقد أنه ساعدني على الوصول إلى أكبر عدد ممكن من الطلاب الذين ليس لديهم وسيله أخرى للحصول على التعليم الجامعي.	
أنا استخدمت التعليم عن بعد عبر الإنترنت لأكثر من فصل دراسي و أخطط للإستمرار في استخدامه.	

القسم الثاني: السمات المؤثرة على انتشار التعليم عن بعد عبر الإنترنت

أدناه قائمة بسمات التعليم عن بعد عبر الإنترنت والتي قد تؤثر على انتشاره. الرجاء قراءة كل فقرة جيدا" و تحديد الخيار المناسب بوضع علامة (√)، وذلك بناء" على المقياس التالي:

(1) غير موافق بشدة (2) غير موافق (3) غير متأكد (4) موافق (5) موافق بشدة

العبارة	غير موافق بشدة	غير موافق	غير متأكد	موافق	موافق بشدة
1) المزايا النسبية					
استخدام التعليم عن بعد عبر الإنترنت يمكنني الوصول إلى عدد أكبر من الطلاب.	1	2	3	4	5
التعليم عن بعد عبر الإنترنت يتيح لي مرونة أكبر في الوقت.	1	2	3	4	5
استخدام التعليم عن بعد عبر الإنترنت يمكن أن يساعدني في الحصول على المزيد من الموارد التعليمية.	1	2	3	4	5
يمكن توفير التعليم عن بعد عبر الإنترنت بشكل أقل كلفة اقتصادية.	1	2	3	4	5
2) مدى التوافق					
تكنولوجيا التعليم عن بعد عبر الإنترنت متوفرة لي.	1	2	3	4	5
أنا متقبل لاستخدام تكنولوجيا التعليم عن بعد عبر الإنترنت.	1	2	3	4	5
طرق التدريس المستخدمة في التعليم عن بعد عبر الإنترنت سوف تكون متناسبة مع ظروفي التدريسية.	1	2	3	4	5
تكنولوجيا التعليم عن بعد عبر الإنترنت متوفرة للطلاب.	1	2	3	4	5

الرجاء المواصلة للصفحة التالية ←

العبارة	غير موافق بشدة	غير موافق	غير متأكد	موافق	موافق بشدة
3) مدى التعقيد					
تكنولوجيا التعليم عن بعد عبر الإنترنت متوفرة لأعضاء هيئة التدريس.	1	2	3	4	5
تكنولوجيا التعليم عن بعد عبر الإنترنت يمكن استخدامها بسهوله.	1	2	3	4	5
التغييرات في طرق التدريس الضرورية لتطبيق التعليم عن بعد عبر الإنترنت يمكن فهمها بسهوله.	1	2	3	4	5
يمكنني بسهولة عمل التغييرات اللازمة في طرق التدريس من أجل تطبيق التعليم عن بعد عبر الإنترنت.	1	2	3	4	5
4) إمكانية التجريب					
متاح لي أن أقوم بتدريس أجزاء مختاره من مقرراتي (درس أو وحدة) باستخدام الإنترنت قبل تطوير مقرر دراسي كامل.	1	2	3	4	5
متاح لي حاليا" أن أقوم بوضع مواد تعليمية مختاره (على سبيل المثال: مواد للقراءة أو واجبات) على شبكة الإنترنت من أجل دعم مقرراتي.	1	2	3	4	5
يمكنني حاليا" إنجاز بعض مهامي التدريسية (على سبيل المثال: توزيع الدرجات ، التواصل مع الطلاب) عبر الإنترنت.	1	2	3	4	5
من الممكن للطلاب استخدام أدوات التعليم عن بعد عبر الإنترنت (على سبيل المثال: الدخول على الإنترنت، تحميل ورفع ملفات، مشاهدة دروس الفيديو، المحادثة إلكترونيا"،...).	1	2	3	4	5
5) إمكانية الملاحظة					
أعرف بعضا من أعضاء هيئة التدريس الذين يستخدمون التعليم عن بعد عبر الإنترنت.	1	2	3	4	5
لقد تابعت بعض من المقررات في كليتي تدرس عن بعد عن طريق الإنترنت.	1	2	3	4	5
لديّ اطلاع عن فوائد التعليم عن بعد عبر الإنترنت بالنسبه للطلاب.	1	2	3	4	5
لديّ اطلاع ببعض عيوب البرامج الأكاديمية التي توفر التعليم عن بعد عبرالإنترنت بالنسبة للطلاب.	1	2	3	4	5

الرجاء المواصلة للصفحة التالية ←

القسم الثالث: العوامل التي تعيق انتشار التعليم عن بعد عبر الإنترنت

أدناه قائمة ببعض العوامل التي قد تعيق انتشار التعليم عن بعد عبر الإنترنت. الرجاء قراءة كل فقرة جيدا" و تحديد الخيار المناسب بوضع علامة (√)، وذلك بناء" على المقياس التالي:

(1) ليس عائقا" (2) عائق ضعيف (3) عائق متوسط (4) عائق قوي (5) عائق قوي جدا"

العبارة	ليس عائقا"	عائق ضعيف	عائق متوسط	عائق قوي	عائق قوي جدا"
1) مخاوف متعلقة بالوقت					
زيادة الوقت المتطلب من أعضاء هيئة التدريس من أجل تطوير المقررات.	1	2	3	4	5
زيادة الوقت المتطلب من أعضاء هيئة التدريس للتواصل مع الطلاب عن طريق الإنترنت.	1	2	3	4	5
زيادة الوقت المتطلب من أعضاء هيئة التدريس للحصول على التغذية الراجعة من الطلاب.	1	2	3	4	5
زيادة الوقت المتطلب من أعضاء هيئة التدريس للبحث عن مزيد من المعلومات.	1	2	3	4	5
2) مخاوف مرتبطة بالحوافز					
توفير حوافز مالية من أجل تطبيق التعليم عن بعد عبر الإنترنت.	1	2	3	4	5
الحث و التشجيع على تبني التعليم عن بعد عبر الإنترنت.	1	2	3	4	5
تقدير أعضاء هيئة التدريس لاستخدامهم التعليم عن بعد عبر الإنترنت.	1	2	3	4	5
تقديم جوائز و مكافئات لاستخدام التعليم عن بعد عبر الإنترنت.	1	2	3	4	5
الرجاء المواصلة للصفحة التالية ←					

العبارة	ليس عائقا"	عائق ضعيف	عائق متوسط	عائق قوي	عائق قوي جدا"
3)) جودة البرامج الأكاديمية للتعليم عن بعد عبر الإنترنت.					
مخاوف حول تقييم عمل الطلاب.	1	2	3	4	5
مخاوف حول اختبار الطلاب.	1	2	3	4	5
مخاوف حول تدني جودة المعايير المستخدمة في قبول الطلاب.	1	2	3	4	5
مخاوف حول تدني المخرجات التعليمية المتوقعة من الطلاب.	1	2	3	4	5
4) مخاوف مالية					
ارتفاع معدلات و تكاليف الرسوم الدراسية.	1	2	3	4	5
ارتفاع تكلفة التكنولوجيا المستخدمة.	1	2	3	4	5
مشاركة المردود المالي للتعليم عن بعد عبر الإنترنت مع أقسام أخرى.	1	2	3	4	5
عدم وجود الدعم المالي لتنفيذ برامج التعليم عن بعد عبر الإنترنت.	1	2	3	4	5
5) قضايا التخطيط					
عدم وجود احتياجات معروفة وواضحة للتعليم عن بعد عبر الإنترنت.	1	2	3	4	5
عدم وجود رؤية مشتركة في الجامعة لدور التعليم عن بعد عبر الإنترنت.	1	2	3	4	5
عدم وجود خطة استراتيجية في الجامعة للتعليم عن بعد عبر الإنترنت.	1	2	3	4	5
نقص المنافسة بين الأقسام في الجامعة في مجال التعليم عن بعد عبر الإنترنت.	1	2	3	4	5
6) الخوف من التكنولوجيا					
تهديد لثقة المدرس و سلطته.	1	2	3	4	5
الاعتقاد بأن الأمان الوظيفي في خطر.	1	2	3	4	5
مخاوف قانونية (على سبيل المثال: جرائم معلوماتية، قرصنة الإنترنت، حقوق البرامج التعليمية والنشر).	1	2	3	4	5
زيادة انفصال المدرس عن الطلاب.	1	2	3	4	5
الرجاء المواصلة للصفحة التالية ←					

العبارة	ليس عائقا"	عائق ضعيف	عائق متوسط	عائق قوي	عائق قوي جدا"
7) التعارض مع التعليم التقليدي					
المنافسة مع الفصول التقليدية داخل الحرم الجامعي أو المنافسة لجذب الطلاب الحاليين.	1	2	3	4	5
اخلال بالتنظيم الإجتماعي المتعارف عليه في الفصول التقليدية.	1	2	3	4	5
الجدول أو التقويم الأكاديمي للفصول التقليدية يمكن أن يعيق التعليم عن بعد عبر الإنترنت.	1	2	3	4	5
قلة التواصل الشخصي مع الطلاب و صعوبة بناء صلات وثيقة مع المشاركين في التعليم عن بعد عبر الإنترنت.	1	2	3	4	5
8) الدعم التقني					
غياب الدعم التقني.	1	2	3	4	5
قلة البرامج التدريبية على استخدام التعليم عن بعد عبر الإنترنت.	1	2	3	4	5
غياب المعرفة بالتعليم عن بعد عبر الإنترنت.	1	2	3	4	5
نقص الأشخاص "المؤهلين" لتطبيق التعليم عن بعد عبر الإنترنت.	1	2	3	4	5
9) الدعم الإداري					
قلة الدعم و التشجيع من قبل الإدارة و المسؤولين.	1	2	3	4	5
القضايا المتعلقة بحقوق النشر.	1	2	3	4	5
صعوبة في جذب أعضاء هيئة التدريس.	1	2	3	4	5
صعوبة في جذب الطلاب.	1	2	3	4	5
10)البنية التحتية					
عدم وجود البنية التحتية و الأجهزة اللازمة.	1	2	3	4	5
نقص الفرص الكافية للطلاب لاستخدام الكمبيوتر و الانترنت.	1	2	3	4	5
نقص الفرص الكافية لأعضاء هيئة التدريس لاستخدام الكمبيوتر و الإنترنت.	1	2	3	4	5
نقص الخدمات المكتبية لتوفير أو توصيل المواد التعليمية.	1	2	3	4	5
الرجاء المواصلة للصفحة التالية ←					

القسم الرابع: معلومات شخصية

الرجاء الإجابة على العبارات التالية وذلك بوضع علامة (√) أمام الخيار المناسب, وكذلك كتابة الإجابة لبعض الأسئلة التي تتطلب ذلك.

1	ما اسم الجامعة التي تنتمي إليها؟	( ) جامعة الطائف ( ) جامعة تبوك
2	ما اسم الكلية التي تعمل بها؟	( )كلية التربية ( ) كليةالآداب ( ) كلية الاقتصاد و العلوم الادارية ( ) كلية الهندسة ( ) كلية العلوم ( ) كلية الطب ( ) كلية الحاسبات و نظم المعلومات ( ) كلية العلوم الطبية التطبيقية ( ) كلية المجتمع ( ) كلية العلوم الصحية
3	الجنس:	( ) ذكر ( ) أنثى
4	العمر:	( ) أقل من 30 سنة ( ) 30-34 ( ) 35-39 ( ) 40 - 44 ( ) 45-49 ( ) 50-54 ( ) 54+
5	المرتبة العلمية:	( ) معيد/مدرس ( ) محاضر ( ) أستاذ مساعد ( ) أستاذ مشارك ( ) أستاذ
6	الجنسية:	( ) سعودي ( ) غير سعودي
7	ما هو أعلى مؤهل حصلت عليه؟	( ) بكالوريوس ( ) ماجستير ( ) دكتوراة
8	كم عدد سنوات خبرتك في التدريس الجامعي؟	( ) أقل من 5 سنوات ( ) 5 - 9 سنوات ( ) 10 - 14 سنة ( ) 15- 19 سنة ( ) أكثر من 19 سنة
9	هل سبق لك استخدام التعليم عن بعد؟ ( ) نعم ( ) لا إذا كانت اجابتك **بنعم**،الرجاء ذكر نوع و مدة برامج التعليم عن بعد التي قمت باستخدامها: ( ) التعليم عبر الإنترنت _____سنوات ( ) التعليم عبر الراديو أو التلفاز _____سنوات ( ) التعليم بالمراسلة _____سنوات ( ) أخرى (حدد): _____ _____ سنوات	

10	الرجاء إعطاء سببين رئيسيين مؤثران في قرار استخدامك أو عدم استخدامك للتعليم عن بعد عبر الانترنت: ....
11	الرجاء توضيح كيف يمكن لجامعتك أن تشجعك على المشاركة مستقبلا في التعليم عن بعد عبر الانترنت: ....
اذا كان لديك اي تعليق او اضافة، الرجاء استخدام المسافة ادناه:	

انتهت الأسئلة

شكرا" لك مرة أخرى على المشاركة في هذه الدراسة.

APPENDIX D: IRB EXEMPTION

Exempt from Institutional Review Board Review

Indiana State University
More. From day one.

Institutional Review Board
Terre Haute, Indiana 47809
812-237-3092
Fax 812-237-3092

DATE:	November 19, 2010
TO:	Mohammed Alhawiti
FROM:	Indiana State University Institutional Review Board
STUDY TITLE:	[200346-1] Faculty Perceptions about Attributes and Barriers Impacting the Diffusion of Online Education in Two Saudi Universities
IRB REFERENCE #:	11-051
SUBMISSION TYPE:	New Project
ACTION:	DETERMINATION OF EXEMPT STATUS
DECISION DATE:	19 November 2010
REVIEW CATEGORY:	Exemption category #2

Thank you for your submission of New Project materials for this research study. The Indiana State University Institutional Review Board has determined this project is EXEMPT FROM IRB REVIEW according to federal regulations (45 CFR 46). You do not need to submit continuation requests or a completion report. Should you need to make modifications to your protocol or informed consent forms that do not fall within the exempt categories, you will have to reapply to the IRB for review of your modified study.

Internet Research: You are using an internet platform to collect data on human subjects. Although your study is exempt from IRB review, ISU has specific policies about internet research that you should follow to the best of your ability and capability. Please see that section on the ISU IRB website.

Informed Consent: All ISU faculty, staff, and students conducting human subjects research within the "exempt" category are still ethically bound to follow the basic ethical principles of the Belmont Report: a) respect for persons; 2) beneficence; and 3) justice. These three principles are best reflected in the practice of obtaining informed consent.

We will put a copy of this correspondence in the IRB files, in the Office of Sponsored Programs.

If you have any questions, please contact Thomas Steiger at 812-237-3426 or thomas.steiger@indstate.edu. Please include your study title and reference number in all correspondence with the IRB. I wish you well in completing your study.

cc: IRB file

APPENDIX E: PERMISSION TO CONDUCT SURVEY AT TAIF UNIVERSITY

بسم الله الرحمن الرحيم

Kingdom of Saudi Arabia
Ministry of Higher Education
Taif University
Vice President for Academic Affairs

المملكة العربية السعودية
وزارة التعليم العالي
جامعة الطائف
وكيل الجامعة للشؤون التعليمية

"عاجل جداً"

سعادة وكيل وزارة التعليم العالي للشؤون التعليمية المكلف حفظه الله

السلام عليكم ورحمة الله وبركاته وبعد

إشارة إلى خطاب سعادتكم رقم (١٢٧٨٦٣) وتاريخ (١٤٣١/١٢/٢٩هـ) بخصوص الطلب المقدم من الطالب/ محمد بن مفرج الحويطي والمبتعث لدراسة مرحلة الدكتوراه-تخصص تكنولوجيا التعليم بجامعة أنديانا الحكومية ، ورغبته بتوزيع استبانة متعلقة ببحثه بعنوان "تصورات أعضاء هيئة التدريس للسمات والمعوقات التي تؤثر على تبني وانتشار التعلم عن بعد باستخدام الانترنت في الجامعات السعودية".

أفيد سعادتكم بأن الجامعة ليس لديها مانع في توزيع الطالب لاستبانته داخل الجامعة.

وتقبلوا سعادتكم فائق التحية والاحترام،،،

وكيل الجامعة للشؤون التعليمية

٢/١/٢٩

د. فريد بن هاشم فلمبان

الرقم ١٧٩ التاريخ ٩ / ١ / ٣٢ ١٤هـ المشفوعات

APPENDIX F: PERMISSION TO CONDUCT SURVEY AT TABUK UNIVERSITY

KINGDOM OF SAUDI ARABIA
Ministry of Higher Education
University of Tabuk
Office of Vice President for Graduate Studies and Scientific Research

المملكة العربية السعودية
وزارة التعليم العالي
جامعة تبوك
مكتب وكيل الجامعة للدراسات العليا والبحث العلمي

سعادة وكيل الوزارة للشؤون التعليمية المكلف حفظة الله

السلام عليكم ورحمة الله وبركاته

تهديكم جامعة تبوك أطيب تحية وتقدير وتشكر تعاونكم الدائم معها . ونشير إلى خطاب سعادتكم رقم ١٢٧٨٦٣ وتاريخ ١٤٣١/١٢/٢٩هـ بشأن طلب الموافقة على توزيع استبانه لبحث الدكتوراه لمبتعث الجامعة / محمد بن مفرج الحويطي والذي هو بعنوان (تصورات أعضاء هيئة التدريس للسمات والمعوقات التي تؤثر على تبني وانتشار التعليم عن بعد باستخدام الانترنت في الجامعات السعودية) والذي سيقوم بتوزيعها على الجامعة .

نفيد سعادتكم بموافقة الجامعة على طلب المذكور على أن يتم اتخاذ الإجراءات اللازمة حسب البرقية الخطية السرية العاجلة لصاحب المعالي وزير التعليم العالي رقم ٨١٠٤ وتاريخ ١٤٣١/٠٥/٠٧هـ والتي تشير بأن يتم الرفع للوزارة عن كل موضوع يتقدم فيه المبتعثون بتطبيق استبانة أو إجراء بحث يتعلق بالمملكة العربية السعودية أو بأي من أجهزتها أو مؤسساتها العامة للحصول على التوجيه بشأنها .

آمل التفضل بالاطلاع والإحاطة .

ونقبلوا سعادتكم خالص تحياتي وتقديري .

وكيل الجامعة
للدراسات العليا والبحث العلمي
أ. د.فالح بن رجاء الله السلمي

Fax 044250965 فاكس Tel. 044250960 تلفون
Tabuk 71491 تبوك P. O. Box 741 ص.ب
Kingdom of Saudi Arabia المملكة العربية السعودية
www.ut.edu.sa

الرقم : Ref
التاريخ : Date
المرفقات : Encl.

APPENDIX G: PERMISSION TO REPRINT SURVEY

I (Yan Li) make this formal permission statement to allow Mahammed Alhawiti to reprint my survey instrument, which was created in my dissertation "Faculty Perceptions about Attributes and Barriers Impacting Diffusion of Web-based Distance Education at the China Agricultural University" during 2003-2004 semester at Texas A&M University, in his doctoral research activity. I created the instrument to explore diffusion status of WBDE in Chinese Universities. I hope that Mahammed Alhawiti would utilize the instrument to explore issues of WBDE-related faculty adoption behavior in some other countries or areas.

Yan Li, Associate Professor
Modern Educational Technology Center
College of Education
Zhejiang University
Hangzhou, Zhejiang Province, 310028
P.R. China
E-mail: yanli@zju.edu.cn
Homepage: http://mypage.zju.edu.cn/en/0004269

16 February, 2011