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EVALUATING STAKEHOLDER ATTITUDES TO ICT IN THE ADOPTION OF E-LEARNING IN JORDAN

Mazen Kamal Qteishat

A thesis submitted in partial fulfilment of the requirements of
Sheffield Hallam University
For the degree of Doctor of Philosophy

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"Allah will exalt in degree those of you who believe and those who have been granted knowledge. And Allah is well-acquainted with what you do "

Holy Quran Chapter 58. Verse 11

The Prophet Mohammad, peace be upon him, Said "Whoever takes a path in search for knowledge, Allah will facilitate for him a path to Paradise "

Prophet Teachings

Abbreviations

FA	Factor Analysis
ICT	Information Communication Technology
KMO	Kaiser-Meyer-Olkin Measure of Sampling Adequacy
PLS	Partial Least Square
PSC	Principle component Analysis
SEM	Structural Equation Modelling
SPSS	Statistical Package for Social Science
TAM	Technology Acceptance Model
TAM-EL	Technology Acceptance Model for E-Learning

Abstract

E-Learning is gaining increased importance in government agendas and among other stakeholders such as academics, students and technology Providers. This study examines the factors contributing to attitudes towards E-Learning in higher education among stakeholders in Jordan. The research developed a TAM-EL model for predicting the intention to adopt E-Learning based on the constructs of the Technology Acceptance Model (TAM). TAM-EL proposes that Perception of usefulness of technology, Perception of ease of use of the technology, Patronised (degree support for the technology), and Practised (previous experience with the technology) influence attitude towards adoption of E-Learning. The main research question of the study was: To what extent does the proposed model, in particular the role of the components Perception, Patronised, and Practised, play in the adoption of E-Learning? The TAM-EL model was tested using data collected from a large sample of participants representing E-Learning Users and Providers from universities in Jordan. The partial least square method was used to test the model for the study and regression and multiple regression analysis were used to test the hypotheses of the study.

The findings of the study validated the TAM-EL model for technology adoption among Users and Providers of E-Learning in Jordan. Moreover, attitude of Providers towards E-Learning was found to be a very strong predictor of the adoption of E-Learning by the institution, accounting for approximately three-quarters of the variance in prediction of E-Learning. In addition, the degree of support for Providers as measured by the Patronised variable accounted for approximately two-thirds of the variance in Prediction of E-Learning, suggesting that this variable is a significant factor contributing to Attitude and to Prediction.

Additionally, the findings and the analysis indicate that Users also have an important role as stakeholders in the adoption of E-Learning in Jordan. While the variable of Attitude contributes to approximately 57% of the variance in the Prediction of E-Learning, the variable of Patronised contributes only approximately 28% of the variance in the Prediction of E-Learning.

Moreover, the findings show a marked difference between Users' and Providers' Attitudes towards E-learning and therefore an obvious recommendation is the need to engage Users in a more determined manner.

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Thank you all so much!

Mazen K. Qteishat

June, 2010

Dedication

I dedicate this work for my lovely wife Rana Qteishat and our lovely daughters Abla and Lama. Without their encouragement, patience and understanding I could never have completed this work.

Love to all of you.

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Chapter 1 : Introduction

The purpose of this chapter is to introduce the study presented in this thesis, which investigated the adoption of E-Learning in Jordan. It discusses the context of the study, which involved university students, administrators and staff at a university in Jordan. It also presents the aim and objectives of the study, which were to assess the factors influencing stakeholder attitudes towards E-Learning. The chapter also contains the research questions guiding the direction of the study. The chapter discusses the contributions of the study and their significance for theory and practical applications. It also contains an overview of the study and the material found in subsequent chapters. The chapter concludes with a brief summary of key points.

1.1 Context of the Study

E-Learning is becoming an increasingly important aspect of higher education because it provides students with potentially greater accessibility to courses and allows them to use greater flexibility to tailor the learning process to their individual needs. E-Learning is the use of internet-based courses or programs that deliver instruction using pedagogical tools as part of a formal educational program (Debbagh, 2005; Seok, 2008). The development of E-Learning is a result of the growth of information and communications technology (ICT) in education because of the need to provide education for larger numbers of students as well as training in the technologies students will need in the workplace (Karlsudd & Tagerud, 2008; Stensaker, Maassen, Borgan, et al., 2007). As a result, ICT and E-Learning provide benefits for all stakeholders in higher education. The primary stakeholders in higher

education are the administrators, staff and students in an institution that are directly affected by E-Learning. The secondary stakeholders in higher education include businesses employing graduates and society at large because of the increased value that higher education produces for all individuals (Reinhartsen, 2003). In Jordan, political stakeholders in the university system are also significant, with current policy advocating a rapid expansion in higher education and the decentralization of academic institutions (Reiter, 2002).

E-Learning differs significantly from traditional classroom education because it can be both synchronous and asynchronous (Desai, et al, 2008). With synchronous E-Learning, students and faculty simultaneously interact at a specific time using the internet for direct communications. With asynchronous E-Learning, the students and faculty interact at different times by placing messages or coursework in files that are accessed at different times. With either approach, E-Learning provides the advantage of allowing an educational institution to provide learning without requiring the physical presence of the student or faculty on the institution's campus. Another advantage of E-Learning is the flexibility it provides to students that can accommodate various types of learning styles (Lam & Bordia, 2008). E-Learning also allows students to attend classes without the need to be physically present on the campus of a university, which theoretically increases access to higher education. Using E-Learning in education can also reduce costs for the institution and for the students.

Although the general global trend is towards increased use of E-Learning in higher education, the technology is not evenly dispersed throughout all groups and cultures (Hodgkinson-Williams, Slay, & Sieborger, 2008). The disparity in availability of E-Learning at university level is apparent in the nations of the Middle East. Some institutions

of higher education in Middle Eastern nations are increasing their emphasis on ICT education and access because of the need for these institutions to compete with universities outside the region to retain students (Lefrere, 2007). In many nations in the region, such as Turkey, there is a generally positive attitude towards E-Learning (Inal, Karakus & Cagiltay, 2008). In contrast, the rate of adoption of E-Learning in Jordan and the UAE has been slow (Alshara & Alsharo, 2007). Universities in many nations in the region have experienced significant difficulties with the practical development and implementation of E-Learning programs, which contributes to the disparity in the availability of E-Learning in higher education.

A significant factor for the development and implementation of E-Learning in Jordan is resistance to E-Learning among students, administrators and educators in higher education, which slows the rate of E-Learning adoption. Various reasons have been offered by researchers to explain resistance to E-Learning adoption in higher education in developing nations. Insufficient ICT infrastructure at the national level and the institutional level discourages the adoption of E-Learning because students and administrators do not have adequate internet connectivity or bandwidth to support transmitting large files (Jones & Gregor, 2006). The absence of technical support services from the educational institution also fosters a perception among educators and students that E-Learning may not be a practical educational solution because of difficulties resolving technical problems in a timely manner (Stella & Gnanam, 2004). Access to computers is also a factor influencing adoption of E-Learning in Jordan. If an insufficient number of students can access computers either through personal ownership or through shared institutional computers, E-Learning cannot be effectively implemented. An educational institution can also slow the rate of diffusion of E-Learning in the organisation by placing relatively low value on the

importance of ICT and E-Learning, which discourages educators from adopting learning methods mediated by ICT (Minishi-Majanja & Kiplang'at, 2005). The lack of a generally accepted pedagogical theory also discourages administrators and faculties in universities from adopting an E-Learning model for education delivery because of the difficulty of assessing the effectiveness of the approach when determining learning outcomes (Unwin, 2007).

A particular problem for universities is resistance to innovation among administrators and faculties, which are critical stakeholder groups responsible for providing E-Learning courses to students (Alshara & Alsharo, 2007). Resistance can arise from staff with insufficient competencies in ICT and a general perception that online degrees are less credible than traditional classroom degrees (Adams, 2008). Student attitudes towards ICT and E-Learning are dependent on access to ICT as well as the perception of the usefulness of E-Learning in the educational process (Kirkwood & Price, 2005). Students' attitudes are also influenced by their previous experience with ICT and E-Learning. As a result, it is necessary to identify the factors producing resistance among these two critical stakeholder groups to provide information for institutions for developing strategies to improve attitudes and perceptions towards the use of ICT in education and E-Learning.

The specific problem investigated in this study is the effect of student, administrator and educator stakeholder attitudes on the adoption of E-Learning in universities in Jordan. The research was grounded in the Technology Acceptance Model (TAM) which postulates that the subjective norms and perceptions of individuals influence attitudes towards a technology, with attitude as the best predictor of the intention to adopt a technology (Shin & Kim, 2008). The extended TAM-EL model proposes that perception of the technology, experience with using the technology, and the subjective assessment of the degree of

support for use of the technology, are the primary factors influencing attitude and the intention to adopt the technology. The model is used to determine the way in which individuals view and use a specific technology (Schneberger, Amoroso, & Durfee, 2008). The model is applicable to this research because it identifies key variables that can be measured and analyzed to support an empirical assessment of the effect of the variables on the intention to adopt E-Learning.

The issue of ICT use in higher education and the factors influencing the adoption of E-Learning in Jordan have not been extensively investigated by previous researchers. Although the research examined the factors influencing attitudes towards E-Learning among university stakeholders in Jordan, the findings are applicable to higher education in other developing nations in the Middle East faced with similar ICT use and acceptance issues such as the UAE (Alshara & Alsharo, 2007). The higher education system in Jordan contains both private and public institutions, which is similar to the structure of the educational system in many other nations in the Middle East (Jensen, 2006). In addition, the higher education systems in all nations in the Middle East are facing stakeholder pressures to adopt the educational practices found in Western university systems (Lefrere, 2007). As a result, the key findings presented in this study have implications for developing and implementing E-Learning in higher education in other Middle Eastern nations.

1.2Aim and Objectives

The aim of this quantitative study is to identify the effect of the factors of perception of ICT, support for ICT, experience using ICT, and attitude with the intention to adopt E-Learning among stakeholder groups of student Users of E-Learning, and administrator and educator Providers of E-Learning in higher education in Jordan.

1.2.1 Objectives

Based on the aim of the study, the specific objectives of the study are:

1. To increase knowledge about and understanding of E-Learning in higher education in Jordan by developing a proposed TAM-EL model. TAM-EL integrates the TAM theoretical framework with factors identified in the literature as relevant to the intention to adopt E-Learning. These factors are: Perception of usefulness of E-Learning; perception of ease of use of E-Learning, Patronised of the degree of support for E-Learning, previous experience with E-Learning, and Attitude towards E-Learning.
2. To examine the application of a theoretical model through a large investigative empirical study involving field work to explain the main factors influencing the intention to adopt E-Learning among student as Users and administrator and educator as Providers of E-Learning in institutions of higher education in Jordan.
3. To explore the relative importance of each factor for the adoption of E-Learning in institutions of higher education in Jordan, generating new insight and understanding about the relative influences of user and provider stakeholders for the development of E-Learning in higher education in Jordan that may be applicable to higher education in other developing nations.

1.3 Research Questions

While the state of the reviewed literature provides a theoretical foundation for this investigation, more investigation is required in order to fully understand and explain how E-Learning is developed in institutions of higher education in general, and those of Jordan in particular. For instance, most of the reviewed literature assumes only one group of stakeholders, demonstrating a gap in understanding that the views of many stakeholders are concerned in the evaluation of E-Learning. A critical review of the available literature enabled the thesis to focus on three research questions in order to fill this gap:

1.3.1 Principle Research Question

To what extent does the TAM-EL, in particular the role of the components Perception, Patronised, and Practised, play in the adoption of E-Learning?

1.3.2 Three sub-questions

1. What is the role of Users and Providers as stakeholders in the adoption of the TAM-EL?
2. What is the role of Users as stakeholders in the adoption of the TAM-EL?
3. What is the role of Providers as stakeholders in the adoption of the TAM-EL?

1.4 Research Contribution

This research contributes to the emerging body of research into the adoption of E-Learning within the context of Jordan with potential theoretical and practical implications for the following reasons:

1. This research has adopted TAM and shows how it can be used within the domain of E-Learning. A TAM-EL extends the model with two external factors (Patronised and Practised) which help in predicting E-Learning adoption.

2. Although previous studies have examined E-Learning in higher education, that research has not extensively investigated the adoption of E-Learning in Jordan within the context of both Users and Providers. Filling the gap with this research is one of the contributions of this study.

3. The research also makes a practical contribution by identifying enablers and barriers to the adoption of E-Learning among stakeholders in higher education in Jordan and other Arab nations by providing information about perceptual and attitudinal barriers to the use of E-Learning.

1.5 Thesis Structure

This section presents an overview of the contents of the thesis, which begins with this chapter. Figure 1.1 graphically presents the structure of the thesis.

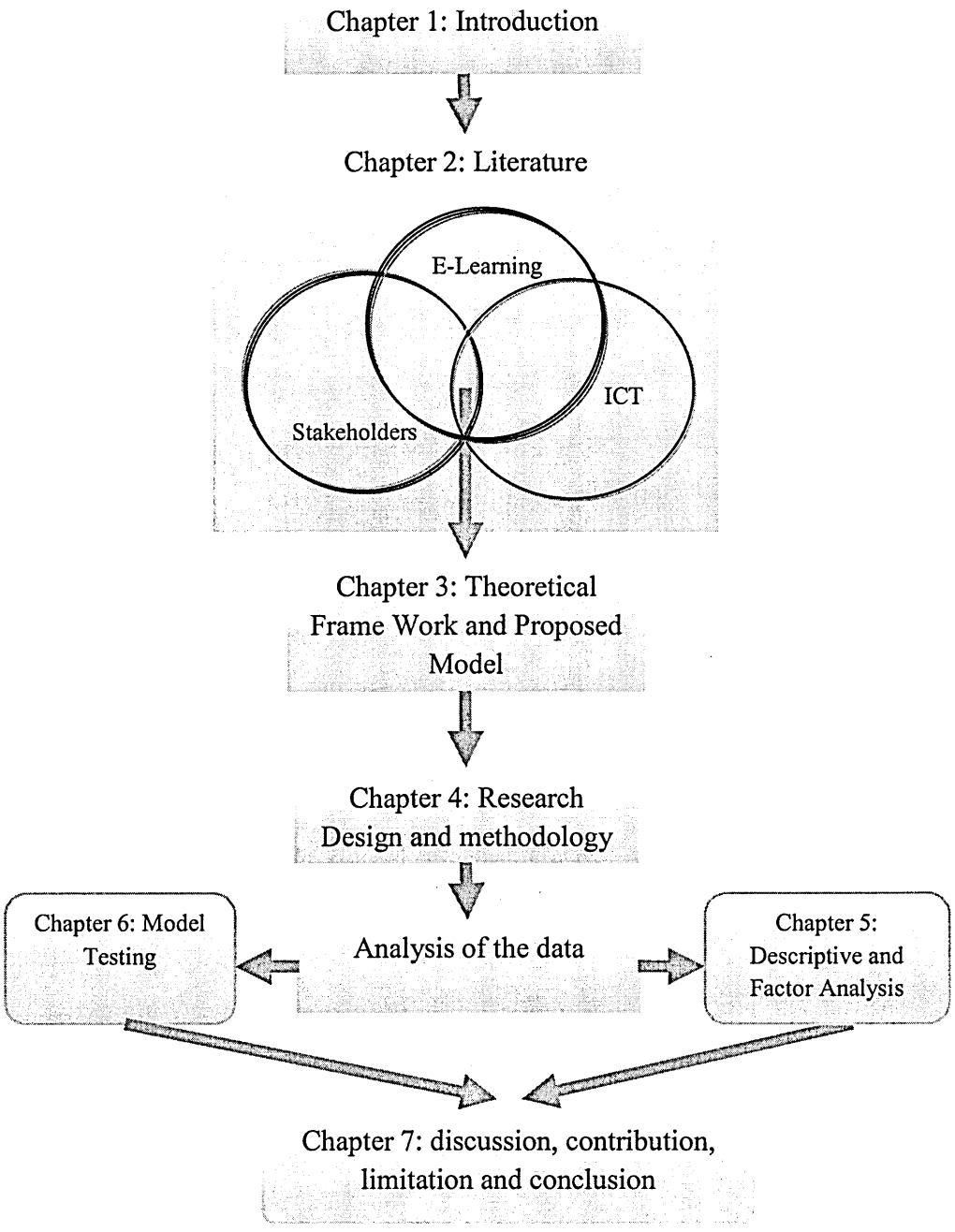


Figure 1.1: Thesis Arrangement

Chapter 2 contains a review of literature examining previous research investigating ICT and E-Learning in higher education. The literature review provides general information about the use of ICT and E-Learning in the educational environment. It begins with a discussion of the differences between E-Learning and traditional classroom learning, which is followed by an examination of the application of E-Learning in higher education in Jordan and other Arab nations. Theories of ICT diffusion in higher education, including Roger's theory of technology diffusion, are considered. Additionally, the chapter presents literature concerning stakeholder theory and the role of stakeholders in the diffusion of technology in higher education is also presented.

Chapter 3 discusses the theoretical model underlying the research. The study was based on TAM, which contains the proposition that perception of usefulness and ease of use, perception of support, and previous experience with a technology influence attitude towards the adoption of the technology. The model also proposes that attitude towards the adoption of a technology is the best predictor of intention to adopt the technology. The model created the boundaries for the investigation by defining the nature of the constructs for the independent and dependent variables influencing the attitudes of stakeholders and the adoption of E-Learning in Jordan.

Chapter 4 presents the research design and methodology used in the study. It contains a discussion of the rationale for using a quantitative, positivist research approach through a comparison of different research paradigm options and the respective value of inductive and deductive reasoning for answering the research questions posed by this study. The chapter also describes the survey questionnaire developed for the study to gather the data necessary to answer the research questions. The chapter contains a section discussing the sample population, the size of the sample population, and the method used for random

selection of the participants in the study. This is followed by a description of the regression analysis approaches used to analyze the data and test the hypotheses of the study. Methods used to assess the reliability and the validity of the survey questionnaire, as well as the limitations of the methodology and ethical considerations in the data collection process, are also presented.

Chapter 5 presents the findings of the descriptive statistics from the analysis of the data obtained by the survey questionnaire and the assessment of the reliability and validity of the instrument. The chapter describes the methods used to prepare the data for analysis, the descriptive statistics of data obtained from the sample; this is analyzed by frequency method. The reliability of the survey instrument using Cronbach's alpha and the validity of the scale using exploratory factor analysis along with a brief summary of the findings are also presented.

Chapter 6 presents the findings of the hypothesis testing beginning with a test of the structural model as described in Chapter 3 of this thesis, involving tests of the individual hypotheses of the study by regression analysis or multiple regression analysis, depending on the nature of the individual hypothesis.

The final chapter of the study contains a discussion of the findings and the conclusions drawn from the findings and the implication of the descriptive statistics for the findings, the findings from the model testing and the hypotheses testing to the research questions of the study are discussed in relation to the effect of the variables in the TAM on E-Learning adoption among stakeholders in higher education in Jordan.

Chapter 2 : Literature

2.1 Introduction

The following review focuses on the role of stakeholder attitudes towards information communication technology (ICT) applications in E-Learning adoption. The review supports the present research, which seeks to determine how the attitudes of stakeholders in higher education towards the application of ICT influence the adoption of E-Learning in institutions of higher learning in Jordan. The following review will focus on works which have been collected in the areas of:

- E-Learning and traditional learning.
- Stages of teaching and learning in general and relevant to Jordan.
- ICT diffusion and application.
- Stakeholder definition and theory.
- University stakeholders in general and in higher education in Jordan.
- Stakeholder attitudes towards ICT, including demographic preferences and experience.

A careful review of research in these areas will provide insights into the effect of stakeholder attitudes towards ICT in the adoption of E-Learning in higher education in general and Jordan in particular.

2.2 E-Learning: Scope and Overview

The central focus of this research is to examine how attitudes towards ICT impact on the adoption of E-Learning. In particular, the development of E-Learning has been quite extensive in recent years; this has prompted a proliferation of research examining this field and its impact on the development of education. Various definitions for the practice have been noted in the literature; however, there are notable overlaps in the theoretical description of this process. The context in which E-Learning is delivered is varied; however, "it generally involves the delivery of text, video and audio via the Internet as it is accessed by personal computer or other electronic mediums" (Sandars and Langlois, 2005, p.129).

Seok (2008, p. 726) defines E-Learning as "internet-based learning in which educational actions and functions delivered by the Internet are organized systematically as part of an educational program". In order to be effective however E-Learning must have three components - accessibility, adaptability and clarity of communication - which are integrated across the scope of learning activities it provides (Seok, 2008). Thus, E-Learning can encompass a wide range of educational processes and practices that use information communication technology to deliver structured teaching methods to students (Dabbagh, 2005).

There are at least five pedagogical models that support the context, purpose and design of E-Learning methods in higher education:

1. Open Learning: Open or flexible learning is a pedagogical paradigm which enables the instructor to focus on "individual and local needs and requirements, and creating open learning places based on the here and now" rather than a pre-designed curriculum

(Dabbagh, 2005, p. 30). In this environment the focus on education is student-centeredness and learning instead of teaching.

2. Distributed Learning: Distributed learning has also been advanced as a pedagogical framework for conceptualizing E-Learning. As reported by Dabbagh (2005, p.30), "Distributed learning is described as education delivered anytime, anywhere, to multiple locations, using one or more technologies or none at all". This enables students to engage in education at their own pace, abandoning the push model of education.

3. Learning Communities: Learning communities involve groups of students working together to improve and enhance education and knowledge. In this process students learn "from one another as well as from their environment and engaging in a collective socio-cultural experience where participation is transformed into a new experience or new learning" (Dabbagh, 2005, p.30). Learning communities are informal learning settings which shift education away from teaching towards learning.

4. Communities of Practice: Dabbagh (2005, p. 31) defines communities of practice as "groups of people informally bound together by shared expertise and passion for a joint enterprise". These groups are defined more by knowledge than task and what holds the group together over time is the desire to engage in the group, rather than the need to complete a task.

5. Knowledge Building Communities: Finally, Dabbagh notes the use of knowledge building communities to define E-Learning. As he reported, "Knowledge building communities are learning communities in which communication is perceived as transformative (resulting in a new experience or learning) through knowledge sharing and generation" (Dabbagh 2005, p. 30). In these communities learners come together for the specific purpose of building knowledge in a specific area.

While the application of these pedagogical frameworks does provide a more succinct understanding of the scope and breadth of E-Learning, the underlying theories which serve as the foundation for E-Learning are quite diverse. With no real unified pedagogy for E-Learning practice, it is not surprising to find that various definitions and contexts for E-Learning have been provided. In a final review of the definition of E-Learning, Dabbagh

(2005) asserts that E-Learning can be defined as "an open and distributed learning environment that utilizes pedagogical tools, enabled by Internet and Web-based technologies, to facilitate learning and knowledge building through meaningful action and interaction" (Dabbagh, 2005, p. 30).

Nichols (2003) notes the specific challenges which exist in developing a unified definition and theory of E-Learning, particularly as it extends across a broad range of areas and contexts, warranting the development of a definition which is comprehensive. For instance, Nichols argues that the development of E-Learning requires frameworks for education that can be applied for both face-to-face instruction and distance education, a notion that suggests that E-Learning is not a system of education but rather "a means by which these education models can be implemented" (Nichols, 2003, p. 3).

Additionally, Nichols (2003, p. 3) notes that defining and understanding E-Learning requires the realization that this process "enables unique forms of education that fit within the existing paradigms of face to face and distance education". In this process, Nichols (2003) argues that the development of E-Learning allows for the combination of paradigms and practices that are used in both face-to-face and distance education. This process is one which has been referred to as blended education and, in many respects, appears to encapsulate some of the best practices which are used in face-to-face and distance education. Nichols (2003) asserts that the most notable problem in this area is creating the needed terminology which can be used to effectively explicate the educational processes which occur in the context of E-Learning.

2.3 Differences between E-Learning and Traditional Education

With a basic review of the scope and definition of E-Learning provided, it is now pertinent to consider a review of the differences which exist between E-Learning and traditional classroom education. Desai et al. (2008) in their review of the differences in these areas report that "traditional learning involves the use of synchronous communication which is undertaken in a sequential process. Traditional education is structured in terms of both the time and resources used for instruction while online learning is equally structured but offers both synchronous and asynchronous communication" (Desai et al. 2008, p. 331).

Not surprisingly, the differences between traditional and online education have implications for both students and instructors. As reported by Desai et al. (2008), online instruction requires more discipline on the part of educators and requires specific responses from students. This assertion is supported by the fact that online instruction requires a higher level of collaboration and interaction than is found in traditional learning (Desai, et al. 2008). Even though online learning has notable benefits, the discipline and structure which are required to carry out this type of instruction may contribute to stress and additional burdens that make it difficult for educators and students to fully embrace.

Desai et al. (2008) suggest that E-Learning does not provide the same type of opportunity for spontaneous response as the traditional classroom environment. Even though group participation can be scheduled in the E-Learning environment, coordinating schedules for this type of activity can be difficult; traditional classrooms allow for succinct scheduling of learning, facilitating meeting times for group interaction. Assessment in this environment has also been noted to be a principle issue of concern. They demonstrate that research has

consistently shown that instructors find student assessment more complicated, especially with regard to the skill, experience and dedication required for success.

In developing their comparison of E-Learning with traditional classroom instruction, they argue that one of the most important differences in these two environments is the structures which are employed for education. In particular, the researchers report that a flexible structure is essential to the success of E-Learning but is not as prevalent in the traditional classroom. At the same time, this flexibility, while it offers students the opportunity to learn in their own time, also offers students the ability to "abandon" the opportunity because of the inability to structure their time properly (Desai, et al, 2008, p. 332). When it comes to developing E-Learning programs therefore, Desai et al. (2008) argue that efforts must be made to address this issue in the instructional methods and supports which are offered for this approach.

Lam and Bordia (2008) further examine differences between E-Learning and traditional classroom instruction. In their research, Lam and Bordia consider the advantages and disadvantages of E-Learning in context with traditional classroom instruction. Specifically, these authors argue that E-Learning practices overcome problems which are inherent in traditional classroom learning. These issues are quite evident in the flexibility engendered by E-Learning practices which overcome some of the rigidity which is fundamental to traditional learning. In exploring these issues Lam and Bordia report a number of "advantages to using technological tools in education including but not confined to flexibility in adapting to the educational needs of students, cost effectiveness in opening educational opportunities to larger number of students, and convenience in providing access to information" (Lam and Bordia, 2008, p. 132). In addition, Lam and Bordia report that online education enables students to think before they speak and to interact with every

student in the classroom. Due to the structure and focus of the traditional classroom, these practices are not always possible.

Even though Lam and Bordia (2008) do demonstrate the overall benefits which can be garnered through the use of E-Learning, these authors also note the drawbacks of E-Learning, which can be addressed through the utilization of traditional classroom learning. In particular, they report that among the disadvantages of E-Learning is "the lack of two important forms of communication, body language and voice inflection" as well as the absence of "social and diversity aspects in the E-Learning class" (Lam and Bordia, 2008, p. 132). Moreover, they go on to note that learning in this area is often an essential component of student development, as these types of skills can be useful in the business environment. Additionally, they note the importance of motivation. Structure in traditional education can provide students with the support and motivation needed to engage in education. The unstructured environment of online learning may not be commensurate with the motivation and needs of the learner.

In a similar vein of inquiry, Stella and Gnanam (2004) consider the drawbacks of distance education, comparing them to the specific attributes and benefits of traditional education. Critically reviewing data in this area, Stella and Gnanam report that one of the most pertinent drawbacks to E-Learning is the assessment of quality in this process. As noted by these authors, quality is an issue which encompasses the specific practices which are used in the development of E-Learning. For instance, quality in interaction cannot be assured in online learning environments. Of particular concern in this area is "the adequacy of student support services and the missing element of interaction with teachers and other students..." (Stella and Gnanam, 2004, p. 149). Other issues which have evolved in this area include the

ability to assess the outcomes of online education and the effectiveness of this approach. In formal traditional classrooms these issues are more closely monitored by instructors.

To better understand how these issues translate into practice, it is pertinent to consider research which has been undertaken to examine differences between online and traditional education. Gallien and Oomen-Early (2008), for instance, consider differences in student responses for online coursework. Specifically, the authors sought to determine if the type of feedback provided impacted on student satisfaction, academic performance and the perceived level of connectedness between the student and the instructor. They go on to argue that one of the principle differences between online and traditional classroom instruction is the amount of written feedback which is required in the online environment. Educators must respond to students via different writing tools and techniques.

With this in mind, Gallien and Oomen-Early (2008) sought to discern if different types of written feedback impacted upon outcomes for students in the online learning environment. Students in online courses were assigned to personalized or collective feedback groups. In the personalized group, instructors were required to provide individualized feedback; in the collective group, feedback was provided through general communications to the entire class. The results of the investigation indicate that students that received personalized feedback performed academically better than those receiving collective feedback. In addition prior online experience of students was associated with increased student satisfaction and overall performance in the course. These findings present important implications for the development of online learning as educators must be more sensitive to the specific types of feedback that they use in order to promote academic development, performance and overall course satisfaction of students.

2.4 E-learning within the Public and Private Institutions in Jordan

The higher educational system in Jordan consists of both private and public universities and community colleges located in major urban centres. The public universities in Jordan fall under the direction of the Ministry of Education and the Higher Education Council. The private universities in the nation must meet minimum standards established by the Higher Education Council but have greater latitude for developing curricula. Because of governmental policies intended to improve human capital in the nation, approximately one-third of the population is enrolled in some type of higher education but not necessarily courses that lead to degrees (Tubaishat, Bhatti, & El-Qawasmeh, 2006, p. 670). Research investigating the availability of E-learning infrastructure in Jordanian universities has determined that all major universities have the necessary computer and internet availability and technical support systems (Qudais, Al-Adhaileh, & Al-Oman, 2010).

An analysis of the effectiveness of E-learning initiatives in Jordan that were launched with government support in 2001 has determined that these initiatives have not met their intended objectives (Mofleh & Wanous, 2008, p. 6). The E-learning initiatives are managed by the Ministry of Education and represent the second largest information communication and technology (ICT) programme in the nation. Although the Ministry of Education intended to create a nation-wide E-learning platform for training teachers and providing availability of educational resources to students of all educational levels, the platform had been not launched by 2008. An objective of this programme was to ensure that students entering university had sufficient computer knowledge and skills to take advantage of E-learning opportunities. The majority of E-learning initiatives in Jordon are established by private and public universities, with some support from the government.

Research conducted by Al-Mobaideen (2009, p. 10) determined that some differences exist between public and private Jordanian universities in the attitudes of senor administrators toward ICT usage. The public universities have sufficient technology infrastructure to support the use of ICT in E-learning, but lack the vision and comprehensive strategy necessary for the diffusion of E-learning throughout the organisation. As a result, the use of E-learning among and within the public universities is highly variable. Al-Mobaideen (2009, p. 11) argued that the effective diffusion of E-learning throughout a public universities requires the senior administrators to use a democratic management style that encourages open communication and sharing information in both horizontal and vertical hierarchies. In contrast, E-learning is used more extensively among private universities although the technical infrastructure may be inferior to that of public universities because of cost containment strategies. In general, E-learning can generate more revenues at lower costs for private universities than traditional classroom facilities.

Over the past decade, the number of institutions of higher education in Jordan has increased substantially. According to Mashhour (2007, p. 1), E-learning has played a significant role in the expansion of higher education opportunities, with traditional universities extending course offerings with an E-learning strategy while a few newer universities offering only E-learning with no traditional classrooms. An investigation of the rate of internet usage to deliver part or all of a university course among Jordanian universities, however, found that the rate of internet usage is related to the amount of time since the university introduced E-learning programmes (Mohammed, & Al-Karaki, 2008, p. 245). This finding suggests that the early adopters of E-learning gain knowledge about the way in which online learning programs should be developed and managed, which leads to increased usage of E-learning for collect and university level instruction.

Al-Jaghoub, et al. (2009, p. 5) assessed the approach to the early adoption of E-learning at Al-Ahliyya Aman University, which was the first private university in Jordan. The administrators adopted a project management method for E-learning implementation with the intention that it would become a fundamental method for delivering instruction. The university employed an external consultancy to develop a proprietary instructional platform and to train teaching staff in the technology. The project also established a centre at the university to continuously improve the quality of E-learning technology and to develop new E-learning courses. The early adoption as well as the emphasis on E-learning throughout the organisational culture was intended to establish an effective E-learning system that benefited students while maintaining a low cost structure.

Despite the successful early adoption of E-learning at some private universities, the overall rate of E-learning usage by universities in Jordan is low and less than 50% for all courses, despite the proliferation of universities offering E-learning alternatives Mohammed, & Al-Karaki, 2008, p. 245). The evidence suggests that the late adopters of E-learning are slow to use distance learning capabilities, possibly because of a low level of experience among administrators and instructors in the application of information and communication technology to education. Research conducted by Eyadat (2008, p. 83) at the Hashemite University in Jordan determined that the more senior faculty that included professors and associate professors had a more positive attitude toward E-learning than instructors. The differences in attitude may have been because of the lengthier use of online instructional methods by the senior staff, with the early adoption by staff facilitating the diffusion of E-learning throughout the educational institution.

Some evidence from research also indicates that the late adopters of E-learning at the university level often use commercial software platforms to support E-learning with some

supplementary use of traditional texts and printed materials (Dirami & Yoon, 2009, p. 7). This practice is intended to rapidly implement E-learning in a specific course with minimal administrative burdens for instructors, but may not have sufficient flexibility to meet instructional needs. According to Hiyari and Abu-Shawar (2009, p. 33), however, the use of a commercial software platform for E-learning systems allows the late adopters such as the University of Jordan to rapidly implement a standardised E-learning system with minimal cost. The practice of using commercial software also among the late adopters also varies from the development of a specific E-learning platform for the university as in the case of Al-Ahliyya Aman University (Al-Jaghoub, et al., 2009, p. 5).

The majority of student users of E-learning technology in Jordan do not own a computer and must rely on a shared computer (Mashhour, 2007, p. 1). In some institutions of higher learning such as the Jordanian University of Science and Technology, student access to computer labs for E-learning is limited because the facilities are often reserved for special purpose projects (Tubaishat, Bhatti, & El-Qawasmeh, 2006, p. 671). This suggests that many students are late adopters to E-learning and will take advantage of E-learning opportunities only when they have access to the necessary technology. The low level of skills among late student adopters of E-learning in Jordanian higher education may be one of the factors contributing the drop-out rate of 35% in E-learning, which is substantially higher than the drop-out rate in traditional classroom instruction (Dirami & Yoon, 2009, p. 8). At the same time, some evidence from research in Jordan indicates that students with strong ICT skills tend to be early adopters of E-learning because they have a high level of skill and confidence in the use of the technology (Mohammed, & Al-Karaki, 2008, p. 246).

The literature examining the early and late adopters of E-learning suggests that early adopters obtain some advantages such as greater flexibility through the design of a specific

E-learning system for the university (Al-Jaghoub, et al., 2009, p. 5). Prior research also suggests that the early adopters of E-learning have greater knowledge about the way in which the technology systems can be optimally used to meet student needs (Mohammed, & Al-Karaki, 2008, p. 245). The private universities in Jordan may devote fewer resources to E-learning, but administrators and staff in both public and private universities have a positive attitude towards E-learning (Eyadat, 2008, p. 83).

2.5 ICT Diffusion in Higher Education

The research demonstrates that the proliferation of information communication technology has had some impact on the development of teaching practices employed in higher education (Zhang, Martinovic 2009). It is essential therefore to consider evidence of its impact in higher education in the United States, as an exemplar of the West, and in the Middle East. By examining the diffusion of ICT in different cultural contexts it will be possible to conceptualize effectively how institutions of higher education have, or have not, embraced these technologies.

Unwin (2007) reported that information technology (IT) became a growing part of society and education in the United States beginning in the 1980s. In the 1990s the impact of IT on education as it was supported by communication became so extensive that the term communication was added to IT to become ICT. This change was undertaken to emphasize the importance of communication in the development and application of information technology in such forms as email and mobile technologies that have become "faster, cheaper and more user-friendly" for a growing population of Users (Unwin, 2007, p. 295).

The importance of ICT in education is demonstrated by its role in developing social goals such as increasing the number of students able to attend college. Because ICT can support

the application of E-Learning methods, colleges and universities have been able to exploit ICT as a principle means of addressing the demand for accessibility to education. The value of ICT is further supported by the fact that its application in the form of E-Learning has facilitated the development of new education delivery models which can, in turn, be used by educators to improve and enhance the learning experiences of students (Unwin, 2007). The present research is founded on the assumption that educators in Jordan can similarly improve and enhance the learning experiences of their students provided that they exhibit positive attitudes about ICT and its application to education.

The research, however, shows that there is an overall lack of theory and conceptual frameworks for developing ICT in higher education, even in the United States where attitudes to ICT are identifiably positive and have translated into a clear embrace of E-Learning methods in higher education. The lack of established pedagogical theory supporting the use of ICT in the form of E-Learning has been blamed for discouraging the broader acceptance and application of ICT through E-Learning in some regions of the world (Unwin, 2007). Other challenges to the acceptance of ICT in higher education include the lack of theory and tools for implementing and developing ICT in higher education which, coupled with rapid changes in technology development, have left some educators unable to keep pace with ICT implementation and application in higher education (Unwin, 2007). Challenges like these can lead to technology anxiety among educators, which can further limit the use and application of ICT in higher education.

Jones and Gregor (2006) provide a broad overview regarding the importance and utilization of ICT in the development of university education. They also reported that "The importance of information and communication technologies and E-Learning in promoting open, distant and flexible education in contemporary universities cannot be denied" (Jones and Gregor,

2006, p.1). They further note that by 2004 2.6 million students were estimated to be engaged in some type of online learning. In addition, 50% of all colleges and universities in the US viewed E-Learning as a principle tool for the delivery of education in the future. The central challenge in developing ICT for education, according to Jones and Gregor, is developing the information communication technology infrastructure needed to support online learning.

This diffusion of ICT in higher education has further been examined by Hodgkinson-Williams et al. (2008). In this review of ICT, the authors note that the proliferation of information communication technology has been both boon and bane for higher education. In terms of the overall benefits which can be acquired through the use of ICT in this setting, Hodgkinson-Williams and co-workers report that ICT has been shown to enhance the learning experiences of students, expanding the learning process from one that is focused on the individual to one which includes the community. With regard to the drawbacks of ICT in higher education, Hodgkinson-Williams et al. (2008) note that the technology is not evenly dispersed through all groups and cultures. In reviewing the problems created in this context Hodgkinson-Williams, Slay and Sieborger (2008, p. 434) observe that although technology supports a more level playing field in terms of social and economic opportunities, the benefits of technology are not the same "from one group and nation to another", especially when some groups and nations have greater access to the elements of technology like the computer.

Despite the challenges created in this context, Milani (2008) argues that ICT diffusion in Western universities continues to increase, creating opportunities for students to engage solely in online learning for the completion of their degree. This assertion is supported by a growing number of "virtual campuses" that provide a diverse population of students with

the opportunity to obtain degrees. Milani asserts that virtual mobility has become a vivid reality for an increasing number of college and university students. Even though increased use of ICT has been recorded, Milani argues that there is a paucity of empirical research which effectively considers the outcomes of this type of education and the specific issues of quality which are essential to traditional classroom education.

While the diffusion of ICT in higher education is often viewed in the context of the development of E-Learning, Deepwell and Malik (2008) argue that ICT has become an embedded part of all aspects of higher education, serving a prominent role in shaping and mitigating higher education in the traditional classroom environment. Specifically, these authors report that over the course of the last decade the learning experience in higher education has become focused on the use of technology for instruction and communication. According to Deepwell and Malik, (2008, p. 5) "Institutions have invested heavily in establishing a robust and integrated technical infrastructure not only to support their own administration functions, but also to enable computing access, e-mail communication, online information systems and virtual learning environments (VLEs)". Additionally, Deepwell and Malik (2008) argue that the diffusion of technology in higher education has become so extensive that a new model of pedagogy known as blended learning has been developed. Blended learning refers to the use of both face-to-face and computer-mediated instruction.

Blended learning has also been reviewed by Stacey and Gerbic (2007) in their evaluation of the impact of ICT on higher education. The data provided by Stacey and Gerbic suggests that blended learning has become a product of the incorporation of ICT in both traditional classrooms and online learning experiences. According to these authors, blended learning is changing the foundation of learning and teaching in colleges and universities. "Information

and communication technologies have impacted by providing a means of access to digital resources and interactive communication for all courses and the blending of pedagogy and technology has produced a range of approaches to teaching and learning" (Stacey and Gerbic, 2007, p. 165). Stacey and Gerbic (2007) go on to report that the use of information communication technology in online education has served as the foundation for expanding learning communities and increasing socialization in the learning and teaching processes.

In a similar vein of inquiry, Stensaker, Maassen, Borgan, et al., (2007) consider the development of ICT in higher education as a comprehensive process for pedagogical development. This assertion is based on what they identify as the more prolific use of ICT in institutions of higher education. ICT has become such an integral part of higher education that studies examining the use and application of ICT have been divided to include the use of ICT in traditional classroom environments and the use of ICT in non-traditional groups—i.e. E-Learning. In both areas, ICT is often viewed by educators as being a boon for higher learning because it supports not only diversification in curriculum but also diversity in the student populations that it serves in the application of E-Learning methods (Stensaker, Maassen, Borgan, et al., 2007).

In their investigation of the diffusion ICT in higher education, Karlsudd and Tagerud (2008) contend that the proliferation of ICT in higher education has been the direct result of the need for colleges and universities to provide more education to a larger group of students. Although the term "education for the masses" has been widely used in the literature, this process requires a re-conceptualization of how colleges and universities can effectively meet the demand for education. The end result has been the development of E-Learning through the creation and implementation of information communication technologies to support this model of education.

Karlsudd and Tagerud (2008) further examine the development of ICT in higher education, noting that the push towards E-Learning has promoted changes in the formality of educational services provided at colleges and universities. Karlsudd and Tagerud (2008, p. 43) submit that "On-campus pedagogical development has been characterized more by formal than informal structures and is less open to exchanging experiences between teachers and departments". The proliferation of ICT and E-Learning however has facilitated changes in the learning environment which have created more informal or flexible frameworks for the delivery of education. What this effectively suggests is that ICT has facilitated changes even in traditional higher education classrooms.

Although current research does suggest that notable changes have occurred in the delivery of higher education as a result of the application of ICT, Boezerooij, van der Wende and Huisman (2007) report that ICT integration in higher education has also shaped back office development of institutions of higher learning. In particular, these authors report that "Over the last decades higher education institutions have experienced profound changes in their external environment affecting both their primary processes of education and research and their secondary processes of organization, administration, and support services" (Boezerooij, van der Wende and Huisman, 2007, p. 313). The changes which have occurred in this area have made institutions of higher education more efficient and facilitated the use of ICT as a principle tool for creating competitive advantage in the organization. From a business standpoint these changes have been imperative to keep institutions of higher education financially sound: "Higher education institutions must deal with greater market forces, because of the decline in public funding, together with other challenges such as rising expenses, increasingly diverse student bodies and their changing needs and

expectations and heightened demand for new and different programs and service" (Boezerooij, van der Wende and Huisman, 2007, p. 314).

Selwyn (2007, p. 83) reports that "Despite huge efforts to position information and communication technology (ICT) as a central tenet of university teaching and learning, the fact remains that many university students and faculty make only limited formal academic use of computer technology". Selwyn (2007 p. 83) goes on to argue that research regarding the limited used of ICT in higher education has suggested that this lack of utilization is due, in part, to "a variety of operational deficits on the part of students, faculty, and universities". While these variables do indeed impact on outcomes for ICT implementation and utilization, Selwyn argues that a lack of theory regarding technology implementation continues to impact on the way in which ICT is used in higher education.

The challenges which exist with regard to the diffusion of information communication technology in higher education have been noted elsewhere in the literature. Specifically, Kirkwood (2006) considers the impact of access to and skills associated with ICT in higher education. As reported by Kirkwood (2006, p. 118) there are a host of variables which impact outcomes for the application and implementation of ICT in higher education. Some of these include: access to suitable equipment, familiarity, skills and competencies for working with the necessary hardware and software, and an understanding of the educational purposes, processes and outcomes that can be served or achieved.

However, these variables provide a limited picture and Kirkwood asserts that working models for the development and continued used of ICT in higher education are needed. Moreover, Kirkup and Kirkwood (2005) note the reality which has resulted as a consequence of the application of ICT to higher education:

Despite the widespread adoption of information and communications technologies in higher education, recent research suggests that the impact of ICT has fallen short of the rhetoric that it would produce radical change in learning and teaching. This has led to a sense of disappointment that the transformatory potential of the technology is being missed—or worse, resisted (Kirkup and Kirkwood, 2005, p. 185).

Kirkup and Kirkwood (2005) go on to argue that over the course of the last several years, institutions of higher education have consumed ICT at a phenomenal rate. However, the specific manner in which these technologies are employed often varies greatly. This is due, in large part, to the fact that different paradigms for the application of information technology have been used in different organizations. Without a clear unifying model for the development, implementation and utilization of information technology in higher education there is a dearth of precise models and theoretical frameworks for the utilization of information communication technologies.

2.6 Rogers' Diffusion of Innovations Theory

Efforts to further understand the development of ICT in higher education have focused on the application of Rogers' diffusion of innovations theory (Kirkup & Kirkwood, 2005). To provide a review of this theory Sharma and Kanekar (2008) report that this theory deals with the dissemination of new ideas in a systematic manner. In particular, they report that "The diffusion of innovations theory deals with dissemination of an innovation as an idea, practice, or product perceived as new by an individual or other unit of adoption, moreover, communication channels serve as the link between those who have the know-how of the innovation and those who have not yet adopted it" (Sharma and Kanekar, 2008, p. 3). They go on to note that, as conceptualized by Rogers, the diffusion of innovations focuses on five specific processes which include:

- Gaining knowledge about the innovation.
- Becoming persuaded about the innovation.
- Decision step of adopting or rejecting the innovation.
- Implementation step of putting the innovation to use.
- Confirmation step of either reversing the decision or adopting the new innovation.

Murray (2009) further reports that the basic tenet of this theory is that innovation diffusion is a general process that is not bound by a specific group, place or culture. Rather, innovations diffuse as a result of their widespread application and their subsequent adoption to specific areas or disciplines.

Minishi-Majanja and Kiplang'at (2005) also note the importance of specific steps in the diffusion process. They suggest that the beginning of ICT development diffusion is contingent upon agenda setting by the organization; then reviewing the value and outcomes of ICT and making a determination regarding the application of ICT. Once this process is complete, it is then possible for organizations to conceptualize how ICT will shape the specific outcomes for operations.

Minishi-Majanja and Kiplang'at (2005) further report that ICT is often viewed as an innovation in and of itself, because it engenders new capabilities for the organization, and becomes both a medium for change and a mechanism by which the organization can develop a new communication infrastructure. In the process of conceptualization, organizations will attempt to determine the attributes of ICT which are pertinent to success in operations. Minishi-Majanja and Kiplang'at (2005, p. 216) also report that the five attributes which are commonly reviewed in this context include: Relative advantage, compatibility, complexity, Trialability, and Observability.

Relative advantage includes the specific benefits which can be provided to the organization by the adoption of ICT while compatibility considers the application of ICT to the existing

organizational infrastructure. Complexity requires an assessment of the new technology and a determination of whether new training and development will be needed to use ICT tools. Trialability refers to the time it will take to develop ICT competence and implementation, while observability involves the degree to which ICT is adopted in the organization.

The application of these attributes to decision making, according to Minishi-Majanja and Kiplang'at (2005), will serve as the foundation for diffusion of ICT in the organization. Based on these attributes, individual organizations will make determinations about the feasibility of applying specific types of ICT to their operations. Over time trends in the way organizations adopt ICT will have a larger impact on the development of industry. In short, when one organization is able to successfully use and implement ICT, others will follow suit in an effort to remain competitive. In higher education, the application of ICT and E-Learning has become an essential tool for increasing the competitive advantage of the organization. Thus, as ICT proliferates in universities, more institutions of higher learning will be forced to adopt this model in order to remain competitive.

Sahin and Thompson (2006), in their review of the diffusion of ICT in higher education, provide some insight regarding the development of this process. They argued that the proliferation of technology in higher education has become a principle area of concern for the development of higher education. As they report (2006, p. 81), "Technology serves as a foundation to universities to create the appropriate learning organizations and supports the four components of universities: organization, people, learning, and knowledge". Sahin and Thompson (2006) note that the current need for technology to support the demands of so many stakeholders in higher education continues to serve as the impetus for the diffusion of ICT in higher education.

Sahin and Thompson (2006) are able to conceptualize the development of technology diffusion through a broad assessment of technology in higher education, by examining the specific variables which contributed to its continued use. The variables that shaped the overall diffusion of technology include: access to ICT; level of expertise; and the availability of training.

Based on the literature provided here regarding the development of diffusion of ICT in higher education, it becomes evident that the diffusion of technology in this environment has been precipitated by larger environmental influences, such as competition and the diffusion of ICT in society in general, as well as specific variables in institutions of higher education. In particular, the literature suggests that while there is a general push to develop ICT in higher education—as a means for the organization to remain competitive in the industry—the specific factors which influence the diffusion of ICT in individual institutions will be contingent upon a number of different factors. These factors relate to the ability of educators to adopt this technology, the ability of institutions to provide the technology and the existence of training and development programs to help increase the overall use and application of ICT in higher education.

2.7 ICT Diffusion in Higher Education in Jordan

A search of the available literature reveals a dearth of research on ICT in higher education in Jordan. More significantly the empirical evidence in this area is even more limited. It is necessary to consider a review of technology development and use in institutions of higher education in the Middle East. This approach is based on the assumption that some inferences can be made about attitudes towards ICT in Jordan based on an examination of ICT diffusion in the Middle East. Research regarding the development of ICT in

developing areas such as the Middle East suggests that the process of globalization is currently having a notable impact on the diffusion of ICT in higher education. This presents important implications for the present research, which seeks to establish if the same is true for higher education in Jordan.

The process of globalization has prompted developing nations to compete with developed nations in providing higher education (Lefrere, 2007). Foreign universities are increasingly striving to provide quality education that meets high Western standards, which means that they must also provide education at an affordable price. In an effort to create this type of value, ICT has become an important and integral component for development, helping to fill the gaps in education and bolstering growth for these institutions (Lefrere, 2007).

An examination of universities in Turkey as a reflection of attitudes towards ICT in institutions of higher education in the Middle East reveals that ICT as support for distance education has been available at all levels of education since 1992 (Inal et al., 2008). The development of distance education in Turkey, manifested by 1.6 million students enrolled in distance education, has been precipitated by a number of variables including the desire to have a better job, age of the student, compulsory military service (for men) and the presence of a disability or incarceration (Inal et al., 2008).

The positive attitude towards ICT in Turkey is reflected in the high utilization of E-Learning (distance learning), this despite the fact that problems exist that threaten its application, including but not necessarily confined to: social issues, including military service; technical issues, including insufficiency of telecommunication services; organizational issues regarding the centrality of educational services; and the effectiveness of distance education programs (Inal et al., 2008). Attention to quality and effectiveness of

distance learning has prompted efforts on the part of both educators and institutions of higher education in Turkey to improve outcomes of distance education. The improvements have been aimed at enhancing student perceptions of distance education and improving the context and scope of distance education courses.

An examination of the development and diffusion of ICT in higher education in the United Arab Emirates (UAE) presents a less promising perspective on attitudes towards ICT in the region. Specifically, Alshara and Alsharo (2007) examined the challenges which have impeded the development of ICT in universities in this region. According to Alshara and Alsharo, institutions of higher education in this region have been criticized for the lack of ICT development. However, the research does suggest that there are prominent reasons for an overall lack of ICT development in UAE universities. For instance, businesses in the UAE attempting to implement ICT for operations have found that new business models are needed in order to embrace these technologies effectively. Because universities and colleges also require new business models to embrace the use of ICT, challenges remain in creating the foundations and frameworks needed for institutions of higher education to make these tools effective for education and business.

While the specific business models needed for the implementation are issues of concern for the application of ICT in higher education in the Middle East, there are broader issues that have affected the adoption of ICT in institutions of higher education in the region. The research demonstrates that the ability of institutions of higher education as well as educators to adapt to new technologies is a barrier that impedes overall development and application of an educational model supported by ICT, that is, the E-Learning model (Alshara & Alsharo, 2007). Many institutions of higher education in the Middle East do not have the infrastructure or competency among educators to embrace ICT development and

implementation effectively, and the unwillingness of colleges and universities to make changes regarding ICT have inhibited the development of ICT in these institutions (Alshara & Alsharo, 2007).

Randeree (2008) further considers the challenges which exist regarding the development and diffusion of ICT in colleges and universities in the Middle East. As reported by this author, although efforts to advance the development of ICT in institutions of higher education have been underway for some time, challenges exist with regard to resistance to change. In particular, Randeree (2008, p. 41) reports that "A significant number of instructors have proven to be late adopters and have demonstrated, in particular, resistance to the implementation of portals, preferring to continue teaching through textbooks and hardcopy materials". This situation has given rise to a consideration of the change management tools which may be needed to effectively address the transition from traditional classroom environments to E-Learning.

The state of art in ICT diffusion shows a very mixed picture. In some areas there has been considerable uptake but little empirical evidence as to its effectiveness. In other areas there has been a certain amount of significant resistance; however, it is unclear as to what the factors that really underpin this resistance are and what role the key stakeholders, the Providers (senior managers and educators), and the Users (students) play in this adoption and resistance.

We now turn our attention to the role of the key players in ICT diffusion, who we term the stakeholders, to deepen our understanding of this diffusion as well as to asses their attitudes.

2.8 Stakeholder Definition and Theory

It is necessary first to provide a review of the scope and context of stakeholder theory. Dunham et al. (2006) provide a review of stakeholder theory in which they note that this paradigm was first introduced by Freeman in 1984. In reviewing this seminal work, Dunham, Freeman and Liedtka (2006, p.25) argue that stakeholder theory was developed "as a strategic management approach aimed at enabling the firm to survive in turbulent times by becoming more responsive to the many constituencies that could play a role in the firm's success". Dunham, et al., 2006, p. 25) go on to note that in this theory, Freeman defined stakeholders as "any group or individual who can affect or is affected by the achievement of a corporation's objectives".

Accordingly stakeholder theory is important because it rejects the idea that ethics and economics can be neatly separated. Specifically, Freeman, Wicks and Parmar (2004, p. 364) stated that "Stakeholder theory begins with the assumption that values are necessarily and explicitly a part of doing business, and rejects the separation thesis". Although Freeman, Wicks and Parmar (2004) reported that considerable obfuscation has been created in theoretical explorations of shareholder theory, the reality is that all individuals or groups influenced by the organization must be considered when assessing stakeholder participation.

Providing a more concrete review of the application of stakeholder theory, Freeman and Phillips (2002, p. 333) further report that:

The central idea is that an organization's success is dependent on how well it manages the relationships with key groups such as customers, employees, suppliers, communities, financiers, and others that can affect the realization of its purpose. The manager's job is to keep the support of all of these groups, balancing their interests, while making the organization a place where stakeholder interests can be maximized over time.

Freeman and Phillips (2002) go on to report that the development of stakeholder theory has focused on the specific groups which should be considered as stakeholders for the organization. The specific groups identified have clear implications for the specific actions taken and policies employed by the organization. As such defining stakeholders in the organization is a principle issue of concern.

2.9 Stakeholders in E-Learning

The most significant factor addressed in the present research is the influence of stakeholder attitudes on the application of E-Learning in institutions of higher learning in Jordan. It is essential therefore to understand who those stakeholders are as well their attitudes towards ICT. This research suggests that students, educators and administrators are traditionally the principle stakeholders in the development and application of the curriculum and the educational process as a whole. It stands to reason therefore that they are also key stakeholders in the development and application of E-Learning methods through ICT.

With this in mind, it is pertinent to consider what has been noted about important stakeholders for the organization. Specifically, Lewis (2007, p. 178) reports that "Stakeholder theory provides a view of organizations—their internal and external relationships with individual and organizational 'stakeholders'—and provides both researchers and practitioners with frameworks to assess those relationships". Lewis (2007) goes on to report that frameworks for assessing and assigning stakeholders to the organization have been based on three attributes:

- **Power** – This refers to the ability of the stakeholder to impose its will.
- **Legitimacy** – Legitimacy refers to an assessment of the stakeholder influence on the organization as positive, desirable and appropriate.
- **Urgency** – Urgency refers to the degree to which the stakeholder claim is time sensitive to the organization.

Groups identified as having all three of these attributes are defined as definitive stakeholders, having the most significant impact on the organization (Lewis, 2007).

Other scholars examining the specific frameworks which should be used for the identification of stakeholders in the organization also consider narrow frameworks which define the specific attributes which should be possessed by the stakeholder. Specifically, Kochan and Rubinstein (2000) note that while Freeman has argued that all groups which are impacted by the organization should be considered as stakeholders, efforts to refine this definition have focused on specific characteristics of the stakeholder which make it important to the organization. Kochan and Rubinstein also identify three specific attributes which should be used in identifying organizational stakeholders. In particular, Kochan and Rubinstein (2000, p. 369) note that that the following should be considered when assessing stakeholder groups:

- The extent to which potential stakeholders contribute valued resources to the firm.
- The extent to which they put these resources at risk and would experience costs if the firm fails or their relationship with the firm terminates.
- The power they have in or over an organization.

The definition of stakeholders in the organization has also been examined by Jackson (2001). She asserts that members of the organization must carefully review the organization's operations and all groups impacted and potentially impacted upon by operations. In providing this review, Jackson (2001, p.139) formally defines stakeholders as "groups or individuals with a significant interest in, or who could affect or be affected by, the activities of an organization". This definition requires the organization to effectively broaden its scope of focus when considering the stakeholder groups which will be important to operations. Based on a stakeholder assessment, Jackson (2001) further argues that it is possible to prioritize the importance of stakeholders to create policies which are

effective for effectively and systematically meeting the needs of different stakeholder groups.

2.9.1 Stakeholders in the University

While specific frameworks for understanding the evaluation of stakeholders in the organization have been employed to effectively identify those groups which should be included, a comparison of organizations and universities suggests that these structures are markedly different. For instance, Robertson and Seneviratne, (1995, p. 584) note the differences between organizations and universities, citing the differences and those which exist between public and private organizations. In their review of these two different types of institutions, Robertson and Seneviratne report that "private sector organizations are driven primarily by market or consumer preferences..." they go on to report (1995, p. 584) that "Compared to private organizations, many public sector organizations are subject to a greater range of rules, regulation and procedures fixed by the authority of a superior body". Given the differences in structures which exist, it is reasonable to assume that differences in stakeholders for universities would result.

An overview of what has been noted about stakeholders in the university reveals that research in this area has identified changing patterns in stakeholder interest for these organizations. McClung and Werner (2008), in their review of stakeholders in higher education, report that while students and parents have long been considered essential stakeholders in the development of these institutions, changes in social expectations for institutions of higher education have prompted more focus on other stakeholders including policymakers and industry. In particular, McClung and Werner (2008, p. 103) report that "Government and industry have come to play a more central role and have a significant

impact on the Finances of the institution. The increasing influence of government and industry has resulted in universities taking a more entrepreneurial view of their role in economic development". These groups have become even more important in light of the challenges facing students and their parents in paying for higher education.

Spitzeck and Siegenthaler (2007) further note the changes in stakeholders for higher education. As reported by these authors, the overall costs of higher education have prompted a greater focus on the overall value that students receive for their money. This focus has served as the foundation for a university to reconsider how it provides services and education to students. The overall outcomes which are being achieved in this context are being evaluated not just by students but by organizations and institutions which attempt to assess the value which students derive from higher education. As reported by Spitzeck and Siegenthaler (2007, p. 49), "Institutions of higher education worldwide are called upon to enhance skills, knowledge and values, which enable people of all ages to take responsibility for creating a sustainable future". Thus, the stakeholders who are essential to the development of higher education have changed over the course of time.

The increasing role of society as a stakeholder in higher education has also been noted by Reinhartsen (2003). Specifically, he makes the following observations with regard to the importance of society in the development of higher education (2003, p. 71): "The role of education in general and of higher education in particular, is consistently one of the most important long-term issues that we address in recruiting, retaining, and creating high-value jobs. Society needs a well-prepared citizenry, and for the most part our respective educational systems have served us well". Reinhartsen (2003) goes on to note that the conceptualization of higher education in this manner has prompted a re-examination of the importance and role of higher education in society. Stakeholders in higher education have

now become those groups which can improve and enhance higher education to ensure that the best possible social and economic outcomes are achieved.

Even though there is notable evidence which suggests that the stakeholder roles in higher education are changing, there is evidence which demonstrates that the historical development of structure and bureaucracy in higher education continues to shape outcomes for stakeholder involvement in these institutions. De Wit and Verhoeven (2000), in their review of institutions of higher education, report that the specific stakeholders who are active in the organization are often contingent upon the structure of the organization. While some universities and colleges have moved towards more democratic structures, allowing for the participation of external stakeholders, the reality is that most universities have not implemented a democratic or open structure which effectively allows for a broader group of external stakeholders to take action in the organization.

Based on the literature presented here, it becomes evident that the specific stakeholders who have a voice in higher education are changing. Colleges and universities which were once governed by closed bureaucratic systems are now required to become more open and receptive to the needs of external stakeholders. This includes society as a whole. As this transition progresses, colleges and universities will be charged with the responsibility of expanding frameworks for assessing and evaluating the role of stakeholders. Presently, the research suggests that this transition has not been completed and therefore there is a paucity of empirical research which effectively demonstrates the entire scope of current stakeholders for all colleges and universities. While administrators, educators, and students continue to play important stakeholder roles in these organizations, the number of stakeholders is clearly expanding to include government, industry and society. These

changes will clearly have implications for the development of colleges and universities and the policies which are pursued by these organizations.

2.10 University Stakeholders in the context of Jordan's Higher Education

The central focus of this investigation is to examine the role of stakeholder's attitudes toward ICT in the development of e-learning in higher education in Jordan. In an effort to clearly define and develop the current research project, it is essential to consider a review of the Jordan's system of higher education that will be integral to the research project. In order to effectively identify the specific stakeholders which will be integral to the current research, it is necessary to provide a general review of the system of higher education in Jordan. Through a review of this system, it will be possible to identify both individual and organizational stakeholders which will be integral to the development of the current research.

2.10.1 Government Agencies and Higher Education in Jordan

Abu-El-Haija (2002) provides a general review of the system of higher education in Jordan noting that the system was first established in the second half of the twentieth century. During this time various Teachers' Colleges were established to train educator needed to meet increasing demand for public school education. The first public university in Jordan, the University of Jordan, was established in 1962. Subsequently, seven more public universities were established in various parts of the Kingdom. Abu-El-Haija reports that it was not until 1990 that the first private university was established. Amman University was the first private university established in Jordan and remains only one of 12 private universities to be created in the country. Beginning in 1981, Abu-El-Haija notes that Teachers' Colleges expanded the educational services offered and have evolved into

community colleges, focused on specialized, career-oriented training and preparing students for mid-level positions.

The evolution of higher education in Jordan was followed by the development of state-run agencies which were charged with overseeing the educational services provided by Jordanian universities. Abu-El-Haija (2002) reports that it was not until 1982, however, that formal state oversight for higher education was established. As reported by Abu-El-Haija the Jordanian Council of Higher Education was established in 1982 as a central agency to regulate and develop higher education policies among public universities. The Council developed a secondary branch known as the Ministry of Higher Education & Scientific Research, which was established in 1985. The Ministry and Council worked together to regulate higher education in Jordan until 1998, when the Council was annulled. In 2001, the Council was re-established under the title the Ministry of Higher Education & Scientific Research. The Ministry has subsequently been divided into the Higher Education Council and the Accreditation Council.

In an effort to provide a more integral understanding of the specific functions and operations performed by each of the divisions Abu-El-Haija (2002) provides the following information regarding the responsibilities of each of these agencies:

- **Ministry of Higher Education & Scientific Research (MHE&SR):** The ministry is responsible for implementing the general policy of higher education in Jordan. It accomplishes this goal by coordinating consultation and research between higher education institutions and public and private centres. In addition, the Ministry engages in cultural and scientific agreements in the field of higher education and research.

Scholarship rules for students in and outside of Jordan are also established by the Ministry.

- **Higher Education Council (HEC):** The Higher Education Council formulates the general policy of higher education in Jordan. It provides the support for developing new institutions of higher education and issues instruction regarding administration and finance of the education sector. Additionally, the Council evaluates the sufficiency and efficiency of higher education in Jordan. The Council also develops admission requirements for students seeking admission into Jordan's system of higher education.
- **Accreditation Council (AC):** The Accreditation Council defines the regulations of accreditation which are needed for institutions of higher education. In addition this agency supervises the performance of higher education institutions and their commitment to the accreditation process. The Accreditation Council also ensures that institutions of higher education reach pre-determined goals. This is accomplished through continuous evaluation of university programs.

Based on the literature provided here, it becomes evident that the system of higher education in Jordan is substantially regulated and controlled by government agencies which have been established to ensure the quality and outcomes of higher education in the country. With this in mind, it seems reasonable to argue that the development of e-learning in institutions of higher education in Jordan will require approval from government agencies which oversee the development of these organizations. In reviewing the duties of the Ministry of Higher Education & Scientific Research, the Higher Education Council and the Accreditation Council, it is evident that each of these agencies will have some influence over the development of e-learning in higher education in Jordan. With this in mind it is

pertinent to consider the role that each agency will play in the adoption of e-learning in higher education in Jordan.

Specifically, the Ministry of Higher Education & Scientific Research will be responsible for setting policy for higher education in Jordan. Thus, the Ministry will need to approve e-learning adoption before it can be integrated into the system of higher education. The Higher Education Council, which establishes basic education policy for higher education in Jordan will also need to review and approve e-learning for higher education. The Accreditation Council will be responsible for developing protocols and policies regarding how e-learning will be carried out. Given the role of these agencies in the development of e-learning in Jordan, it is evident that these agencies and their overall attitudes toward ICT will be important to the development of e-learning. As such, government agencies will be a key stakeholder in the determination of e-learning adoption.

2.10.2 Institutional Level

Providing a general review of the institutional system of higher education in Jordan, Abu-El-Haija (2002) reports that there are currently eight public universities and 13 private universities in Jordan. Bachelor's Degrees are offered at both public and private universities while Master's and Doctoral degrees are offered only at public universities. One exception is the Amman Arab University of Graduate Studies which is a private university which offers specialized Master's and Doctoral degrees. Abu-El-Haija goes on to provide a review of each of the universities and the specific programs that they provide for students. Generally speaking all of the institutions of higher education in Jordan offer similar programs which span a wide range of subjects and disciplines.

The literature provided by Abu-El-Haija (2002) suggests that overall there is notable congruity between institutions of higher education which exist in Jordan and those which exist in the United States. Even though there are similarities between Jordanian institutions of higher education and those found in the West, Bekhradnia (2006) provides more integral insight into the specific issues and practices which shape outcomes in institutions of higher education in Jordan. Specifically, this author reports that even though Jordanian universities have a certain degree of autonomy in theory, they are heavily regulated by state agencies. The regulations placed on these institutions impacts specific areas of functioning which include the number of students which may be recruited and, for private universities, the types of academic programs which may be offered. Despites these specific constraints Bekhradnia (2006) goes on to report that universities in Jordan do enjoy specific types of freedom including the right to choose their curriculum and freedom over the way in which they use their budgets. Bekhradnia asserts that the juxtaposition of state regulation in specific areas has created a certain level of "restrained autonomy" for institutions of higher education in Jordan.

In addition to external governance structures which shape the development of operations in institutions of higher education, Bekhradnia (2006) also notes that all universities have internal governance structures which set tone and policy for the organization. For instance, Bekhradnia reports that all universities have a Board of Trustees in place. However, Bekhradnia asserts that research regarding these Boards suggests that in public universities these entities barely function. As such, decisions regarding the operations of public universities often fall to the president of the university, the Council of Deans and the Higher Education Council. Bekhradnia argues that this arrangement is unfortunate because it ultimately limits the ability of the institution to garner a higher degree of autonomy in

decision making and operations. In private universities, where the Board of Trustees functions more appropriately, Bekhradnia notes that "Trustees have responsibility for all aspects of the governance of a university, such as approving the budget and strategic plan, and appointing the President" (p. 3).

Even though educational systems which employ a Board of Trustees provide the most opportunity for the development of autonomy in higher education Bekhradnia (2006) does note that the developmental history of the system of higher education in Jordan has created a notable barrier to these organizations establishing a high degree of autonomy. Bekhradnia asserts that in the context of private universities, the lack of autonomy in decision making has created notable tension between these organizations and the state. In total private universities in Jordan, which account for more than 20 percent of higher education services, provide the state with an important service without the costs associated with public universities. Despite this however, these universities are subject to considerable control by the state.

There appears to be a high degree of overlap in the governance of public and private universities—as neither appears to have a strong Board of Trustees in place, however, public universities provide over 80% of the Higher Education provision in Jordan it was therefore decided to focus on public university sector.

2.10.3 Individual Level

Although specific statistics regarding educators in the system of higher education in Jordan are not available, Bekhradnia (2006) does provide some general information regarding both the appointment of staff members and outcomes for students receiving a university education. As reported by Bekhradnia senior staff in the university is appointed by the

Higher Education Council. According to Bekhradnia, the Board of Trustees should be responsible for these appointments as this group would be better able to identify the needs of the local population and provide staffing support which meets the particular needs of students and the region in which the institution operates.

Even though specific data regarding the role that educators play in the development of education in Jordan has not been collected, secondary data regarding graduate employment and ratings of universities in Jordan do provide insight into the overall quality of education which is provided in the country. Generally speaking the data suggests that educators do not have the tools, resources and/or expertise to effectively ensure the best educational outcomes for students. Given that educators have been noted to be an important stakeholder in the development of university education, it stands to reason that these stakeholders will be integral to the development of e-learning adoption in universities in Jordan.

Bekhradnia (2006) provides an extensive review of student populations in Jordan's system of higher education reporting that in recent years, universities in Jordan have witnessed an increase in the number of students seeking higher education. In particular, this author reports that:

...The number of students enrolled in public universities nearly doubled in the 1990s from less than 50,000 in 1990-1991 to nearly 90,000 in 2000-01, and there were over 152,000 (Bachelors and postgraduate) in 2005-06. The number of students in private universities increased even more rapidly from 7000 in 1992-93 in to over 37,000 in 2000-01 and nearly 56,000 in 2005-06 (p. 15)

Bekhradnia goes on to report that the increases in the number of students in private universities are reflective of restrictions placed on public universities with regard to the

number of students which these institutions are permitted to admit. In addition, Bekhradnia notes that public universities are now able to admit students that are able to pay their entire tuition without state subsidy. These issues have increased student enrolment in higher education in Jordan.

Given this overall structure, the following hierarchy was developed to summaries Jordan's System of Higher Education see figure (2.1).

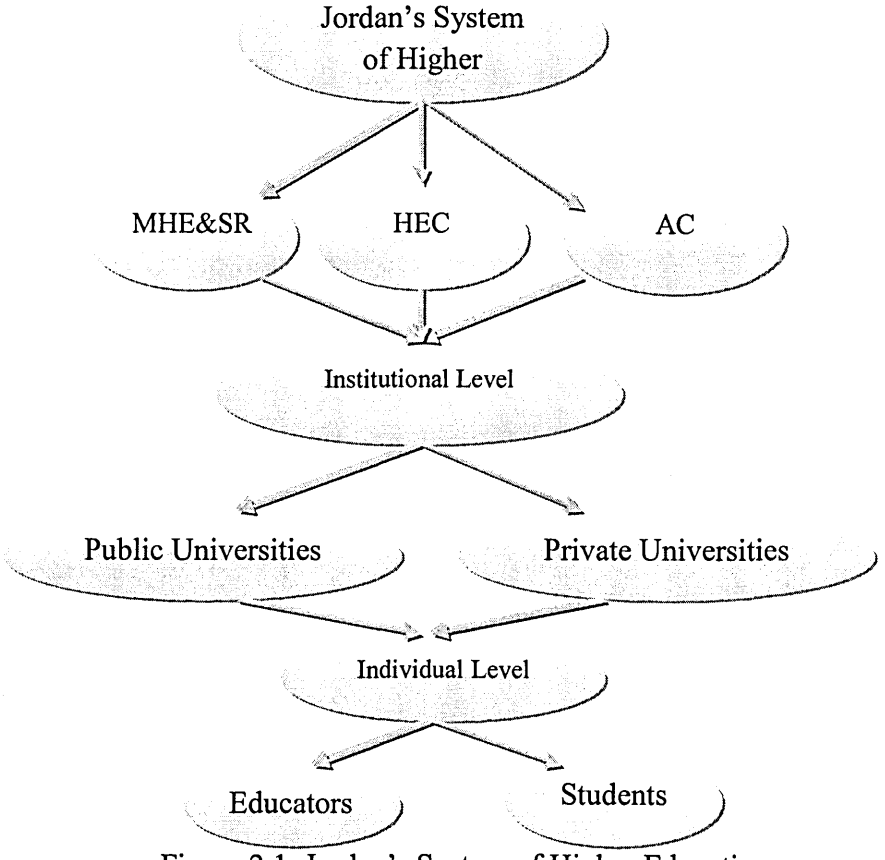


Figure 2.1: Jordan's System of Higher Education

2.11 Stakeholder Attitudes to ICT – General Perspective

One of the primary goals of the present research is to address the lack of information regarding attitudes to ICT among stakeholders in Jordan's educational system. In order to provide insight into such attitudes therefore it is necessary to consider stakeholder attitudes towards ICT in higher education in other regions of the world. An examination of the literature as it pertains to the attitudes to ICT of students, educators and administrators in other regions of the world will offer some understanding of the specific issues that shape ICT development and implementation in institutions of higher education, including those institutions in Jordan.

A critical review of research regarding the acceptance and use of ICT with regard to demographic factors suggests that gender does play an important role in the development of technology use. In an effort to illustrate this point, Birol, Bekirogullari, Etci, et al. (2008, p. 185) note the historical development of gender in understanding computer anxiety and technology use. As reported by these authors:

Males have traditionally dominated the use of computers and their applications in technological fields. Many researchers have attributed this gender gap in computer use to anxiety about using computers. Computer anxiety among females does not lessen with age or with experience using computers, and females have held a more negative attitude towards using computers than males.

Gender preferences with regard to technology use have been widely noted across a wide range of disciplines and industries, shaping the attitudes of males and females with respect to technology use and acceptance.

The challenges created by issues such as gender and experience in technology use have also been noted by Karsten and Schmidt (2008). In their longitudinal study of computer self-efficacy, the authors found that after ten years and additional education and training for computer use, self-efficacy in using computer technology remained significantly lower for

females than for males. "Our findings demonstrate that the 2006 students reported significantly more computer experience, used computers much more frequently, and took significantly more core courses that require computer use than their 1996 counterparts. This experience, however, did not translate into significantly higher computer self-efficacy scores and female students..." (Karsten and Schmidt, 2008, p. 445). This research demonstrates the overall impact of gender on attitudes towards the adoption and use of technology.

2.11.1 Students

With regard to the issue of students' attitudes towards ICT, a review of what has been noted in this area clearly suggests that the way students view ICT will have notable implications for the development and implementation of ICT in higher education. In an effort to illustrate this point, Jamtsho and Bullen (2007) consider the experiences of educators in Bhutan in improving outcomes for a distance education program. In particular, the authors considered the opinions and experiences of students enrolled in distance education courses in this region. The literature collected by the authors clearly suggests that while many of the students viewed ICT favourably—noting its importance for improving education—many students were not prepared to use this technology for educational purposes. In addition, students noted a lack of access to ICT—most notably computer and internet service—as significant barriers limiting their ability to engage in distance learning.

The attitudes of students to ICT use have also been considered by Ojo and Olakulehin (2006). In this research, Ojo and Olakulehin (2006) consider the attitudes and perceptions of students in Nigeria. The study examined the perceptions of students receiving higher education through an open university that did not integrate distance education with

traditional face-to-face education. The results of the study indicate that overall, student perceptions of distance education through the use of ICT were quite positive. Students enjoyed many of the benefits associated with open education, including: "open access, opportunity for flexible learning, provision of quality learning materials, the use of multi-media and ICTs" (Ojo and Olakulehin, 2006, p. 8). Thus, the specific benefits of distance education can help to build favourable attitudes and perceptions of students interacting in this educational environment.

In a more extensive study examining student attitudes and perceptions of ICT in higher education, Kirkwood and Price (2005) note data collection from more than 80,000 students over a given year period. In this research the authors considered such issues as student background and access to ICT as explanatory factors in the development and utilization of ICT in higher education. The results of the investigation are quite profound, elucidating the dynamic interplay of student preparation and access to ICT in shaping the use of this technology in the development of higher education. Specifically, Kirkwood and Price (2005, p. 257) concluded that, "although ICTs can enable new forms of teaching and learning to take place, they cannot ensure that effective and appropriate learning outcomes are achieved. It is not technologies, but educational purposes and pedagogy, that must provide the lead, with students understanding not only how to work with ICTs, but why it is of benefit for them to do so". Kirkwood and Price (2005) thus argue that understanding student knowledge, experience and use of ICT can improve outcomes for program development and design.

Among the changes that have occurred in this stakeholder group, students themselves now pay more frequently for their education rather than relying on the financial support of state subsidies (Bekhradnia, 2006). This change presents major implications for the influence

that students will have on the decision-makers in Jordan's institutions of higher education. Because many students as stakeholders are paying for their education without state support, they might also be inclined to believe that they should play a prominent role in shaping the development of education and educational policy. If this stakeholder group views ICT as a positive tool for education they might, in turn, influence increased demand for the adoption of E-Learning. Over time, this could work to facilitate increased pressure from the lowest level of the organizational hierarchy to adopt E-Learning methods and strategies in education.

Additionally, Selwyn, Marriott and Marriott (2002) consider outcomes for ICT use for university students with home computers. As they report, the presence of a computer in the home serves to shape technological experience and education. Given the important role that ICT experience and use can play in the development of ICT attitudes, an examination of home computer use is a salient choice for reviewing outcomes in this area. The results of the investigation suggest that students who had home computer access were more likely to make use of ICT in the educational environment. In addition, students having home computers were found to have more favourable attitudes towards computers in higher education (Selwyn, Marriott & Marriott, 2002).

Finally, Breen, Lindsay, Roger, et al. (2001) review the impact of information and communication technologies on student learning in the university environment. As reported by these authors, efforts to improve ICT development and implementation have focused on the evolution of ICT as a customer-driven technology which must be implemented to meet the needs of students. As such, they argue that it is essential to understand student experiences with ICT in this environment. In reviewing data from students, the authors

were able to provide notable insights into student experiences and expectations with regard to the use of information communication technologies in higher education.

Of particular importance in the data collected by Breen, Lindsay, Roger, et al., (2001) is an understanding of the overall expectations of students when it comes to the use of ICT in higher education. As reported by these authors, data from first year students in 1997 and 1999 indicate that most students expect ICT to be incorporated into the basic foundation of university education. This is witnessed by the number of first year students who purchased computers before starting school: "Without any university-led drive to persuade students to buy PCs, 42% of the 1997 first years were computer owners and 52% in 1999, and three-quarters of the 1999 owners believe that PCs are essential learning tools" (Breen, Lindsay, Roger, et al., 2001, p. 111). Additionally, that data collected regarding computer use revealed that students typically used their computers for two or more hours each day, a finding that demonstrates the importance of this technology and its perceived usefulness. It also presents important implications for the development of positive perceptions on the use of ICT and the subsequent application of E-Learning methods in education.

2.11.2 Educators

Considering next the attitudes of educators in the development of ICT in higher education, Eynon (2008) examined attitudes of educators towards the use of the World Wide Web in learning and teaching in higher education. Specifically, Eynon considered data collected from forty-one instructors at one "old" and one "new" university in England. The themes uncovered in the research provide important insight into the specific issues which are involved in ICT adoption for higher education. For instance, the authors were able to discern motivations of ICT adoption at both institutions. At the old university the

motivation for ICT adoption was "distance learning, to enhance campus-based learning, and to help overcome the reduction of funding at the same time as teaching increasing numbers of students" (Eynon, 2008, p. 17). While this focus was similar at the new university, the results suggest that more emphasis was placed on improving campus-based learning, with less emphasis on distance education outcomes. Further, the research provided by Eynon (2008) considered the reasons for individual instructors to adopt ICT for teaching and learning. The results obtained in this area suggest that similarities in decisions to use ICT were noted between educators at the old and new universities. Specifically, educators at both the old and new universities were unlikely to use ICT because of insufficient time, interest, skills and support (Eynon, 2008, p. 19).

The attitudes of educators regarding the use of ICT in education were also examined by Jimoyiannis and Komis (2007). Specifically, they considered data collected responses from 1,165 university educators in Greece. The researchers collected responses from participants who have recently received education and training for using ICT in the classroom. The results of the investigation demonstrate that while many educators could see the value and importance of using ICT in the classroom, many had reservations regarding the use of ICT in practice. The data showed underlying negative attitudes towards ICT adoption in the classroom, with identifiable trends found along personal lines including subject matter, gender and overall experience. Female educators with less experience were likely to be more anxious about ICT use in the classroom and harbour more negative feelings towards this process. Additionally, science educators were more likely to have positive views on ICT use in the classroom (Jimoyiannis & Komis, 2007). Findings like these point out the imperative of identifying the attitudes of stakeholders that might also prohibit or enhance the adoption of E-Learning in Jordan's system of higher education.

2.11.3 Senior Management

Research regarding attitudes for ICT adoption in higher education has also been considered through assessment of senior management response. Lofstrom and Nevgi (2007) note a survey of institutional leaders and deans working in higher education to evaluate the development and proliferation of ICT in this environment. The results of the survey suggest that the development of ICT in higher education is a challenging process which requires the organization to create the infrastructure needed to support ICT development and use. While educational leaders see the value of these programs they also note that there are significant challenges in developing ICT for the university. Among the most significant challenges noted in this area is the development of training programs for educators to implement ICT in their coursework. Creating cohesion between the vision of ICT development and the competence of educators is a significant issue impacting on how administrators view ICT in higher education.

Kanuka and Rourke (2008) further consider administrator reviews of technology in higher education. Specifically, Kanuka and Rourke (2008) conducted informal interviews with 12 administrators in higher education in order to understand their perceptions and attitudes towards technology and E-Learning. In reviewing the responses provided by administrators, it becomes evident that professionals working in these positions have developed a balanced image of information technology. In most instances, administrators were able to see the benefits of using ICT along with the drawbacks which accompany this process. For instance, Kanuka and Rourke note that most educators can see the benefit of E-Learning in the development of more flexible course offerings and educational opportunities. However, administrators also recognize that the use of ICT shapes the way in which communication occurs and can serve to isolate learners from one another and the larger learning

community. These issues have implications for how ICT is developed and implemented in the university environment.

Adams (2008) further considers the specific attitudes of administrators in higher education towards ICT. In this study, the author examined survey responses from 123 university administrators (deans, chairpersons, etc.) in an effort to assess the development, implementation and use of ICT in higher education. The results of the investigation suggest that in developing ICT for higher education, administrators are aware of the conflicting issues for ICT development which exist in this environment. Specifically, Adams illuminates the issues involved regarding the credibility of online degree programs and their reflection on the university. Overall, data indicates that online degrees are not always viewed as favourably as traditional classroom degrees. This general attitude towards online degrees prompts administrators to consider how their institutions will be viewed by offering such courses. In this process, administrators are attempting to balance the need for online education with the reputation of the University for offering these types of courses and degrees.

2.12 Summary

The lack of research on the relationship between attitudes on ICT and E-Learning adoption in institutions of higher education in the Middle East and Jordan supports the theoretical framework proposed for the present study. Specifically, the research suggests that the proliferation of ICT in society will have a direct impact on outcomes for individual and group attitudes. These attitudes will shape the willingness of individuals and groups to further explore the development of ICT though its application to specific types of technologies, including E-Learning in higher education. The research also supports the

opinion that different stakeholders, i.e. students, educators and administrators, will also have different attitudes to ICT and, ultimately, will have different influences on the adoption of E-Learning methods and strategies in higher education.

While the state of the reviewed literature provides some insight into the theoretical foundations for the current research, there are considerable gaps in the field which require empirical evidence in order to fully understand and explain how E-Learning is developed in institutions of higher education in general but Jordan in particular. Specifically, the previous empirical studies have simply looked at it from the point of view of one stakeholder whilst this investigation looks at it from all three stakeholders (senior mangers, educators, and students). Without this understanding it is difficult to construct a clear picture of the role of various stakeholders in the application and use of E-Learning methods and strategies in general and in Jordan in particular.

The previous literature also fails to fully explore the integral relationships that exist among stakeholders and the influence of these relationships on the development of technology acceptance and E-Learning adoption. However, some studies attempt to address this issue but do not provide an integrative examination of the influences and outcomes of stakeholder groups. For instance, Gambescia and Paolucci (2009) consider the integrative roles of stakeholders in the adoption of E-Learning through an examination of academic fidelity. This research acknowledges the importance of different stakeholder groups but does not provide insight into the manner in which these groups are integrated to shape outcomes for E-Learning development in the organization. Further, the successful development of E-Learning requires a coordination of stakeholders to produce the best possible outcomes for such a model (Bassoppo-Moyo, 2008).

Such coordination among stakeholders in Jordan however has yet to be manifested and therefore the application of E-Learning has not been fully realized in its system of higher education. Based on research examining the prospects of distance education/E-Learning in Jordan, Mashhour (2007) has established that, while this model is "better suited for today's needs and lifestyles in Jordan", there are still obstacles to their proliferation including but not necessarily confined to, "computer literacy, English language proficiency, cost of Internet and degree accreditation" (p. 9).

The current research is directed at providing a comprehensive understanding of how the attitudes of stakeholders influence E-Learning development by understanding both the role of the stakeholder and the stakeholders' overall attitude towards ICT. By addressing these issues through research, it will be possible to compare them with the development of E-Learning in the university to understand how stakeholders influence outcomes in institutions of higher education in Jordan. This insight will be important for developing ICT and E-Learning as well as for developing a broader understanding of the underlying patterns which shape general policy and practice in the educational setting.

Earlier we argued the importance of ICT diffusion as a means of understanding and explaining E-Learning adoption. In the previous section we have argued the importance of stakeholders and their role of research. Technology Acceptance Model (TAM) effectively combines these two key components of our research. We intend to use the (TAM) model and modify it with three new factors of our own (Perception, Patronised, Practised), and more significantly we intend to test the empirical validity and relevance of the proposed model.

Therefore it is the aim of this research to asses the factors that underpin the attitudes of these stakeholders. As we intend to do this in an empirical manner, in the next section, we look at some conceptual models that will assist in the formulation of a framework of inquiry.

Chapter 3 : Theoretical Framework and Proposed Model

3.1 Introduction:

Critical review of the literature suggests that specific factors such as Perception (perceived usefulness and perceived ease of use), Patronised (degree of support), and Practised (previous use of technology) work together to shape the relationship between stakeholder attitudes to information and communication technology (ICT) and the application of E-Learning. By its simplest definition, E-Learning encompasses "a web-based educational system on platform with Internet, Intranet or computer access" (Yucel, 2006, p. 1). With regard to the role of stakeholders, the research demonstrates that an organization's stakeholders have a direct impact on its outcomes (Freeman & Phillips, 2002). Stakeholders include individuals and groups that have direct contact with the organization and can significantly influence operations, especially when it comes to meeting the specific needs of those stakeholders (Freeman & Phillips, 2002).

Although maximizing benefits (profits and learning experience) is an issue of critical importance for the organization, the research demonstrates that stakeholder needs must also be attended to in order to ensure that the best possible outcomes for the organization are achieved. The needs of stakeholders are typically addressed in the development of the organization, however, the degree to which they are given priority will often depend on how much the stakeholder or stakeholder group influences organizational outcomes. Lewis (2007) contends that there are specific frameworks that help to understand the influence that stakeholder groups have over the organization. These include the attributes of power,

legitimacy and urgency. While each of these attributes enhances the role of the stakeholder in the organization, stakeholder groups that manifest all three of these attributes have the greatest influence over the development of the organization (Lewis, 2007).

3.2 Stakeholders:

A primary objective of the present research is to identify the influence that attitudes on ICT adoption among the following stakeholders have on the development of E-Learning:

- Institutional Level:
  - President/Dean
  - College and University Presidents.
  - College and University Administrators.
- Individual Level:
  - Educators.
  - Students.

In examining institutional stakeholders in Jordan, Abu-El-Haija (2002) notes similarities between the overall role that they play in both the US and in Jordan. In both regions, these stakeholders demonstrate identifiable levels of power, legitimacy and urgency with regard to shaping outcomes for their respective organizations. The manner in which institutional stakeholders influence outcomes however will depend on both the attitudes of individuals in this group and the manner in which they interact with other stakeholders including state agencies, educators and students.

With regard to educators and students, Spitzeck and Siegenthaler (2007) contend that the former are being held to higher standards of accountability and are thus influenced from the bottom-up when it comes to their attitudes towards education and educational policy. While governmental and institutional stakeholders play a deterministic role in the development of E-Learning, educators can expect to face pressure from students, parents and the academic community to provide ICT resources that meet the modern demands of students in a global

education system (Spitzeck and Siegenthaler, 2007). The attitudes of students towards ICT therefore are extremely relevant to the present investigation.

The literature on the identified stakeholders demonstrates that their influence differs according to their position in relation to the organization and the specific manner in which they can influence it. State agencies clearly have considerable direct power in influencing policy development in institutions of higher education. Consequently, the attitudes of this group towards ICT can be expected also to have a direct impact on E-Learning adoption.

The attitudes of institutional stakeholders such as college and university presidents and/or administrators can have a direct influence on whether or not technology is deemed an acceptable vehicle for enhancing curriculum, professional practice and academic performance.

The attitudes of educators and students as stakeholders can influence policy development from the ground-up, a manner that is often less evident than that manifested at the state and institutional levels. It is essential therefore to understand the influence manifested by each of these groups and their impact on outcomes for the organization, especially with regard to the adoption of E-Learning methods and strategies in education.

3.3 An Overview of the Technology Acceptance Model:

A critical analysis of the literature regarding stakeholder attitudes offers insight into how each stakeholder might influence E-Learning adoption in institutions of higher education in Jordan. It is important however to identify a theoretical framework within which the relationship between attitudes towards ICT and the adoption of E-Learning methods and strategies can be examined. The appropriate theory would support the assumption that

positive attitudes towards ICT can drive the development of E-Learning by fostering acceptance and application of this educational model in Jordan's system of higher education.

For the purposes of the present research, the Technology Acceptance Model (TAM) will be applied as the theoretical framework for understanding the willingness of stakeholders to accept ICT (see Figure 3.1). It is necessary therefore to review this model with an emphasis on its application to the perceived usefulness, perceived ease of use, attitude towards use, and actual use, of ICT by the stakeholders identified. Davis (1993) submits, "The Technology Acceptance Model (TAM) specifies the causal relationships between system design features, perceived usefulness, perceived ease of use, and attitude towards using and actual usage behaviour" (p. 475).

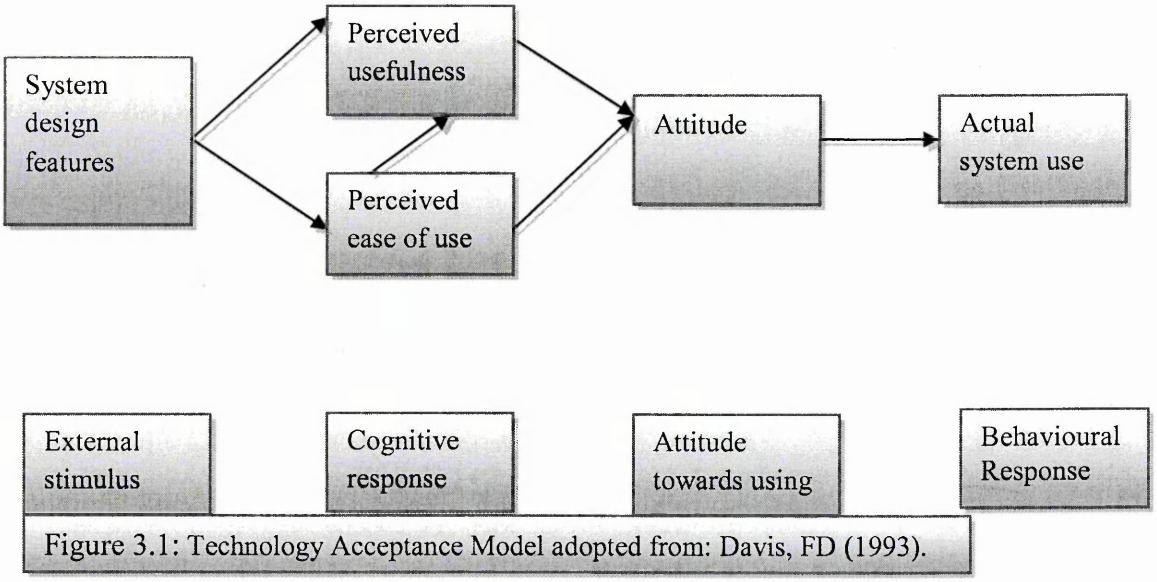


Figure 3.1: Technology Acceptance Model adopted from: Davis, FD (1993).

The TAM is based on principles derived from psychology, which it is possible to understand and measure the "behaviour-relevant components of attitudes" and makes possible the understanding of how external stimuli can influence the beliefs, attitudes and

behaviour of the individual towards such a thing as technology (Davis, 1993, p. 476). This model is applicable therefore to supporting and understanding current stakeholder attitudes for ICT in the development of E-Learning in higher education in Jordan.

Additionally, TAM model is predicated on the assumption that "both the attitude towards an action and subjective norm have an impact on behavioural intention, which in turn affects how people perform the action" (Shin & Kim, 2008, p. 379). Therefore, TAM model can be effectively applied to provide insight into the specific variables which influence the decision of the individual to engage in technology use. Issues such as the perceived usefulness of technology and the ease of use of technology are considered to be essential elements for understanding technology acceptance. These issues facilitate decision making of the individual or group and explain how technology adoption will occur.

This model is integral to this research because it provides a framework for examining the specific issues which stakeholders use in the development of decision making for technology adoption and use. It is relevant therefore to provide a few examples of this model and its importance for understanding stakeholder attitudes towards both information communication technologies and the development and implementation of E-Learning paradigms.

Schneberger, Amoroso and Durfee (2008) further review the TAM model noting that this model provides a method for understanding the process by which technology is used by the individual. By examining specific factors related to the perceived usefulness and perceived ease of use, this model provides important insights regarding the development of attitudes and behaviours towards technology. Perceived usefulness, in this case, is defined as "the extent to which a person believes that using a technology will enhance her/his productivity

and perceived ease of use is the extent to which a person believes that using a technology will be free of effort" (Schneberger, Amoroso & Durfee, 2008, p. 76). The behavioural intentions which are developed in this context will provide insight into actual system use.

The Technology Acceptance Model can provide such important insights into the development of decision making with regard to technology acceptance and rejection. It is pertinent therefore to consider how this model can be used for understanding both ICT and E-Learning adoption in higher education. Park, Lee and Cheong (2007) consider the application of TAM in examining the process of acceptance of electronic courseware by university instructors. In total 191 university educators were surveyed regarding their intention to use electronic courseware. The data collected indicate that ease of use for courseware had a definite impact on developing positive perceptions of courseware among university educators. This ease of use influenced behavioural intentions of educators to use the courseware, demonstrating the efficacy of the Technology Acceptance Model in understanding the acceptance of new technology in the university environment.

The role of stakeholders, their attitudes and the overall influence of these attitudes on the development of E-Learning adoption in higher education is one that must be further examined through research. The stakeholders identified do not exist in a vacuum and therefore the relationship between stakeholders and their influence on each other in the development of technology and E-Learning acceptance must be considered. The Technology Acceptance Model (TAM) can provide such important insight into the development with regard to technology acceptance and rejection. These relationships should be determined through an investigation of the stakeholders identified and the specific external variables that influence their attitudes towards ICT including Perception, Patronised (degree of support), and Practised (technology exposure).

3.4 Proposed Model

The present study expands on the original TAM by integrating a new construct that addresses the following variables: Perception, Patronised (degree of support), and Practised. The following section provides a review of the literature on these external variables as well as a discussion of the relationship between these factors and the TAM variables of perceived usefulness, perceived ease of use, attitude towards using ICT and actual use of E-Learning. Because the TAM supports the assumption that external factors influence the adoption of ICT, the modification of the TAM is regularly carried out in the research to reflect variables unique to regional and/or local contexts (Musa, 2006). This requires an understanding of the factors that influence the acceptance of ICT and the application in E-Learning, which can then be used to modify the TAM and address the unique characteristics of the population to be studied.

3.5 The Relationship between External Variables and TAM Variables

Identifying the relationship between the external variables and the TAM variables in the integrated model (see Figure 3.2) is essential to understanding how external factors might influence the attitudes that drive ICT and how those attitudes can ultimately contribute to the proliferation of E-Learning.

3.5.1 Perception

For the purposes of the present research, individual perception is handled as an external factor for its significance in influencing distinctly personal responses in the form of perceptions of usefulness, perceptions of ease of use, attitudes to technology (i.e. ICT) and actual use of technology (i.e. E-Learning methods and strategies). Calsoyas (2005) suggests that individual perception plays a significant role in how one responds to things, where

individual perception is intrinsically influenced by broader external factors such as culture, environment, and belief systems. Individual perception will, in turn, influence the development of specific perceptions of those things. This chain of interconnectedness explains somewhat why some things, like technology, are readily embraced at the individual, institutional and governmental levels in some cultures and not in others. It is important to note that TAM has been identified for it appropriateness in investigating how national culture impacts on the acceptance and implementation of technology (Veiga, Floyd & Dechant, 2001).

An ideal example of this interconnectedness is demonstrated in how the perceived usefulness of ICT influences the application of E-Learning methods and strategies in higher education. In the research examining the development of E-Learning for organizations of higher education in the United Arab Emirates (UAE), Randeree (2008) discovered that increased use of ICT in the region has spurred greater interest in the development of E-Learning in higher education. This demonstrates how broader cultural shifts can influence individual perception. Randaree (2008) also suggests, however, that a framework of organizational support is necessary to provide institutions of higher education and their educators with the ability to translate individual perceptions into a real application of E-Learning methods and strategies.

The relationship between individual perception and perceived usefulness in this case is relatively straightforward, where perceived usefulness is defined as "the degree to which a person believes that using a particular system would enhance his or her performance" (Davis, 1989, p. 320). As it has in the UAE, a proliferation of ICT in Jordan or the surrounding region could manifest a similar cultural shift and influence on individual perception of technology in general and the perception of its usefulness specifically. The

relationship between individual perception of technology and perceived ease of use of technology is similarly straightforward, where perceived ease of use is defined as "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989, p. 320). A proliferation of ICT in Jordan or the surrounding region could manifest a cultural shift and influence on individual perception of technology in general and the perception of its ease of use in particular. Although there is relatively limited research on this relationship with regard to education in Jordan specifically, an extensive body of research exists to prove this relationship, which can also reasonably be generalized to the educational environment in Jordan.

For example, the relationship between individual perception and these variables is demonstrated in the research on what motivates teachers to accept technology in the educational environment. In their research on the adoption of new technologies among secondary teachers in Taiwan, Wu, Change and Guo (2008) established that the perceptions of teachers on the usefulness and ease of use of computer technology were strongly determined by whether or not they believed that the use of technology was an appropriate fit in the classroom environment.

O'Neil, Singh, O'Donoghue and Cope (2004) submit that pedagogical issues can have significant bearing on whether or not technology is considered useful in improving the educational experience as well as academic outcomes. In this case, pedagogical issues such as the demand for meeting the needs of increasingly diverse student populations can transform traditionally negative individual perceptions on technology to positive perceptions on technology based on its capacity to address different student learning styles (O'Neil, Singh, O'Donoghue & Cope, 2004). In Jordan, the government has demonstrated a strong interest in modernizing its educational system with the goal of "raising the level of

Jordanian students to become more competitive in the labour market" ("King Meets French," 2007). In terms of addressing the diverse needs of students, the research shows that the Jordanian education system is already "adapting innovative methods of teaching and technology to further advance the quality of education" ("Harvard's Women's Leadership Board," 2007).

Alsunbul (2002) suggests an even broader influence on individual perception in the form of a global cultural movement towards distance education, which the research contends present major implications for the Arab World. This is especially true for a region of the world where many individuals seeking higher education are often unable to gain admission in colleges and universities in the Arab world (p. 61). This phenomenon suggests that individuals denied access to a conventional higher education would likely find the concept of E-Learning a viable and privileged option for pursuing an academic career and therefore would develop a positive individual perception of technology. In this case, ICT would certainly demonstrate its usefulness while perceptions on ease of use would be supported by the quality of information and/or experience in E-Learning obtained by the student.

Outcomes like these confirm that the relationship between individual perception and attitude towards using ICT could manifest an indirect but significant influence on the actual use of E-Learning in Jordan. Even more, the findings present important implications for understanding how individual perceptions among the stakeholders identified will influence their attitudes on ICT as well as contribute to the actual use of E-Learning in Jordan's system of higher education.

3.5.2 Patronised

The external factor identified as the role of support addresses the assumption that the acceptance of technology depends on the level of support that technology is given with regard to its introduction and application in society. Numerous cultural, educational and news publications throughout the Middle East and Jordan have documented the growing interest and support of technology in education. This is especially true of E-Learning, which has been identified for several years as the vehicle by which Jordanian students will be made better equipped to compete outside the academic arena. The positive perception on the usefulness of technology is manifested from the highest level of government, an assertion that is supported by the fact that Jordan's king and queen are the most prominent advocates of the use of technology and E-Learning specifically ("Queen Rania Briefs US," 2005; "King Meets French," 2007).

Like the external factor of individual perception, which often manifests a similar influence on the perception of usefulness and the perception of ease of use, the external factor of support bears a major influence on both of these variables. In the same way that Jordan's king and queen influence a positive perception of technology's usefulness, a positive perception of technology's ease of use can be developed through the support of entities that are prepared and equipped to demonstrate its use. For example, these can include public agencies as well as public and private institutions willing to advocate the use of ICT and offer opportunities for educators and students to familiarize themselves with its various applications. Fusilier and Durlabhji (2008) established that university support, in combination with student training and attitude, were significant predictors of perceived ease of use and ultimately, of technology usage. Although the researchers looked specifically at the role of support in influencing Internet use among university students, the findings can

reasonably be generalized to more specific uses of ICT to include E-Learning methods and strategies.

The research demonstrates that the role of support is especially evident when it comes to fostering the actual use of technology, with much of the research predicated on the widely-held belief that organizational support is a "driving" factor in technology usage (Bhattacherjee & Hikmet, 2008, p. 69). In examining the role of organizational support based on the TAM, Bhattacherjee and Hikmet (2008) established that organizational support is capable of influencing perceptions of usefulness and ease of use and, in turn, influencing the acceptance of technology. The willingness of employees to use technology will then influence further development, use and acceptance of technology in the organization as a whole.

Educators and students are identified as individual stakeholders in the larger educational system; however, teachers manifest a considerably greater level of influence than students. As a consequence, their part in the role of support has a significant bearing on whether and the degree to which student demands for technology in education will be met. Gong, Xu and Yu (2004) investigated this relationship in a study examining the use of technology among several hundred Japanese teachers. The researchers recognized that teachers have considerable control when it comes to the acceptance and application of technology in the educational environment because they are "relatively independent and have considerable autonomy over their teaching activities, including technology choice" (p. 365). Using the TAM in combination with social cognitive theory, the researchers employed a framework of analysis that revealed the teachers' computer self-efficacy was one of the most significant determinants in perceived ease of use and the actual use of technology (p. 371). The findings suggest that unless teachers are confident in their own ability to use

technology, they will likely be reluctant to support its application in their own classrooms or in higher education in general.

The importance of support in driving the acceptance of ICT and E-Learning in higher education in the Middle East is fairly evident. Kilic, Baran, Bakar, Cagiltay, Knukseven, Yalabik, et al. (2006) found that, while many teachers in the region have positive perceptions towards technology, they also complain of significant barriers to the development and implementation of technology in higher education. More specifically, the researchers found that founding support in the form of preparation for and training in the use of technology is needed. This finding suggests that in order to improve or increase the acceptance of ICT among educators in the Middle East and in Jordan specifically, course work and/or training should be developed and implemented that better prepares them for the use of technology in the educational environment.

Wu and Lederer (2009) also considered as support mechanisms the variables that influence perception of usefulness of technology in the organization. Specifically, the researchers noted that willingness of Users in the organization to accept and engage with new technology is determined by the presence of social influence or voluntariness as supporting mechanisms. In short, the social context for the development of new technology will have a direct impact on individual perceptions regarding ease of use, usefulness of the technology and willingness to use the technology. This speaks to the important role of stakeholders who are in a position of influence and power sufficient to foster broad social acceptance of ICT.

Gibson, Harris and Colaric (2008) further examined the variables the shape the use of online education in institutions of higher learning. Applying the TAM model, the

researchers discovered that usefulness of the technology as a single construct was the most prominent factor influencing technology adoption. Ease of use did not play a role in the decision to adopt new technologies. As such, this research suggests that as long as the new technology is viewed as helpful and supportive for the development of the learning environment, the ease of use of the technology does not play a significant role in the decision to adopt. Thus, the ability of the faculty member to use the technology for improving education is the single most important variable for technology adoption in this group.

3.5.3 Practised

Al-Gahtani and King (1999) established more than a decade ago that attitudes, especially as they are developed through satisfaction, can be influenced by certain external variables. The researchers employed a Technology Acceptance Model that introduced external variables such as training, computer experience and computing support. The results revealed that perceptions of ease of use, satisfaction and relative advantage could be predicted by an individual's experience with and exposure to technology as well as by the support that they received in the understanding and use of that technology. Even further, the actual use of technology could be predicted by the individual's perception of ease of use, satisfaction and relative advantage (Al-Gahtani and King, 1999).

Gurbuz, Yildirim and Ozden (2000, p. 1) similarly compared student-teacher attitudes towards computers in online and traditional computer classes in a Middle East Technical University. Among the specific variables that were identified as influencing attitudes towards computer learning were "gender, computer literacy, course type, whether any computer-related course was taken before, previous computer attitude, and possession of

home computer". Abbad, Morris and de Nahlik (2009) also found that specific characteristics of this stakeholder group were likely to predict outcomes for E-Learning adoption. In particular, the results demonstrated that perceived usefulness of E-Learning was influenced by understanding of the technology and ease of use was influenced by user experience and self-confidence with regard to the ability to use the technology in everyday life, especially over the long-term. The results of these studies suggest that students who are more receptive to communication technologies are also more likely to engage in the use E-Learning programs.

Using in-depth interviews with students and educators, Dirani and Yoon (2009) sought to identify specific issues that affected these stakeholders and that ultimately influenced the development of E-Learning adoption in the institution of higher education. The results of the research revealed that exposure through the diffusion of ICT at local and regional as well as national level has a significant impact on the development and utilization of the E-Learning model. Nevertheless, the research also shows that ICT development in Arab countries continues to lag behind in comparison to its development in other countries, creating obstacles for individuals to view technology as a positive step towards evolution and change (Dirani and Yoon, 2009). As a consequence the acceptance and application of E-Learning continues to lag as well.

3.5.4 Attitude

In the model, the variables of Perception, Patronised, and Practised are antecedent variables influencing attitude towards ICT. Attitudes are the beliefs of an individual that predisposes them to act in a certain manner, with affect, behaviour and cognition as constituent components of attitude (Paris, 2004). Attitude is composed of the positive and negative

feelings of the individual about a contemplated action (Abdel-Wahab, 2008). With respect to ICT and E-Learning adoption, attitude is a critical factor for the intent to use the computer as a tool for learning and the translation of the intent into the action of using the computer. Attitude is also an important factor underlying student self-efficacy in E-Learning, with a positive or favourable attitude supporting a perception of greater self-efficacy (Yiong, Sam, & Wah, 2008).

Previous investigations examining attitude towards E-Learning among students have found that attitude is primarily influenced by perceived usefulness, although previous use and degree of support also account for some of the variance in student attitudes (Lau & Woods, 2008; Jung, et al., n.d.). The contribution to attitude from previous use may also involve the two dimensions of previous use of computers, which creates greater facility with employing computer applications, and previous experience specifically with the use of computers for E-Learning (Paris, 2004). Although the TAM focuses on perceived ease of use, degree of support and previous use as determinants of attitude, additional intrinsic factors such as enjoyment, curiosity or ability to concentrate related to the online environment may also account for variance in attitude towards E-Learning among students (Moon & Kim, 2001). There is also evidence of variation in attitude towards E-Learning among different cultural groups and between the genders (Al-Doub, Goodwin, & Al-Hunayyain, 2008). It is important for educational institutions promoting the adoption of E-Learning to understand student attitudes because the students are the end-Users of any E-Learning system (Mahdizadeh, Biemans, & Muldar, 2008). The institution may be capable of implementing programs that positively influence the attitudes of students to foster more positive attitudes towards E-Learning.

Research conducted by Teo, Luan, and Sing (2008) determined that the attitude of teachers and administrators in an educational institution is a critical variable for the adoption of E-Learning. If the teachers have a negative attitude towards computer-assisted learning and online learning, they will influence the institution against accepting E-Learning and resist adopting the technology if it is mandated. The attitude of the teachers and administrators towards E-Learning also influences the attitudes of students because the instructors are major actors in the learning process (Sun, et al. 2008). There may also be a difference in attitude towards E-Learning between administrators and teachers. If administrators promote the use of technology for E-Learning, it may nonetheless meet with resistance from teachers if they do not have a positive attitude towards E-Learning (Mahdizadeh, Biemans, & Muldar, 2008).

The attitudes of students and teachers towards E-Learning may not be static and may be modified over time in response to changes in the factors contributing to attitude (Lau & Woods, 2008). Developments in technology and new E-Learning platforms can influence perceptions of ease of usefulness, and provision of additional support resources in an institution can influence the perception of degree of support. Administrators and teachers with a positive attitude towards E-Learning may also influence the perception of usefulness among students. Because educational institutions can influence attitude with persuasion and infrastructure, assessment of the variable is important for planning and implementation of E-Learning.

3.5.5 E-Learning prediction

The TAM model identifies the intention to use E-Learning as the dependent variable, which is influenced by the antecedent variables that are similar for both students and

administrators because both groups must have the intention to use the technology to predict its adoption. In the theory of reasoned action that underlies the TAM, the intention to perform an action precedes undertaking the action. As a result, the intention to use E-Learning or E-Learning prediction must precede the actual use of an E-Learning system by students and administrators (van Schaik, Barker, & Moukadem, 2006). The E-Learning prediction or intention to use is the strongest predictor of actual use of E-Learning (Lau & Woods, 2008). Because factors such as resource availability can intervene between the intention to use a technology and the actual use of the technology, the intention to use or E-Learning prediction is a more appropriate measure for E-Learning than actual use (Teo, Luan, & Sing, 2008).

Previous research examining student intention to use the technology in Middle Eastern nations has established that usefulness, previous experience and resource availability are antecedent variables influencing the intermediate variable of attitude, which influences E-Learning predication (Abel-Wahab, 2008; Al-Doub, Goodwin, & Al-Hunayyain, 2008; van Schaik, Brker, & Moukadem, 2006). The perception of self-efficacy may also influence the decision of the student or administrator to translate the intention to use the technology into the behaviour or using the technology (Yiong, Sam, & Wah, 2008). Although a student or administrator may have a generally positive attitude towards E-Learning, they must also have the belief that that can effectively use E-Learning to achieve their educational objectives.

Previous research has determined that the intention of the teachers and administrators in an educational institution to use an E-Learning system is a significant predictor of the actual adoption of E-Learning system and the subsequent success of the E-Learning educational modality (Mahdizadeh, Biemans, & Muldar, 2008). The teachers and administrators control

the resources that make E-Learning available to students and the importance that it plays in the educational process. Researchers have also determined that the attitudes of teachers and administrators towards E-Learning influences E-Learning prediction among students (Sun 2008). A negative attitude towards E-Learning among teachers becomes part of the information that students use to develop their perceptions of the usefulness and degree of support for E-Learning in the institution, which affects their attitudes and intention to use E-Learning. There is also some evidence from research indicating that teachers and administrators may form attitudes and intentions to use E-Learning during their pre-service training (Teo, Luan, & Sing, 2008).

The students and administrators are linked in dyadic relationship with respect to prediction of E-Learning. If the students have the intention to use an E-Learning system, they cannot effectively actuate the intention unless the administrators make such a system available to them (Jung, et al., n.d.). Conversely, if the administrators of a school have the intention to use an E-Learning system, they cannot effectively actuate the intention unless the students actually use the system. Because of the relationship between students and administrators, the prediction of E-Learning based on intention may not be indicative of actual use of E-Learning. Nonetheless, the prediction of E-Learning is a prerequisite for adoption of E-Learning. This relationship between the prediction of E-Learning among students and administrators is particularly important in developing nations in the allocation decision for scarce resources (Abel-Wahab, 2008).

A review of the literature reveals that any number of variables can be examined for their role in driving ICT and ultimately contributing to or preventing the proliferation of E-Learning. For the present research, those variables include external and internal factors that are expected to explain technology acceptance. The research is clear those external factors

such as Perception, Patronised (degree of support), and Practised (pervious use of technology) work to impact key TAM variables such as attitude towards and actual use of technology. We have summarised these into table 3.1 to show the underpinning literature for our chosen variables.

Concept to explore	Construct	Rational to support central research question/gap	Support References
Personal data	Demographic data	Personal characteristics of the individual user have been shown to impact outcomes for technology adoption and use. These variables impact acceptance and the willingness of the individual to use the technology. These variables can include gender, age, position, education, and experience.	Birol, Bekirogullari, Etci, et al., 2008; Karsten and Schmidt, 2008.
Perception: (*Perceived usefulness and Perceived ease of use*).	Capabilities to use technology and Fit of the technology for individual use.	Research has shown that the manner in which the individual perceived technology use will impact outcomes for use and adoption. How well technology fits for the individual user will influence the degree to which the individual uses the technology and the overall attitude that the individual develops with regard to the technology. If the technology is viewed as a good fit the opportunities for use will increase. If the technology is not viewed as a good fit, it will impact how the individual looks at the technology and the decision to use the technology.	Calsoyas (2005); Veiga, Floyd & Dechant, (2001); Davis, (1989); Wu, Change and Guo (2008); O'Neil, Singh, O'Donoghue and Cope (2004).
Patronised	Support structures Degree of support required	Support structures which are put in place to facilitate technology adoption will play a significant role in the decision of the individual to adopt a new technology	Durlabhji(2008); (Bhattacherjee & Hikmet, 2008); Gong, Xu and Yu (2004); Kilic, Baran, Bakar, Cagiltay, Knukseven, Yalabik, et al. (2006); Wu and Lederer (2009); Gibson, Harris and Colaric (2008)

Practised	Previous use of the technology and Degree to which technology is used.	Previous use of a particular technology will shape the manner in which the individual responds. If the user has extensive use with a technology application of the technology in a new way will be more easily accepted. In addition, previous exposure to a technology will shape attitudes of further applications. The degree to which other similar technologies have been used by the individual will influence the adoption of new technology.	Al-Gahtani and King (1999); (Gurbuz, Yildirim and Ozden, 2000); Abbad, Morris and de Nahlik (2009); Dirani and Yoon (2009)
Attitude	Attitudes towards the acceptance of technology.	Attitudes towards the acceptance of technology play a major role to determining the respondent's behaviour towards the adoption of new phenomena.	(Marie-Louise L. Jung, Karla Loria,Rana Mostaghel,Parmita Saha(2008)); Pei-Chen Sun , Ray J. Tsai, Glenn Finger, Yueh-Yang Chen, Dowming Yeh; Mahdizadeh, H.; Biemans, H.; Mulder, M.; Ahmed Gad Abdel-WAHAB, (2008).
Prediction	Statement or particular claim, event will occur in the future in more certain terms.	To inform the research to what extend the respondents are willing to adopt the new approach in delivering and the use of the new phenomena.	Sandars and Langlois (2005). Seok (2008). Dabbagh (2005). Nichols (2003). Desai, Hart and Richards (2008). Lam and Bordia (2008). Stella and Gnanam (2004). Conole, Carusi and de Laat (2006). MacDonald and Thompson (2005). Hughes and Hay (2001)

Table 3-1: Concepts to Explore

From this summary we are proposing an extended TAM model called TAM-EL as shown in figure 3.2 which for the present research will assess the extent to which each of the external variables Perception, Patronised, and Practised impacts on the key TAM variables attitude towards using ICT and predicted use in identifiable ways; this represents a major part of the research inquiry framework.

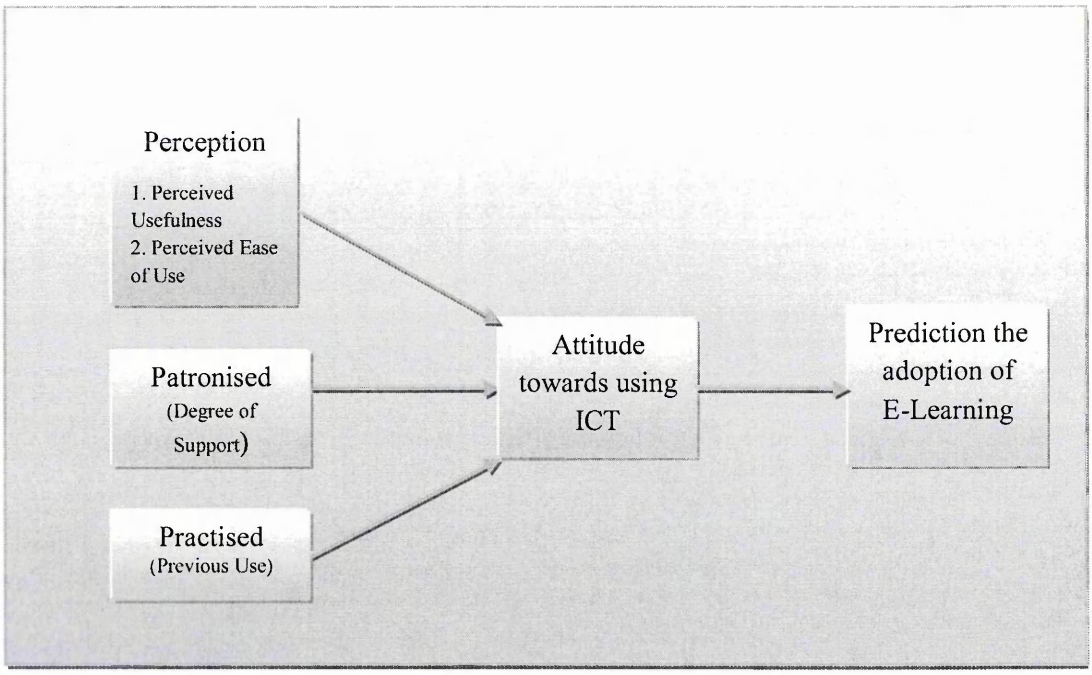


Figure 3.2: TAM-EL Model

3.6 Principle Research Question:

To what extent does the proposed model, in particular the role of components Perception, Patronised, and Practised, play in the adoption of E-Learning?

3.6.1Three sub-questions:

1. What is the role of Users and Providers as stakeholders in the adoption of the proposed model?

2. What is the role of Users as stakeholders in the adoption of the proposed model?

3. What is the role of Providers as stakeholders in the adoption of the proposed model?

3.6.2 Hypothesis Derivation

The derivation of the hypothesis involves a systematic process in which we consider three stages of investigation see table (3-2):

Stage	Hypothesis	Independent Variable	Dependent Variable
1	**H1:** Users and Providers Perception, Patronised, Practised and Attitude have a positive effect upon the Prediction of E-Learning.	**Perception, Patronised, Practised and Attitude**	**Prediction (E-Learning)**
	H2: Users and Providers Attitudes have a positive effect upon the prediction of (E-Learning).	**Attitude**	**Prediction (E-Learning)**
	H10: Users and Providers Patronised have a positive effect upon Prediction.	**Patronised**	**Prediction (E-Learning)**
2	**H3:** Users and Providers Perception have a positive effect upon Attitude.	**Perception**	**Attitude**
	H4: Users and Providers Patronised (degree of support) have a positive effect upon Attitude towards using ICT.	**Patronised**	**Attitude**
	H5: Users and Providers Practised (Previous use) have a positive effect upon Attitude towards using.	**Practised**	**Attitude**
	H6: Users and Providers Perception, Patronised and Practised have a positive effect upon Attitude towards using.	**Perception, Patronised and Practised**	**Attitude**
3	**H7:** Users and Providers Patronised and Practised have a positive effect upon Perception.	**Patronised and Practised**	**Perception**
	H8: Users and Providers Perception and Practised have positive effect upon Patronised.	**Perception and Practised**	**Patronised**
	H9: Users and Providers Perception, Patronised have a positive effect upon Practised.	**Perception and Patronised**	**Practised**

Table 3-2: Derivation of the Hypothesis

1. The first stage involves taking the variable E-learning Prediction (shortened for Prediction of Adoption of E-learning as the dependent variable and all other variables as the independent variables. In this case taking all four factors Perception, Patronised, Practised, and Attitude together leads to hypothesis H1. Where as taking Attitude and Patronised separately as independent variables leads to hypothesis H2 and H10 respectively.

2. The second stage involves taking the variable Attitude as the dependent variable and all other variables as the independent variables. Taking Perception, Patronised and Practised

separately as independent variables leads to hypothesis H3, H4, and H5 whereas; taking all three variables together Perception, Patronised and Practised lead to hypothesis H6.

3. The third stage involves the internal interaction between each of three variables of: Perception, Patronised and Practised taken pair wise as independent variables upon the third as dependent variable leads to the formation of hypotheses H7, H8 and H9 respectively.

3.6 Proposed model and frame work:

Based on these justifications we have the following proposed model and research questions.

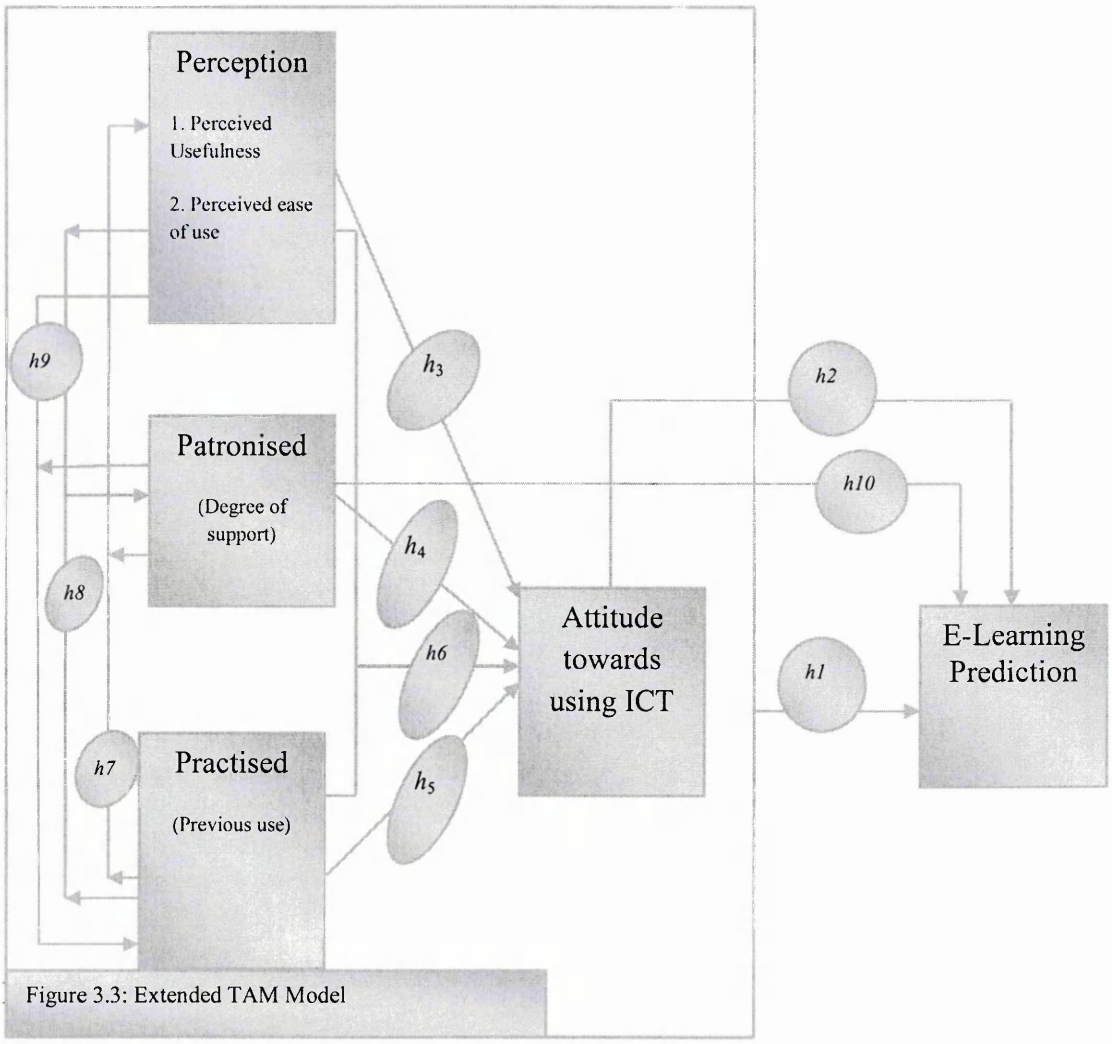


Figure 3.3: Extended TAM Model

H1. Providers'/Users' Perception, Patronised, Practised, and Attitude have a positive effect upon the Prediction of (E-Learning).

H2: Users'/Providers' Attitudes have a positive effect upon prediction of (E-Learning).

H10: Users' and Providers' Patronised have a positive effect upon Prediction.

H3: Users' and Providers' Perception have a positive effect upon Attitude.

H4: Users' and Providers' Patronised (degree of support) has a positive effect upon attitude towards using ICT.

H5: Users' and Providers' Practised (Previous use) have a positive effect upon attitude towards using.

H6: Users' and Providers' Perception, Patronised and Practised have a positive effect upon attitude towards using.

H7: Users' and Providers' Patronised and Practised have a positive effect upon Perception.

H8: Users' and Providers' Perception and Practised have positive effect upon Patronised.

H9: Users' and Providers' Perception and Patronised have a positive effect upon Practised.

Chapter 4 : Methodology

4.1 Introduction:

The current chapter reviews the research design and methodology which was employed for the current study. Specifically, this chapter provides a review of the particular procedures which were used to review stakeholder attitudes towards E-Learning adoption in Jordan's system of higher education. A quantitative methodology, rather than qualitative or mixed methodology, is reviewed along with a rationale for justifying the use of this type of research for the current investigation.

Although the current research focuses on the use of a quantitative design as the principle data collection to assess stakeholder attitudes for E-Learning adoption, the research does not employ a fixed paradigm. A review of the literature regarding the development of adoption of new technology and E-Learning suggests that there are a number of different theoretical frameworks which can be used to assess outcomes for adoption. Issues such as perception (perceived usefulness, and perceived ease of use) of the technology (Birol, Bekirogullari, Etci, et al., 2008), Patronised (degree of support) for technology use (Randeree, 2008; Kilic, Baran, Bakar, et al., 2006) and Practised (previous exposure to the technology) (Abbad, Morris & de Nahlik, 2009) are all critical in the development of technology use and acceptance. With this in mind, the mixed paradigm approach appears to provide the most salient choice for developing the quantitative research and therefore we review the literature more generally on methodologies.

4.2 Scientific Paradigms:

This section of the research considers the scientific paradigm which was employed for the development of the current research. In particular, the ontological and epistemological characteristics of the research context are delineated. The overall conceptual framework is reviewed as well as the cluster of beliefs and dictates which have influenced the researcher's understanding of what should be studied, how the research should be conducted, and the specific procedures which should be used for the interpretation of the results.

In order to begin the process of identifying scientific paradigms, it is first necessary to consider the ontological and epistemological characteristics which comprise the foundation of the research. Ontology refers to the specific issue of *what* can be discovered about a particular subject while epistemology refers to the process of discovery of information for the researcher—i.e. *how* information becomes known (Northoff, 2004). The development of both *ontology* and *epistemology* are integral to the establishment of a methodology. Determination of what and how serve as the foundation for methodology which includes a set of theories and methods that provide a common ground for exploration (Creswell, 2009).

The methodology begins with theory and leads to the concrete practices which will serve as the foundation for the collection and analysis of data (Creswell, 2009). Even though this statement appears to imply a linear development for the research methodology, this is not the case. Research methodologies often employ different approaches to ensure that the conceptual framework of the study is captured in the research (Patton, 2002). In this context, the methodology becomes an all-encompassing process which captures all

elements of the research process. This includes the philosophical underpinnings of the research, the framework used for the development of the research, the particular steps which must be taken in the research and information which justifies the use of each research step. For this reason, careful consideration of specific methodological concepts is warranted, including assessment of inductive and deductive methodologies and assessment of qualitative and quantitative research methods.

4.3 Deductive and Inductive Research Methods:

Considering first the underpinnings of deductive research methods, Bryman and Bell (2007, p. 11) make the following observations: "Deductive theory represents the commonest view of the nature of the relationship between theory and research. The researcher, on the basis of what is known about a particular domain and of theoretical considerations in relation to that domain, deduces a hypothesis that must then be subjected to empirical scrutiny". Bryman and Bell (2007) go on to report that embedded in the development of the hypothesis will be the need for the operationalization of the variables which have been identified for the research. In this process, the researcher must specify the data which need to be collected in order to define the concepts which comprise the hypothesis. Bryman and Bell (2007) further note that the deductive approach is driven by the identification of theory for the deduction of the hypothesis and finally the research methods which will be used to collect data for the hypothesis.

Bryman and Bell (2007) also consider the foundations of inductive research methods, noting that in the inductive approach, theory is often the result of research. In this approach data is collected and generalizable inferences are drawn. These inferences are used as the foundation for the development of theory. In comparing inductive research to deductive

research, Bryman and Bell (2007) assert that opposite processes occur. In deductive research, theory follows process and research. In inductive research, data gathering leads to theory development. Bryman and Bell (2007) go on to argue that the deductive approach is one which is more formal, reducing the subjective context of the research process. Formal processes developed in deductive research require the researcher to follow specific rules and procedures which lead to an analysis of data which is primarily based on logic and fact rather than speculation and human subjectivity.

4.4 Quantitative and Qualitative Research Methods:

Creswell (2009) provides a review of the differences between qualitative and quantitative methods. The author asserts that while the general differences between these two research methods are often defined in terms of the data collected—qualitative research utilizes non-numeric data while quantitative research utilizes numeric data—there are other theoretical underpinnings that differ for each of these research paradigms. Specifically, (Creswell, 2009, p4) reports that: "A more complete way to view graduations of differences between them is in the basic philosophical assumptions researchers bring to the study, the types of research strategies used overall in the research, and the specific methods employed in conducting these strategies".

With these basic delineations in place, Creswell (2009) goes on to provide a succinct review of both quantitative and qualitative methodologies:

Qualitative Research: provides the foundation for exploring the meaning that individuals or groups ascribe to particular social or human problems. Generally speaking the qualitative approach employs an inductive paradigm for research. Particular data on a specific issue or event are collected and then analyzed to provide a clear interpretation of the general and

common features of human response. (Creswell, 2009, p. 4) point out "Those who engage in this form of inquiry support a way of looking at research that honors an inductive style, a focus on individual meaning, and the importance of rendering the complexity of a situation".

Quantitative Research: "is a means for testing objective theories by examining the relationship among variables" (Creswell 2009, p. 4). It allow for the empirical analysis of information. The quantitative approach is based on deductive reasoning and provides the researcher with the ability to develop protections against subjectivity and bias. Completion of this type of research will allow for the generalization of the data and the replication of the research study in the same or a similar context.

In an effort to further explicate the differences between qualitative and quantitative research, Table 3.1, below, summarizes the differences and between these two research methodologies.

Difference with Respect to:	Quantitative Research	Qualitative Research
Underpinning Philosophy	Rationalism: Human beings acquire knowledge because of their capacity to do so.	Empiricism: Knowledge gained from sensory experiences.
Approach to Inquiry	Structured, rigid, predetermined	Unstructured, flexible, open
Main Purpose of Investigation	To quantify variation in phenomenon, situation, etc.	To describe variation in phenomenon, situation, etc.
Measurement of Variables	Emphasis on measurement or classification of variables.	Emphasis on description of variables.
Sample Size	Emphasis on greater sample size.	Fewer cases needed.
Focus of Inquiry	Narrows focus; however collects data from a lager sample size.	Covers multiple issues but collects data from a smaller sample.
Dominant Research Value	Reliability and objectivity.	Authenticity
Dominant Research Topic	Explains prevalence, incidence, and nature of issues, opinion and attitude; discovers regularities.	Explores experiences, meanings, Perceptions and feelings.
Analysis of Data	Frequency distributions, cross-tabulations, or other statistical procedures.	Subject responses, narratives, or observation data to identify themes.
Communication of Findings	Organization more analytical in nature, drawing inferences and conclusions and testing the strength of relationships.	Organization more descriptive and narrative in nature

Table 4-1: Differences between Qualitative and Quantitative Methods (Data Adapted from Kumar, 2005, p. 17-18)

Although the literature provided here suggests that qualitative and quantitative methodologies represent the scope of research frameworks which are available to investigators, Creswell (2009) does note that a mixed methodology for research may be employed as well. In reviewing the research process, (Creswell, 2009, p. 4) reports that mixed methods research "is an approach to inquiry that combines or associated both qualitative and quantitative forms" Creswell (2009) goes on to report that the mixed methods approach not only requires the collection of both types of data but also requires a consideration of the use of two different theoretical underpinnings for research—i.e. inductive and deductive. This approach, according to Creswell (2009) is employed when the data collected and analyzed for the mixed approach provides a stronger understanding of the subject than the use of qualitative or quantitative designs employed independently.

4.5 Research Design:

The information provided above includes a review of the process of conducting research—i.e. quantitative, qualitative or mixed methods. While the process of conducting research is important, the aims of research—which can be classified as exploratory, descriptive, analytical and predictive—are also important to delineate. Houser (2007) provides a review of each of these research aims. Considering first exploratory aims, Houser (2007) asserts that this type of research focuses on the need to understand a subject that has not been widely researched by other scholars. This type of research aim is employed when researchers are seeking to learn more about a subject and gaining insights into the research subject.

Houser (2007) also considers descriptive, analytical and predictive research. According to this author, descriptive research often involves confirmatory processes which allow for a

specific phenomenon to be quantified. In this descriptive research process a phenomenon is investigated more integrally and new insights about the phenomenon are gained. Considering next the analytical research aim, Houser further reports that analytical research can be used as a means for acquiring specific insight into a topic or issue. Basic characteristics of the research topic have been examined and researchers are concerned with developing further detailed analysis of a particular feature of the research. Finally, Houser (2007) considers predictive research. As reported by Houser (2007), predictive research focuses on the prediction of outcomes. In this type of research it is assumed that variables measured at one point in time will provide information regarding responses which will occur at another point in time.

Even though the aims of the research will help guide the development of the research design, aims must be integrated with a host of other essential elements for research design. In particular, Berkowitz (2003) notes the following as essential to the overall research design:

- The design must reflect the activities used for research and must employ a timeframe for the completion of the research.
- The design must be rooted in the research questions posed.
- The design dictates the specific types of sources and information used for the research.
- The design provides a framework for defining the relationships among the variables selected for review.
- The design provides a foundation for defining each of the research steps which will be used for the investigation.
- The design specifies the particular procedures which will be used for data analysis and interpretation of the data.

Although research can be structured through the use of a particular design strategy—i.e. quantitative, qualitative or mixed methodology—Creswell (2009) argues that the design for a specific research project must not always follow a linear pathway for development. Rather, he asserts that sub-designs for the research methodology can be interrelated or divergent methodological processes can be integrated into one overall strategy. With this in mind, the flow of the research can be improved through the use of a single research strategy—in this case quantitative methods—and the explication of the logic behind the use of different research designs such as surveys, interviews, etc.

With this in mind, the current research synthesizes the theoretical and empirical design processes to provide the foundation for establishing a research design. Literature provided by Niglas (2004) demonstrates that theoretical research includes analysis of existing knowledge and the synthesis of new knowledge. Niglas (2004) further notes that empirical research involves: development of a research problem; strategy; sample; data collection procedures; data analysis; interpretations; and conclusions. When the theoretical and the empirical are combined together, they produce the research design for this investigation which includes: problem analysis; design procedures; design solutions; evaluation; and generalizations. Given this foundational and theoretical information, the following sections include a review of the rationale for the methodology for the current research as well as a review of the processes used in conducting this study.

Based on these considerations, the study adopted a quantitative, not controlled experiment but empirical, cross-sectional regression research design. Because the study adopted a positivist research paradigm and the deductive reasoning associated with the paradigm, the research design was intended to collect and analyze data to confirm or relate hypotheses derived from the theoretical model underlying the research. A quantitative research design

is appropriate when the objective of the research is to test hypotheses. It is also appropriate for investigations in which the variables can be measured and the independent variables occur in time before the dependent variables (Creswell, 2009, p. 4). In the current study the variables can be measured with the use of a survey. In addition, the independent variables of Perception, Patronised, Practised, and attitudes are variables antecedent to the dependent variable of prediction of E-Learning. In contrast, a qualitative research design would not be suitable for the research because it does not support empirical testing of relationships among measurable variables.

The research design was non-experimental because it did not contain a control group or a testable intervention. The alternative of conducting experimental or quasi-experimental research was not feasible because of the impracticality of establishing control groups for testing the hypothesis of the study. The research design was cross-sectional because it collected data from subjects at a single point in time. Answering the research questions and testing the hypotheses did not require a longitudinal approach for studying subjects over time. The research was empirical because it was intended to test the effect of a relationship between the independent variables of Perception, Patronised, Practised and Attitude with the dependent variable of prediction of E-Learning. The research design established the foundation for selecting the specific methods used in the research.

4.6 Selection and Justification of the Research Methodology:

Johnson and Christensen (2007) consider the specific issues which must be addressed in the selection of a research methodology. As they reported, there are a number of different issues which must be addressed when selecting a methodology for the research. First, these authors assert that the focus of the research should provide a starting point for evaluating

the selection of research methodologies. Assessment in this area should reveal the specific types of methods which could be useful. In addition, Johnson and Christensen (2007) note that:

- The personal preferences and capabilities of the researcher conducting the investigation must be taken into consideration.
- The researcher's ideas, skills and experience will play a role in the specific methodology which is selected for the research.
- The type of data available on the subject will play a significant role in shaping the methodology selected.

All of these issues must be addressed when considering a rationale for the selection of a research methodology.

Placing this information into the foundational data regarding research design and methodology provided above, it is necessary to note that the main focus of this investigation is to examine stakeholder attitudes towards E-Learning adoption in Jordan's system of higher education. Because the issue of stakeholder attitudes in this educational context has not been previously investigated, the current research has characteristics of exploratory research employing a quantitative approach. Stakeholders' (Providers/Users) attitudes towards ICT in the adoption of E-Learning will be tested empirically in consideration of the TAM. This requires an understanding of the three new factors (Perception, Patronised, and Practised) that influence the acceptance of ICT and the application in E-Learning, which can then be used to modify the TAM and address the unique characteristics of the population to be investigated.

The research methodology employed in this research adopts a positivist approach which organizes knowledge based on the assumption that theoretical propositions can be tested through observation and measurement. The positivist paradigm also relies on an ontological approach in which the findings of research provide an objective explanation of reality (McKenzie, Powell, & Usher, 1997). The positivist paradigm was selected for the research because it permits the testing of the propositions of a theory, with the propositions operationalized as measures of observable phenomenon. In this study, the research was intended to test the theoretical propositions related to the factors influencing E-Learning adoption. The alternative research paradigms such as constructivism or advocacy are not suitable for this research because they are used in research intended to construct a theory from data or to advance an agenda for change.

Gliner and Morgan (2000, p. 19) provide a review of the positivist approach to research in which they note that "The positivist approach to research has prided itself on the notion that the investigator is objective during the experiment". As such, what is observed and recorded by the researcher is viewed as the most salient and reliable evidence which can be obtained for this investigation. Gliner and Morgan (2007, p. 20) go on to report that the focus of positivistic research is also well delineated: "The aim of inquiry is to develop a nomothetic body of knowledge in the form of generalizations that are truth statements that are free from time and context". Based on this paradigm, the positivist approach was employed to facilitate the testing go theory with regard to stakeholder groups in higher learning which include: Providers of higher education (senior administrators, and staff members) and Users of higher education (students).

The research relied on deductive reasoning, which is used with the positivist research paradigm. Deductive reasoning provides a means to test logically the hypothesis related to

theoretical propositions. It can be used to establish relationships between phenomena in one observational setting that can be generalized to other similar settings (Scott & Usher, 1996). Deductive reasoning is appropriate for the investigation of E-Learning predictors because it can be used to test the relationships among variables to support generalization of the findings to a larger population. The alternative approach of using a research method based on inductive reasoning would not be suitable for this study because it is used primarily for research based on a phenomenological approach in which the purpose is to construct a new theory.

A quantitative approach to this subject provides a means for the researcher to measure effectively the attitudes of stakeholders and assess the degree to which these attitudes influence the utilization of E-Learning in a specific environment. Measurement in this area provides a quantitative foundation for understanding the specific barriers and issues which may affect the development of E-Learning for specific stakeholder groups in higher education in Jordan. Based on clearly defined issues, formal recommendations for improving outcomes or eliminating barriers can be made. The quantitative approach is appropriate for use with research based on the positivist paradigm and deductive reasoning because it supports the empirical measurement of the variables under investigation for the testing of hypotheses. The alternative qualitative approach does not conform to the positivist paradigm because it relies primarily on descriptive data that cannot be used to test hypotheses empirically. The researcher interacts with subjects in the data collection and data analysis process, which reduces the objectivity of the researcher.

Even though the positivist paradigm will facilitate the development of research methods which focus on the capture of measurable and observable data, the current research is also focused on understanding the specific issues which contribute to the development ICT use

and subsequent implementation of E-Learning adoption. For this reason, the decision has been made to include the use of survey questionnaires to collect data among the sample population. A survey questionnaire is a commonly used instrument to collect data concerning psychometric attributes such as attitudes and perceptions and can provide information concerning variables influencing behaviour (Newman & McNeil, 1998, p. 37). The survey also provides the ability to collect data from a large number of subjects at a low cost. These questionnaires not only provide additional information regarding the quantitative data collected, but also these tools enhance understanding of the particular issues which impact on the development of E-Learning for stakeholders. The alternative approaches for data collection such as observation or direct testing of subjects are not feasible because of the time and cost constraints of this study.

Additionally, the current research employs the use of surveys as the principle process for data collection. Creswell (2009) notes that there are several advantages for survey research methods. These include: low-cost for geographical survey of a dispersed sample; standardized responses for comparison; reduces bias on the part of the researcher by eliminating subjectivity in interpretation; often provides rapid turnaround in data collection; and allows for anonymity of the subject in revealing important information. Each of these issues has notable implications for the current research as two different stakeholder groups with a total of three sub-groups will be used for data collection—i.e. Providers of higher education (administrators and staff members) and Users of higher education (students). As such, this method for data collection provides an efficient tool for acquiring needed information in a relatively short period of time.

The survey questionnaire was designed using a 5-point Likert scale (see Figure 4.1). The Likert scale asks respondents to rate their level of agreement with statements ranging from

strongly disagree to strongly agree. Polit and Beck (2004, p. 356) provide a review of Likert-scale surveys reporting that these tools consist "of several declarative items that express a viewpoint on a topic". Polit and Beck (2004) go on to report that scores provided through a Likert scale can provide insights regarding the respondent's attitude and can illuminate underlying patterns of behaviour. In keeping with the positivist trend in research, the Likert scale provides the researcher with an explicit tool which ensures that objectivity is retained. Through the use of the Likert scale, the respondent is provided with a clear foundation for expressing opinion without the interference or interpretation of the researcher. The Likert scale was selected for the survey instrument because it is commonly used in social research, and provides data in a form similar to an interval scale (Punch, 2005, 91).

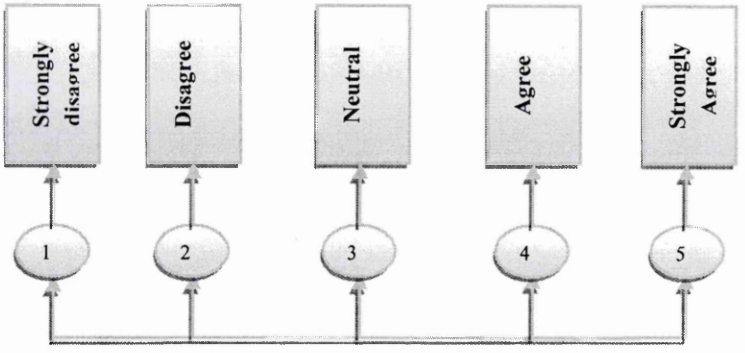


Figure 4.1: Likert Scale

4.7 Data collection instrument:

4.7.1 Survey Method:

The survey questionnaire used in the research was developed based on the literature review, which identified variables related to the TAM model and gaps in prior research as discussed in Chapter 3.

The survey questionnaire obtained data across six dimensions consisting of: 1) personal data; 2) Perception; 3) Patronised; 4) Practised; 5) attitude; and 6) prediction of E-Learning. Each dimension was a construct related to the independent and dependent variables of the study. The structure of the survey questionnaire consisted of six sections. The first section obtained demographic information about the respondents. Each of the remaining five sections obtained data relevant to the constructs tested by the hypotheses of the study.

The first section of the survey questionnaire consisted of four questions concerning personal information related to the demographic construct in the study. This personal information was necessary to establish whether a respondent could be categorized as a student, a staff member, or an administrator. It also provided additional demographic information to determine if demographic variables modify acceptance of E-Learning.

The second section of the survey questionnaire consisted of 14 questions obtaining data in the dimension of perception, which is a construct involving the perceived usefulness of and perceived ease of use of E-Learning. The 14 questions were adopted from Davis (1989). Questions 1, 2, 3, 4, 5, 8, 10, 11, and 14 were slightly modified to meet the investigation goal, while the rest of the questions were left alone. The questions were to elicit the perceptions of individuals of the usefulness and the ease of use influencing the adoption of

the technology. In the TAM model, the construct is also an antecedent variable for attitude, which influences the intention to adopt E-Learning.

The third section of the survey questionnaire consisted of 10 questions obtaining data in the dimension of Patronised. Five of these questions were adopted from Bhattacherjee & Hikmet (2008): these are questions 15, 16, 17, 18, and 24. The rest were constructed from the literature. This construct measures the respondent's Patronised (degree of support) for technology adoption from structures in place in the learning environment. Adequacy of the support structures theoretically influences the intention to adopt E-Learning. The Patronised is also an antecedent variable influencing attitude towards E-Learning.

The fourth section of the survey questionnaire used 10 questions to obtain data from the respondents for the construct of Practised; all these questions were constructed from previous literature. This construct examines the previous use of the technology by the respondents and the degree to which the technology is used. The construct is based on the assumption that previous use of a technology increases familiarity and competency, which facilitate willingness to use the technology in new applications. The construct of Practised influences the intent to adopt E-Learning, and is an antecedent variable influencing attitude towards E-Learning.

The fifth section of the survey questionnaire contained 10 questions intended to obtain data from the respondents about the construct of attitude. Questions 35 and 36 were adopted from Marie-Louise L. Jung, Karla Loria, Rana Mostaghel, and Parmita Saha (2008) and, slightly modified; questions 37, 38, and 39 were adopted from Pei-Chen Sun, Ray J. Tsai, Glenn Finger, Yueh-Yang Chen, and Dowming Yeh (2008). Questions 40 and 41 were adopted from H. Mahdizadeh, HBiemans, and M. Mulder, (2008), and questions 42, 43,

and 44 were adopted from Ahmed Gad Abdel-Wahab, (2008). In the theoretical model, attitude towards E-Learning has a significant influence over the intention to adopt E-Learning. The inclusion of the construct in the survey questionnaire is intended to obtain sufficient data to test the effect of the antecedent variables of Perception, Patronised and Practised on Attitude and to test the effect of attitude for the prediction of E-Learning.

The final section of the survey questionnaire consisted of 10 questions to assess the prediction of E-Learning, which is the dependent variable of the study all theses questions were constructed from the literature. The construct involves the claim that the respondents will adopt E-Learning at some point in the future, and is a measure of the respondents' intention. In the theoretical TAM model, the independent variables of Perception, Patronised, Practised and Attitude influence the dependent variable of prediction.

4.7.2 Sample

The decision to conduct the research in Jordan was based on the absence of a significant amount of research investigating E-Learning in that nation. In addition, the researcher has a personal interest in higher education and the growth of E-Learning in this nation. Jordan can be considered typical of the educational and E-Learning environment in developing nations in the Middle East.

The study population for this investigation consisted of students, staff and administrators at Al-Balaqa Applied University. The university was established in 1996 under the direction of His Majesty King Hassan. Al-Balaqa Applied University was selected for the research because of its size and diversity. It is a public university operating 10 college universities and four community colleges in Jordan. Because of the extent of its operations, Al-Balaqa Applied University is the second largest university in Jordan in terms of both student

population and total staff members. The university has 29,671 students enrolled in all of its programs. Of this group 62% of students are male and 38% are female. The university also employs 1,152 educational staff members, which are 73.5% male and 26.5% female. The size of the study population as well as the diversity of the student population and staff supports the ability to generalize the findings.

A random sampling approach was used to identify participants in the study. The total population of Users and Providers combined is 30823. As recommended by Kothari (2008, p.155) the central limit theorem was applied to determine the appropriate sample size required to achieve the desired confidence level and a confidence interval of 5 upon the assumption of a normal distribution of the population. To determine the sample size the following formula was applied $n = (pqN)/(SE^2 \times N + p + q)$ in which p is the population with the attribute under investigation, q is 1-p, N is the total population and SE is the standard error. For normal distributions p is set at 0.5, and for a confidence level of 95%, the standard error is set at 0.05/1.95 = 0.02564 Substituting these values in to the equation to obtain the desired target sample size:

$$n = \frac{0.5 \times 0.5 \times 30823}{(0.02564^2 \times 30823) + (0.5 \times 0.5)} = 376.$$

The target sample size for both Users and Providers was 376, which was necessary to obtain a confidence interval of 5 at a confidence level of 95%. The actual sample size for Users and Providers was sufficient to meet this sample size objective ($n = 626$).

4.7.3 The analysis of data

The data analysis used multiple regression analysis and regression analysis to test the relationships among the independent and dependent variables of the study. The data

provided by the respondents was initially prepared for coding and analysis using the recommendations of Church and Waclawski (1998, p. 111). The data was then used to test the hypotheses of the study.

The partial least squares approach was used to test the theoretical model of the study. This approach was intended to test the relationships between observed and latent variables for the overall model. The specific method analytic method used structural equation modelling supplemented with the coefficient of determination (R^2) as the measure of goodness of fit. The approach is intended to assess the amount of variation in the dependent variable of prediction of E-Learning accounted for by the variables in the model. The partial least squares approach for model testing is appropriate for use with complex models with many latent variables because it reflects the covariance between the predictor and response variables in the model (Hill & Lewicki, 2006, p. 396).

The hypothesis testing used various forms of regression analysis depending on the nature of the hypothesis. Stepwise regression analysis was used for hypothesis H1, which was intended to identify the variable that makes the largest contribution to R^2 to ensure that important independent variables are not omitted from the model. Multiple linear regression analysis was used to test hypotheses H2, H3, and H7 to identify the variance that can be accounted for by interaction among the variables. Multiple regression analysis is appropriate for analysis of models in which several independent variables can exert an influence on the dependent variable (Pedhauzer & Schmelkin, 1991, p. 414.) The remaining hypotheses were analysed using single linear regression. The analysis also included testing for the underlying assumptions of regression analysis to ensure that the conclusions drawn about the relationships among the data are correct (Allison, 1999, p. 52). The underlying assumptions are inherent in the model and include: linearity, homoscedasticity, normality

of residuals, and residual independence, with multicollinearity an assumption in the stepwise and multiple linear regression analysis. For all analyses, the significance level was set at $p < .05$.

4.7.4 Reliability and validity

Cronbach's alpha was used to assess the reliability of the survey instrument. Cronbach's alpha is appropriate for assessing reliability when the scale used on a test instrument has multiple choices, as is the case with a Likert scale (Gliner & Morgan, 2000, p. 316). Cronbach's alpha assesses inter-item reliability, with an alpha of .70 or higher generally considered acceptable for instruments measuring perceptions or attributes in the subject population.

Internal validity was established by controlling for confounding variables to ensure that the variation measured in the independent variables has a relationship to the variation identified in the dependent variable (Schwab, 2004, p. 14). Factor analysis was used to assess the construct validity of the survey questionnaire, which is a component of internal validity. Factor analysis verifies the number of underlying dimensions in the instrument and the pattern of item-factor relationships, which is an assessment of internal validity (Brown,. 2006, p. 475). It is appropriate for use with instruments containing multiple constructs and factors related to the constructs.

External validity examines whether the research methodology supports the ability to generalize the findings of the study to a larger population. The use of a large sample selected by random sampling methods established the external validity of the study (Gliner & Morgan, 2000, p. 159). A record was also made of the response rate of individuals

solicited for participation in the study to assess the effect of self-selection bias on external validity.

4.7.5 Limitation of the methodology

Methodology has an inherent limitation from researcher bias, which can influence the research design, data collection approach and conclusions drawn from the analysis of the data. The use of a quantitative approach increases objectivity and reduces the effect of researcher bias on the study. Nonetheless, the preconceived views and opinions of the researcher may have influenced critical elements of the research design such as hypothesis formulation and survey questionnaire content. An additional limitation of the methodology is the possibility that testing bias influenced the responses of the respondents providing data with the survey questionnaire. Testing bias occurs when the respondents are aware they are in a testing situation and provide information that is not accurate or candid. While the use of a large sample reduces the effect of testing bias on the findings, it remains as a limitation of the methodology.

Another limitation of the methodology is the research design that established boundaries for the investigation to predefined variables. Because the research was confined to the investigation of specified variables, the possibility exists that confounding variables not accounted for in the research design influenced the findings. The effect of confounding variables may not be fully revealed by instrument assessments such as factor analysis.

4.8 Ethical Considerations

With regard to the specific ethical considerations which were developed through this research, it is important to note that the central ethical issues included both confidentiality

in obtaining results as well as accurate representation of the research study to participants. Considering first the issue of confidentiality, Thomas and Hersen (2003) argue that steps must be taken to ensure that the identity of subjects is protected. Confidentiality provides subjects with a degree of confidence that personal attitudes will not be exposed. Steps taken in this research to ensure the protection of anonymity included the removal of all identifying personal information on the surveys.

Considering next the issue of accurate representation of the research to subjects, Thomas and Hersen (2003) argue that honesty in presenting information is essential to ensure that subjects respond appropriately to efforts to elicit information. This issue was addressed through the development of a cover letter attached with all research questionnaires. The cover letter included information regarding the research, the intent of the research and the protection of confidentiality through the research process. This information was considered to be essential for ensuring that ethical standards for research were met while it provided respondents with a clear understanding of the research being undertaken.

4.9 Summary

The current chapter establishes the theoretical framework for the development of the research methodology. As demonstrated in this chapter, the research framework used is one which focuses primarily on a deductive approach and is carried out through the use of a quantitative (Likert) survey. Given the specific focus of the research—i.e. assessing stakeholder attitudes towards ICT in the adoption of E-Learning in higher education—this type of research methodology was judged to best suit the particular research subject. Descriptive analysis will be used to asses the demographic data while Factor analysis will

be applied to justify the validity of the instrument. However, regression will be used to examine the model-fit and the relationships among the variables.

Chapter 5 : Descriptive data and factor analysis

5.1 Introduction

The purpose of this chapter is to analyze the data collected to test the hypothesis presented in chapter three. This chapter will focus on both Users' and Providers' Attitudes towards the adoption of E-Learning within the context of higher education in Jordan. This analysis is divided in to four stages:

- Stage 1: Preparation of the data (presented in section 5.2).
- Stage 2: Descriptive statistics (presented in section 5.3).
- Stage 3: Exploratory factor analysis (presented in section 5.4)
    1. Part (1): Exploratory factor analysis for Users and Providers as a composite group (presented in section 5.4.1)
    2. Part (2): Comparison of Principle components Analysis for three sets of stakeholders (presented in section 5.4.2).
- Stage 4: Confirmatory Factor Analysis (Presented in section 5.5).

5.2 Stage1: Data Preparation

The data was prepared and analysed through the use of SPSS (Statistical Package for Social Science) version 16. The method used to prepare the data for analysis followed the recommendations of Church and Waclawski (1998, p. 111) of using four steps involving coding, entry of the data into a database, data cleaning, and identifying missing responses in the data.

The specific method used in the initial step for coding relied on the pre-coded nature of the survey questionnaire, which established pre-defined coding categories for the data. This stage included a visual inspection of the data to ensure that the data provided was legible and did not include multiple responses to the same question. The entry of data to a database was performed manually. According to Edwards (1997, p. 106), data cleaning is "the process of checking the data to see if they were entered accurately, checking errors, and rectifying inconsistent responses". Following the recommendations of Edwards (1997, p. 107), the first stage of data cleaning examined the data for accuracy using frequencies and out-of-range responses. Any questionnaires identified with anomalous frequencies or an out-of-range response was re-examined to ensure the data had been entered accurately into the database. In the second stage of data cleaning, the data were examined for inconsistencies such as duplicate answers to the same questions. Surveys with duplicate answers to the same question were excluded from the data analysis. The final step in the preparation of the data for analysis involved identifying missing responses. The analysis of missing responses indicated that they were less than 1% of the data, with the surveys completed by respondents with missing data deleted from the analysis file.

5.3 Stage 2: Descriptive statistics, Providers and Users:

The survey questionnaires were disseminated to 850 participants meeting the requirements for inclusion in the study and selected through random sampling methods within Al-balqa Applied University. The participants returned a total of 645 questionnaires, 19 of which were not usable for the study because of missing response items. As a result, the total number of usable surveys for data analysis was 626. The 626 usable questionnaires represent a 74.6% return rate, which is satisfactorily above the 70% response rate considered adequate to minimize the effect of self-selection bias on the findings (Fink,

2003, p. 42). Self-selection bias occurs when a large percentage of the study population declines to participate in a survey, which raises the possibility that a confounding variable influences the decision to participate or not to participate in the study. Among the 626 usable questionnaires, 380 were Users, which represents 59% of the sample distribution, and 246 were Providers, of whom 200 were educators and 46 were senior managers, which represents 41% of the sample distribution.

The data provided by the participants was analysed by the frequency distribution; this is useful for showing the number and percentage of participants in each demographic variable based on the scale of measurement used in the survey questionnaire (Gravetter & Forzano, 2009, p. 409).

5.3.1Gender:

From Table 5.1 it is evident that the ratio of male to female in the total sample was 2:1 whilst the ratio of Users to Providers was 3:2. Moreover, the ratio of male to female for Users was much closer together, representing a third and quarter of the population; however the ratio was significantly different for Providers in that the females represent less than one tenth of the population. This clearly shows an over-representation of male Providers, but was expected, as it is in line with the fact that there are presently more male teachers in Jordan's higher education system, as indicated in Al-Balaq Applied University (2006) yearly report.

			Gender		
			MALE	FEMALE	Total
Type	Users	Count	221	159	380
		% within Type	58.2%	41.8%	100.0%
		% of Total	35.3%	25.4%	60.7%
	Providers	Count	193	53	246
		% within Type	78.5%	21.5%	100.0%
		% of Total	30.8%	8.5%	39.3%
Total		Count	414	212	626
		% within Type	66.1%	33.9%	100.0%
		% of Total	66.1%	33.9%	100.0%

Table 5-1: Gender frequencies for both Users and Providers.

5.3.2 Age:

From Table 5.2 it is evident that the ratio of Users to Providers in the sample was 3:2. Not surprisingly, four fifths of the Users (in our case, students), were under the age of 25, whilst all the Providers (teachers and managers) were over the age of 25. The Providers in the age range 26-35 accounted for half of the Providers' population and the remainder were over 35 years of age.

		Age					
		Less than 25	26-35	36-45	46-55	OVER 55	Total
Type Users	Count	305	75	0	0	0	380
	% within Type	80.3%	19.7%	.0%	.0%	.0%	100.0%
	% of Total	48.7%	12.0%	.0%	.0%	.0%	60.7%
Providers	Count	0	136	64	35	11	246
	% within Type	.0%	55.3%	26.0%	14.2%	4.5%	100.0%
	% of Total	.0%	21.7%	10.2%	5.6%	1.8%	39.3%
Total	Count	305	211	64	35	11	626
	% within Type	48.7%	33.7%	10.2%	5.6%	1.8%	100.0%
	% of Total	48.7%	33.7%	10.2%	5.6%	1.8%	100.0%

Table 5-2: Age frequencies for both Users and Providers.

5.3.3 Roles

From Table 5.3 it is evident that, whilst there were more students, the ratio of students to teachers and administrators from the total population was about 3:2. Moreover, whilst there were more teachers, the ratio of teachers to administrators was about 4:1 of the Providers' sample population.

		Position			
		STUDENT	STAFF	ADMINISTRATOR	Total
Type Users	Count	380	0	0	380
	% within Type	100.0%	.0%	.0%	100.0%
	% of Total	60.7%	.0%	.0%	60.7%
Providers	Count	0	200	46	246
	% within Type	.0%	81.3%	18.7%	100.0%
	% of Total	.0%	31.9%	7.3%	39.3%
Total	Count	380	200	46	626
	% within Type	60.7%	31.9%	7.3%	100.0%
	% of Total	60.7%	31.9%	7.3%	100.0%

Table 5-3: Position frequencies for both Users and Providers.

5.3.4 Computer experience

The frequency analysis of the nominal data related to the length of computer experience indicates that over four fifths of Users had between one and five years of computer experience. In contrast, the majority of the Providers indicate that nearly two thirds had more than six years of computer experience.

			COMPUTEREXP			
			1-5	6-10	11-15	Total
Type Users		Count	322	58	0	380
		% within Type	84.7%	15.3%	.0%	100.0%
		% of Total	51.4%	9.3%	.0%	60.7%
	Providers	Count	87	136	23	246
		% within Type	35.4%	55.3%	9.3%	100.0%
		% of Total	13.9%	21.7%	3.7%	39.3%
Total		Count	409	194	23	626
		% within Type	65.3%	31.0%	3.7%	100.0%
		% of Total	65.3%	31.0%	3.7%	100.0%

Table 5-4: Computer experience frequencies for Users and Providers

Clearly the difference between Users and Providers relating to gender, age, and experience is to be expected because the older and more experienced presently dominate the provider stakeholders (Teacher, administrators) whereas younger and less experienced respondents are more likely to be students. This reflects the stakeholders of the respondents in Jordan and at Al-Balaq Applied University (2007).

5.4 Stage 3: Exploratory Factor Analysis

Exploratory factor analysis is used in this investigation to establish instrument validity. Factor analysis is based on the assumption that the most valid indicators have the greatest commonality and therefore will appear in clusters that should appear in the final instrument (Black, 1999, p. 299). However, the reliability for the instrument was established using Cronbach's alpha, which is a measure of the internal consistency of the instrument. Cronbach's alpha estimates the true score variance captured by the items in the scale by comparing the sum of the item variance with the variance of the sum of the scale (Hill & Lewicki, 2006, p. 461). A Cronbach's alpha result of 0.70 or higher is generally considered

to show adequate reliability for instruments used to gather psychometric data (Dunn-Ranking, 2004, p. 118). The analysis of the data with Cronbach's alpha indicated that the instrument was reliable for each of the five scales Perception, Patronised, Practised, Attitude, and Prediction of E-Learning. Table 5.5 shows Cronbach's alpha for the instrument scales.

Scales	Cronbach Alpha	N. of Items
Perception	0.891	14
Patronised	0.937	10
Practised	0.866	10
Attitude	0.877	10
E-learning Prediction	0.901	10
Total		54

Table 5-5: Reliability coefficients of scales (Cronbach's Alpha)

The validity of the scale was assessed using exploratory factor analysis, which is used to verify the number of underlying dimensions in the instrument and the pattern of item-factor relationships (Brown,. 2006, p. 475). The exploratory factor analysis determined whether the questions in the instrument loaded on the same factor in the relevant dimensions, and assessed whether items should be eliminated from the scale because they obtained data or loaded in more than one factor. The exploratory factor analysis was based on the general linear model (GLM) assumptions of linear relationships among interval data, low multicollinearity, and normalcy in the multivariate distribution to support testing of statistical significance. The exploratory factor analysis approach is suitable when the objective is to demonstrate the dimensionality of a measurement scale that responds to clearly separate constructs (Colton & Covert, 2007, p. 72)

The factorability of the instrument in the exploratory factorability was determined for each of the five scales related to Perception, Patronised, Practised, Attitude and E-learning Prediction. The inter-item correlations were determined using the coefficient of correlation, with the threshold correlation for the questions in the survey instrument set at 0.30. The Kaiser-Myer-Oklin (KMO) test of sample adequacy was also used, with a threshold for acceptance of the validity of the instrument set at 0.5. The KMO test examines the magnitude of the observed correlation coefficients compared to the partial correlation coefficients to determine whether factor analysis is an adequate test of reliability. Bartlett's test of Sphericity was used to ensure that the factor analysis was statistically significant. Bartlett's test determines the sums of the products and cross-products in the correlation matrix to ensure that the variables do not exhibit multicollinearity. The factor analysis also examined the total amount of variance explained by the individual items in each dimensional scale using eigenvalues, which represent the amount of variance in all items in the scale that can be explained by the principle component of the factor (Pett, Lackey, & Sullivan, 2003, p. 91). A scree plot providing a graphical display of the eigenvalues as the Y axis and the test components as the X axis provides an indication of the items that should be eliminated from the scale based on the rate of decline in the eigenvalues (Bacharach & Furr, 2007, p. 74).

5.4.1 Part (1): Exploratory factor analysis for Users and Providers as a composite group

The main purpose of this investigation was to analyse the Users and Providers as demonstrating stakeholders' Attitude towards the adoption of E-Learning in higher education in Jordan. We included in this investigation five key factors that influence the adoption of E-Learning. These factors are Perception, Patronised, Practised, Attitude, and

Prediction of E-Learning. To ensure and confirm the validity of the five key factors exploratory factor analysis was applied.

5.4.1.1 Perception:

Questions 1 through 14 in the survey instrument were related to the scale Perception. The correlation coefficients for the questions indicated that questions 11, 12, 13, and 14 should be eliminated from the instrument because the correlation was less than the threshold value of 0.30. Table 5.6 shows the correlation matrix for the provider/user responses in for the Perception scale.

Correlation Matrix[a]

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14
Correlation Q1	1.000	.384	.406	.352	.415	.370	.383	.336	.348	.342	**.224**	**.136**	.347	.578
Q2	.384	**1.000**	**.392**	.451	.415	.372	.513	.444	.379	.344	.407	**.223**	.341	.496
Q3	.406	.392	1.000	.338	.373	.361	.383	.378	.425	.365	.310	**.205**	.243	.456
Q4	.352	.451	.338	1.000	.444	.441	.450	.359	.359	.376	.396	**.193**	.315	.438
Q5	.415	.415	.373	.444	1.000	.397	.409	.364	.432	.362	.389	**.140**	.364	.449
Q6	.370	.372	.361	.441	.397	1.000	.439	.450	.336	.338	**.283**	**.189**	.318	.453
Q7	.383	.513	.383	.450	.409	.439	1.000	.545	.422	.389	.358	**.183**	.416	.486
Q8	.336	.444	.378	.359	.364	.450	.545	1.000	.470	.334	.346	**.210**	.405	.476
Q9	.348	.379	.425	.359	.432	.336	.422	.470	1.000	.499	.479	**.173**	.440	.469
Q10	.342	.344	.365	.376	.362	.338	.389	.334	.499	1.000	.468	**.279**	.409	.399
Q11	.224	.407	.310	.396	.389	.283	.358	.346	.479	.468	1.000	**.230**	.371	.368
Q12	.136	.223	.205	.193	.140	.189	.183	.210	.173	.279	.230	1.000	**.295**	**.253**
Q13	.347	.341	.243	.315	.364	.318	.416	.405	.440	.409	.371	.295	1.000	.479
Q14	.578	.496	.456	.438	.449	.453	.486	.476	.469	.399	.368	.253	.479	1.000

Table 5-6: Correlation matrix for provider and user Perception

Because four questions should be eliminated from the Perception scale due to insufficient correlation, the correlation matrix was revised to reflect the ten questions remaining in the

instrument in this scale. Table 5.7 presents the correlation matrix for the revised instrument for the dimension of Perception.

Correlation Matrix[a]

		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
Correlation	Q1	1.000	.384	.406	.352	.415	.370	.383	.336	.348	.342
	Q2	.384	1.000	.392	.451	.415	.372	.513	.444	.379	.344
	Q3	.406	.392	1.000	.338	.373	.361	.383	.378	.425	.365
	Q4	.352	.451	.338	1.000	.444	.441	.450	.359	.359	.376
	Q5	.415	.415	.373	.444	1.000	.397	.409	.364	.432	.362
	Q6	.370	.372	.361	.441	.397	1.000	.439	.450	.336	.338
	Q7	.383	.513	.383	.450	.409	.439	1.000	.545	.422	.389
	Q8	.336	.444	.378	.359	.364	.450	.545	1.000	.470	.334
	Q9	.348	.379	.425	.359	.432	.336	.422	.470	1.000	.499
	Q10	.342	.344	.365	.376	.362	.338	.389	.334	.499	1.000

Table 5-7: Correlation matrix for revised provider and user Perception

The KMO test was well above the threshold of 0.50, indicating that factor analysis is an appropriate determinant for the validity of the instrument in the Perception scale. Bartlett's test was statistically significant, indicating that the correlations in the matrix are not due to sampling error. Table 5.8 contains the results for the KMO test and Bartlett's test for Perception, which indicates that the values are suitable for factor analysis.

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.917
Bartlett's Test of Sphericity	Approx. Chi-Square	2034.737
	df	45
	Sig.	.000

Table 5-8: KMO and Bartlett's Test for provider/user Perception

The analysis of the eigenvalues, as shown in Table 5.9, indicated that the first component accounts for the greatest amount of variance in the ten items remaining in the provider/user

Perception scale (eigenvalue = 4.585). The scree plot for the Perception scale, as shown in Figure 5.1, also identified only one component accounting for the majority of variance.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.584	45.841	45.841	4.584	45.841	45.841
2	.817	8.173	54.014			
3	.758	7.576	61.590			
4	.699	6.995	68.585			
5	.639	6.394	74.978			
6	.590	5.904	80.882			
7	.579	5.790	86.672			
8	.478	4.777	91.450			
9	.456	4.557	96.006			
10	.399	3.994	100.000			

Extraction Method: Principal Component Analysis.

Table 5-9: Total Variance Explained for provider/user Perception

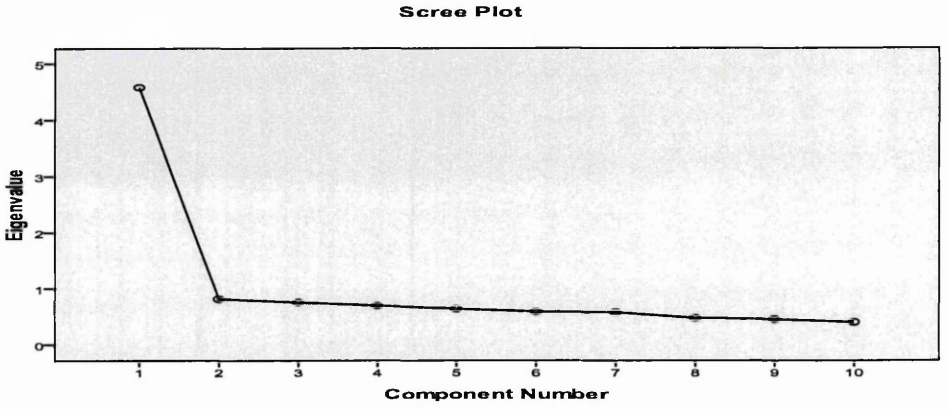


Figure 5.1: Providers' and Users' Perception Scree plot

Factor loading of the scale items in the Perception scale was also examined. A factor loading of 0.4 or lower is generally considered low because these items account for only a small percentage of the variance (Pedhazur & Schmelkin, 1991, p. 67). Items with a factor loading of 0.4 or lower should be eliminated from the instrument. The analysis of the factor

loading for the components of the Perception scale found no values below 0.4, with the findings shown in Table 5.10.

Component Matrix[a]

	Component
	1
Q7	.738
Q2	.698
Q8	.697
Q9	.691
Q5	.681
Q4	.676
Q6	.664
Q3	.649
Q10	.637
Q1	.634

1 component extracted.

Table 5-10: Factor loading for *provider/user* Perception

The finding shows that Perception was extracted as a single component. Perception explains nearly half (45.8%) of the total variance which validates the use of this component in the E-Learning model.

5.4.1.2 Patronised:

Questions 15 through 24 of the survey instrument were related to the Patronised scale, which refers to the degree of support. The analysis of the factors related to the Patronised scale did not result in the elimination of any questions from the survey instrument. The correlation matrix, as shown in Table 5.11, indicates all the values for the questions related to the Patronised scale had correlations above 0.30.

Correlation Matrix[a]

	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24
Correlation Q15	1.000	.700	.706	.601	.682	.651	.660	.588	.530	.478
Q16	.700	1.000	.669	.695	.656	.672	.633	.710	.655	.562
Q17	.706	.669	1.000	.691	.692	.640	.632	.564	.545	.531
Q18	.601	.695	.691	1.000	.645	.610	.591	.565	.605	.572
Q19	.682	.656	.692	.645	1.000	.748	.625	.531	.489	.438
Q20	.651	.672	.640	.610	.748	1.000	.685	.540	.465	.486
Q21	.660	.633	.632	.591	.625	.685	1.000	.571	.453	.465
Q22	.588	.710	.564	.565	.531	.540	.571	1.000	.745	.540
Q23	.530	.655	.545	.605	.489	.465	.453	.745	1.000	.528
Q24	.478	.562	.531	.572	.438	.486	.465	.540	.528	1.000

Table 5-11: Correlation matrix for provider/user Patronised (degree of support)

The KMO test produced a value of 0.934, which was well above the threshold of 0.50 and indicated that factor analysis is an appropriate determinant for the validity of the instrument in the Perception scale. Bartlett's test was statistically significant, indicating that the correlations in the matrix are not due to sampling error. Table 5.12 contains the results for the KMO test and Bartlett's test for the Patronised scale of the instrument, indicating that the values are suitable for factor analysis.

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.934
Bartlett's Test of Sphericity	Approx. Chi-Square	4597.010
	df	45
	Sig.	.000

Table 5-12: KMO and Bartlett's Test for provider/user Patronised

The eigenvalues for the Patronised scale as shown in Table 5.13 indicate that one component accounts for the greatest amount of variance in the ten items in the instrument (eigenvalue = 6.430). The scree plot for the Patronised scale as shown in Figure 5.2 also identified only one component accounting for the majority of variance.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.430	64.295	64.295	6.430	64.295	64.295
2	.865	8.647	72.942			
3	.556	5.562	78.505			
4	.449	4.494	82.998			
5	.385	3.846	86.844			
6	.352	3.523	90.367			
7	.292	2.916	93.283			
8	.248	2.476	95.760			
9	.226	2.261	98.021			
10	.198	1.979	100.000			

Extraction Method: Principal Component Analysis.

Table 5-13: Total Variance Explained for provider/user Patronised

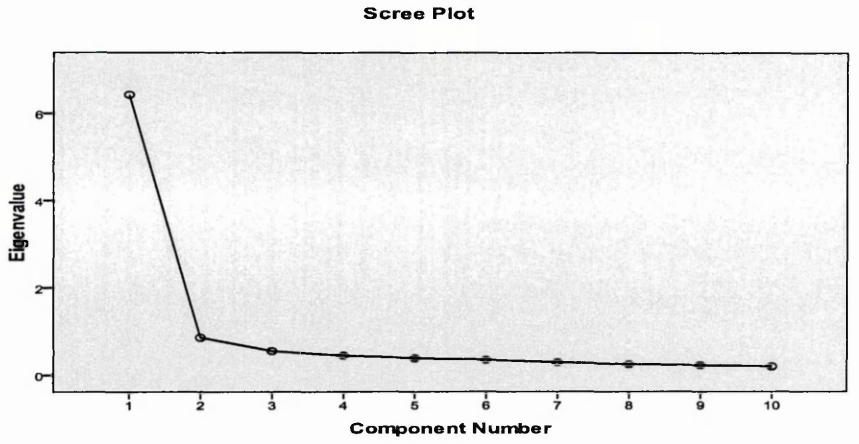


Figure 5.2: Provider/User Patronised scree plot

The analysis of the factor loading for the components of the Patronised scale found no values below 0.4, with the findings shown in Table 5.14.

Component Matrix[a]

	Component
	1
Q16	.871
Q17	.836
Q15	.827
Q18	.822
Q19	.817
Q20	.814
Q22	.791
Q21	.790
Q23	.746
Q24	.689

Extraction Method: Principal Component Analysis.

a. 1 component extracted.

Table 5-14: Factor loading for Patronised

As mentioned before, Patronised was proposed earlier as a key factor in this study. The above results reveal that Patronised was also clustered in one single component, with a total variance explained 64.3% that is presented by the Patronised factor. This implies that this component is a valid construct in the E-Learning model.

5.4.1.3 Practised:

Questions 25 through 34 of the instrument were related to the Practised scale, which examined the previous use of technology among the study participants. The factor analysis resulted in the elimination of questions 27, 29, 30, and 33 from the instrument because they had correlations below 0.3. Table 5.15 shows the correlation matrix for the instrument for all questions in the Practised scale.

Correlation Matrix[a]

	Q25	Q26	Q27	Q28	Q29	Q30	Q31	Q32	Q33	Q34
Correlation Q25	1.000	.405	**.246**	.514	.594	**.234**	.499	.518	.258	.490
Q26	.405	1.000	.470	.410	.382	.453	.420	.447	.470	.395
Q27	.246	.470	1.000	.311	**.253**	.544	.323	.364	.510	.290
Q28	.514	.410	.311	1.000	.660	.280	.572	.565	.302	.569
Q29	.594	.382	.253	.660	1.000	.316	.609	.568	**.264**	.583
Q30	.234	.453	.544	.280	.316	1.000	.324	.379	.527	.301
Q31	.499	.420	.323	.572	.609	.324	1.000	.610	.360	.630
Q32	.518	.447	.364	.565	.568	.379	.610	1.000	.387	.585
Q33	.258	.470	.510	.302	.264	.527	.360	.387	1.000	.350
Q34	.490	.395	.290	.569	.583	.301	.630	.585	.350	1.000

Table 5-15: Correlation matrix for provider/user Practised

After the elimination of the questions from the instrument, a revised correlation matrix was analysed to ensure that the remaining questions had a correlation of 0.30 or higher, which is shown in Table 5.16.

Correlation Matrix[a]

		Q25	Q26	Q28	Q31	Q32	Q34
Correlation	Q25	1.000	.405	.514	.499	.518	.490
	Q26	.405	1.000	.410	.420	.447	.395
	Q28	.514	.410	1.000	.572	.565	.569
	Q31	.499	.420	.572	1.000	.610	.630
	Q32	.518	.447	.565	.610	1.000	.585
	Q34	.490	.395	.569	.630	.585	1.000

Table 5-16: Correlation matrix for revised provider/user Practised

As shown in Table 5.17, the KMO test had a value of 0.894, indicating sufficient sample adequacy, and Bartlett's test was highly significant, with the values suitable for factor analysis.

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.894
Bartlett's Test of Sphericity	Approx. Chi-Square	1518.662
	df	15
	Sig.	.000

Table 5-17: KMO and Bartlett's Test for provider/user Practised

The eigenvalues for the Practised scale indicated that one component accounted for the greatest amount of variance in the ten items in the instrument (eigenvalue = 3.562), with the eigenvalues and explained variance shown in Table 5.18. The scree plot for the Patronised scale, shown in Figure 5.3, also indicated that only one component accounted for the majority of variance, which was above the elbow of the plot.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.562	59.362	59.362	3.562	59.362	59.362
2	.673	11.214	70.576			
3	.545	9.085	79.661			
4	.445	7.419	87.080			
5	.410	6.829	93.909			
6	.365	6.091	100.000			

Extraction Method: Principal Component Analysis.

Table 5-18: Total Variance Explained for provider/user Practised

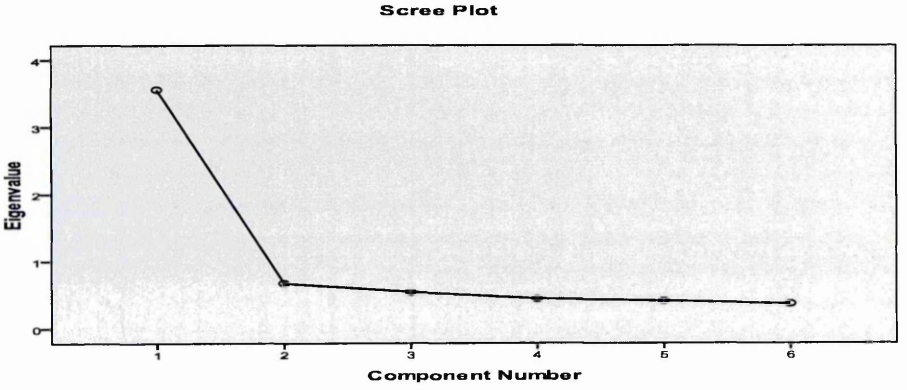


Figure 5.3: Provider/User Practised scree plot

The analysis of the factor loading for the components of the Patronised scale found no values below 0.4, with the findings shown in Table 5.19.

Component Matrix[a]

	Component
	1
Q31	.817
Q32	.814
Q34	.803
Q28	.792
Q25	.738
Q26	.643

Extraction Method: Principal Component Analysis.

Table 5-19: Factor loading for user/ provider Practised

As proposed before, Practised is the third key component in the model. The above results shows that after the elimination of questions 27, 29, 30, and 33, the rest of the questions were grouped together in one single component with a total variance explained nearly 60% of the proposed key factor Practised, which implies that this component is a valid construct in the E-Learning model.

5.4.1.4 Attitude:

The Attitude scale in the survey questionnaire involved questions 35 to 44. The correlation matrix analysis resulted in the elimination of questions 42 and 44 because of insufficient correlation, as shown in Table 5.20. The revised correlation matrix without these two questions is shown in Table 5.21.

Correlation Matrix[a]

		Q35	Q36	Q37	Q38	Q39	Q40	Q41	Q42	Q43	Q44
Correlation	Q35	1.000	.410	.458	.428	.467	.507	.542	.345	.401	**.247**
	Q36	.410	1.000	.526	.381	.194	.520	.587	**.234**	.338	**.216**
	Q37	.458	.526	1.000	.515	.314	.588	.869	**.299**	.452	**.284**
	Q38	.428	.381	.515	1.000	.445	.462	.552	**.289**	.452	.373
	Q39	.467	.194	.314	.445	1.000	.380	.397	.423	.433	**.238**
	Q40	.507	.520	.588	.462	.380	1.000	.688	.398	.542	.311
	Q41	.542	.587	.869	.552	.397	.688	1.000	.366	.550	.317
	Q42	.345	.234	.299	.289	.423	.398	.366	1.000	.492	.262
	Q43	.401	.338	.452	.452	.433	.542	.550	.492	1.000	.406
	Q44	.247	.216	.284	.373	.238	.311	.317	.262	.406	1.000

Table 5-20: Correlation matrix for provider/user Attitude

Correlation Matrix[a]

		Q35	Q36	Q37	Q38	Q39	Q40	Q41	Q43
Correlation	Q35	1.000	.410	.458	.428	.467	.507	.542	.401
	Q36	.410	1.000	.526	.381	.194	.520	.587	.338
	Q37	.458	.526	1.000	.515	.314	.588	.869	.452
	Q38	.428	.381	.515	1.000	.445	.462	.552	.452
	Q39	.467	.194	.314	.445	1.000	.380	.397	.433
	Q40	.507	.520	.588	.462	.380	1.000	.688	.542
	Q41	.542	.587	.869	.552	.397	.688	1.000	.550
	Q43	.401	.338	.452	.452	.433	.542	.550	1.000

Table 5-21: Correlation matrix for revised provider/user Attitude

The KMO test indicated that the sample was adequate for the Attitude scale (KMO = .867) and Bartlett's test indicated that the correlation matrix has significance, as shown in Table 5.22.

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.867
Bartlett's Test of Sphericity	Approx. Chi-Square	2635.088
	df	28
	Sig.	.000

Table 5-22: KMO and Bartlett's Test for provider/user Attitude

The eigenvalues for the Attitude scale indicated that one component accounted for the greatest amount of variance in the ten items in the instrument (eigenvalue = 4.406), with the eigenvalues and explained variance for the scale shown in Table 5.23. The scree plot for the Attitude scale as shown in Figure 5.4 also indicated that only one component accounted for the majority of variance, which was above the elbow of the plot.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.406	55.072	55.072	4.406	55.072	55.072
2	.954	11.930	67.002			
3	.628	7.844	74.846			
4	.580	7.244	82.090			
5	.503	6.292	88.382			
6	.437	5.463	93.845			
7	.379	4.744	98.589			
8	.113	1.411	100.000			

Extraction Method: Principal Component Analysis.

Table 5-23: Total Variance Explained for provider/user Attitude

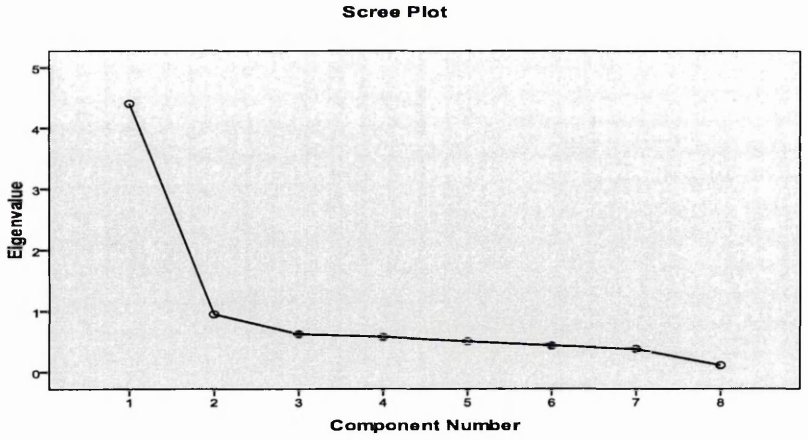


Figure 5.4: Provider/User Attitude scree plot

The analysis of the factor loading for the components of the Attitude scale found no values below 0.4, with the findings shown in Table 5.24.

Component Matrix[a]

	Component
	1
Q41	.896
Q37	.820
Q40	.803
Q38	.711
Q35	.705
Q43	.700
Q36	.671
Q39	.586

Extraction Method: Principal Component Analysis.

a. 1 component extracted.

Table 5-24: Factor loading for user/ provider Attitude

The correlation matrix presented in (Table 5.20) implies that questions 42 and 44 should be eliminated from the study because there correlation significance is lowers than the 0.3. However, the remaining questions were grouped together to form one single component (Attitude) which represents a total variance of 55% in E-Learning model.

5.4.1.5 Prediction:

Questions 45 through 54 of the survey questionnaire were related to the prediction scale. The analysis of the factors related to the Prediction scale did not result in the elimination of any questions from the survey instrument. The finding from the correlation matrix shown in Table 5.25 indicates that the values for the questions in the prediction scale had correlations of 0.30 or higher.

Correlation Matrix[a]

		Q45	Q46	Q47	Q48	Q49	Q50	Q51	Q52	Q53	Q54
Correlation	Q45	1.000	.693	.688	.603	.640	.500	.480	.486	.477	.637
	Q46	.693	1.000	.750	.649	.640	.558	.543	.492	.571	.559
	Q47	.688	.750	1.000	.643	.706	.588	.581	.516	.559	.592
	Q48	.603	.649	.643	1.000	.735	.680	.567	.554	.597	.591
	Q49	.640	.640	.706	.735	1.000	.678	.665	.597	.637	.628
	Q50	.500	.558	.588	.680	.678	1.000	.698	.519	.596	.549
	Q51	.480	.543	.581	.567	.665	.698	1.000	.523	.623	.538
	Q52	.486	.492	.516	.554	.597	.519	.523	1.000	.657	.630
	Q53	.477	.571	.559	.597	.637	.596	.623	.657	1.000	.640
	Q54	.637	.559	.592	.591	.628	.549	.538	.630	.640	1.000

a. Determinant = .001

Table 5-25: Correlation matrix for provider/user Prediction of E-Learning

The KMO measure of 0.934 and the significance of Bartlett's test as shown in Table 5.26 indicate that the data in the prediction scale is suitable for factor analysis.

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.934
Bartlett's Test of Sphericity	Approx. Chi-Square	4524.028
	df	45
	Sig.	.000

Table 5-26: KMO and Bartlett's Test for provider/user Prediction of E-Learning

The eigenvalues for the prediction scale indicated that one component accounted for the greatest amount of variance in the ten items in the instrument (eigenvalue = 6.422), with the eigenvalues and explained variance for the scale shown in Table 5.27. The scree plot for the

Patronised scale as shown in Figure 5.7 also indicated that only one component accounting for the majority of variance, which was above the elbow of the plot. The factor loading as shown in Table 5.28 had no values below .40.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.422	64.217	64.217	6.422	64.217	64.217
2	.782	7.817	72.034			
3	.644	6.435	78.470			
4	.417	4.168	82.637			
5	.397	3.967	86.605			
6	.337	3.369	89.974			
7	.293	2.930	92.905			
8	.269	2.685	95.590			
9	.238	2.379	97.969			
10	.203	2.031	100.000			

Extraction Method: Principal Component Analysis.

Table 5-27: Total Variance Explained for provider/user Prediction of E-Learning

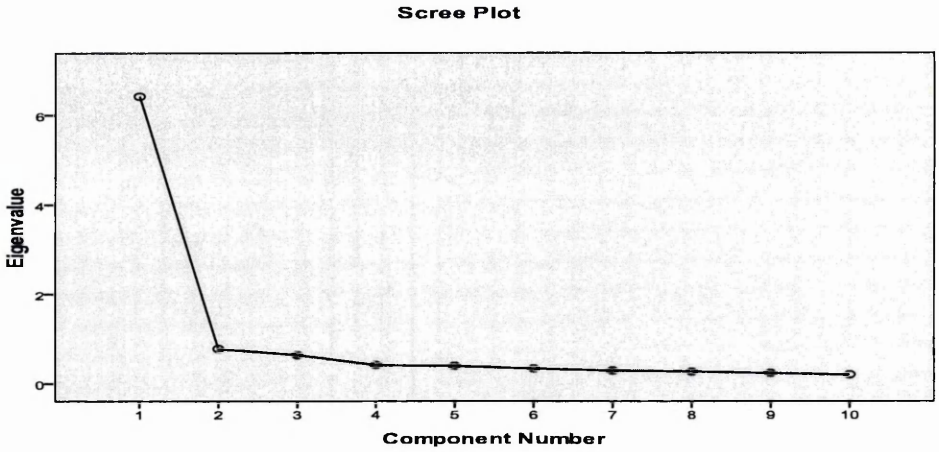


Figure 5.5: Provider/User Prediction of E-Learning scree plot

Component Matrix[a]

	Component
	1
Q49	.868
Q47	.830
Q48	.829
Q46	.808
Q50	.795
Q54	.793
Q53	.792
Q51	.775
Q45	.775
Q52	.741

Extraction Method: Principal Component Analysis.

a. 1 component extracted.

Table 5-28: Factor loading for User/ Provider Prediction of E-Learning

The final key factor in this investigation is Prediction. Prediction is the dependent variable. In this study there was no elimination of any of its related questions. Moreover, all the remaining questions were clustered together to form one single component which explains a total variance of 64%. Therefore, it can be concluded that this component is valid and contributes in the E-Learning model.

A summary of the analysis for the combined stakeholders' (Users and Providers) responses is summarized in Table 5:29

From stage (1) it appears that Users and Providers were demographically different, so we have carried out the same analysis as previously for the Users' and Providers' samples separately. All the analysis is presented in Table 5.30 for Users and Table 5.31 for Providers.

5.4.2 Part (2): Comparison of analysis for Users and Providers separately and Users and Providers combined.

The first table is simply a summary of the previous analysis for both the Users and Providers combined.

Users	Number of Questions in Survey Instrument	KMO & Bartlett's Test	Sig	Total Variance Explained	Factor Loading	Number of Extracted Component
Perception	14	0.917	.000	46%	10	1
Patronised	10	0.934	.000	64%	10	1
Practised	10	0.894	.000	59%	6	1
Attitude	10	0.867	.000	55%	7	1
Prediction	10	0.934	.000	64%	10	1

Table 5-29: Principle component analysis results for Users and Providers combined

Users	Number of Questions in Survey Instrument	KMO & Bartlett's Test	Sig	Total Variance Explained	Factor Loading	Number of Extracted Component
Perception	14	.896	.000	43%	10	1
Patronised	10	.921	.000	69%	10	1
Practised	10	.861	.000	53%	6	1
Attitude	10	.837	.000	57%	7	1
Prediction	10	.927	.000	65%	10	1

Table 5-30: Principle component analysis results for Users:

Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) was applied to check if factor analysis is appropriate for this analysis Users and Providers. Perception, Patronised, Practised, Attitude, and Prediction were tested and showed that the entire component presented in this investigation has a value greater than 0.6 and the Bartlett's test is significant at (p=.000). Therefore, we can argue that all the components are appropriate for factor analysis. Moreover, a Correlation Matrix Table was performed to look for correlation coefficients of 0.3. This test helps the researcher to spot which questions in the instrument should be removed and which could be retained. Looking at Table 5.30, we can see that Patronised and Prediction each started off with 10 items, which were all retained. However, Perception ended up with 10 items out of 14. Practised, on the other hand, started off with 10 items and ended up with a factor loading of 6 items, while Attitude ended up with 7

items. Moreover, all the five components of the study were represented by the retained items with acceptable percentages that explain the variance, as shown in Table 5.30. This demonstrates that all components are valid for investigating stakeholders' Attitude to E-Learning.

Providers	Number of Questions in Survey Instrument	KMO & Bartlett's Test	Sig	Total Variance Explained	Factor Loading	Number of Extracted Component
Perception	**14**	**.924**	**.000**	**49%**	**10**	**1**
Patronised	**10**	**.935**	**.000**	**70%**	**10**	**1**
Practised	**10**	**.913**	**.000**	**69%**	**6**	**1**
Attitude	**10**	**.879**	**.000**	**62%**	**7**	**1**
Prediction	**10**	**.927**	**.000**	**67%**	**10**	**1**

Table 5-31: Factor component analysis results for Providers.

Repeating the same procedures for the Providers, we can conclude from Table 5.31 all the components in this investigation were suitable for exploratory factor analysis because all the components KOM and Bartlett's test exceed 0.5, which is recommended by Kaiser-Myer-Oklin, and all five components Bartlett's test of Sphericity were significant at *P* (0.000). Moreover all the components of Total Variance Explained were over the cut-off point of 0.4 which is recommended by Pedhazur & Schmelkin (1991, p. 67). Accordingly, we can conclude that all the components under investigation are valid.

Applying exploratory factor analysis to our investigation gives the researcher the ability to extract five factors in all the 54 items in the instrument, accounting for Total Variance Explained that exceeded the cut-off point of 0.4, which shows that the instrument that was used for the purpose of this investigation is valid. Moreover, the reliability test was also applied using Cronbach's alpha, which shows that all components exceed 0.7, which is recommended by Dunn-Ranking, (2004) for the instrument to reliable (see Table 5.5).

Comparison of the three tables 5.29, 5.30, and 5.31 shows that whilst the demographic analysis showed a marked difference between Users and Providers, our FA reveals that the

variance of each of the five validated components (Perception, Patronised, Practised, Attitude, and Prediction) are not markedly different for any of the three sets of stakeholders: Users and Providers; Users; and Providers. Therefore, we could take any of the stakeholders to perform further analysis. We chose to consider Users and Providers separately for the next stage of analysis, namely, regression.

5.5 Stage 4: Confirmatory factor analysis

In the previous section we used PCA to explore. However, our literature informs us that Perception, Patronised, Practised, Attitude, and Prediction are potential components, so confirmatory factor analysis, which is used when the scales of the instrument have been validated (Brown, 2006, p.2), was used to verify the number of underlying factors in the instrument and the factor loadings. The Perception, Patronised, Practised, Attitude and prediction scales have been validated, supporting the use of confirmatory factor analysis. The factor loading considered factors with a cut-off point at 0.50. Table 5.32 shows the results of the confirmatory factor analysis, which indicates that all factors remaining in the survey questionnaire were above the cut-off point. Therefore, we can conclude that the instrument is validated and confirmed to be used for further investigation such as regression.

Moreover, Perception, Patronised, Practised, Attitude and Prediction are key factors in explaining the variance in the phenomenon under investigation.

	Perception	Patronised	Practised	Attitude	Prediction
Q7	.736				
Q2	.698				
Q8	.696				
Q9	.708				
Q5	.682				
Q4	.672				
Q6	.650				
Q3	.644				
Q10	.652				
Q1	.616				
Q16		.871			
Q17		.835			
Q15		.827			
Q18		.822			
Q19		.814			
Q20		.813			
Q22		.792			
Q21		.788			
Q23		.746			
Q24		.694			
Q31			.809		
Q32			.803		
Q34			.789		
Q28			.776		
Q25			.730		
Q26			.702		
Q41				.885	
Q37				.802	
Q40				.803	
Q38				.710	
Q35				.706	
Q43				.726	
Q36				.647	
Q39				.610	
Q49					.871
Q47					.832
Q48					.829
Q46					.813
Q50					.790
Q54					.791
Q53					.783
Q51					.767
Q45					.784
Q52					.737

Table 5-32: Factor loading for *user/ provider* Prediction of E-Learning:

5.6 Chapter summary

This chapter consists of four stages. The first stage was applied to prepare the data. The data analysis procedure involved coding, entry of the data into the database, data cleaning, and identifying missing responses in the data. The second stage was the use of PCA to investigate if the five components (Perception, Patronised, Practised, Attitude, and E-Learning Prediction) are key factors in the prediction of E-Learning in Jordan. The third stage was a comparison of PCA for the three sets of stakeholders which indicated that they all contribute equally to the explanation of the TEM-EL model. In the fourth stage, the final form of the instrument was assessed with confirmatory factor analysis; with a cut-off of .50 this stage is considered the most important because it validates the survey questionnaire. Since the survey questionnaire was reliable and valid it is now appropriate for other type of analysis such as regression.

Chapter 6 : Model Testing

6.1 Introduction

This chapter presents the results of the testing of the structural model and the related research hypotheses presented in Figures 6.1 and 6.2. The Partial Least Square (PLS) method was used to test the model, which involves constructing a set of linear inputs using both x and y variants in the construction (Hastie, Tibshirani, & Friedman, 2009, p. 80). The hypothesis testing was performed using a series of multiple linear regressions and simple linear regressions of the data obtained in the survey (see Table 6.1). Multiple linear regressions were used to test hypotheses H1, H3, H7, H8 and H9. Simple linear regressions were used to test hypotheses H2, H4, H5, H6, and H10. The SmartPLS 2.0 package was used to test the structural model while the SPSS 16.0 for Windows was used for the hypotheses testing.

6.2 Structural model

The factor analysis of the survey questionnaire presented in Chapter 5 indicated that the model demonstrated sufficient reliability and validity, with the retained items in the model able to measure the construct under investigation. This section contains the results of the testing of the research model through the use of structural equation modelling (SEM). According to Hoyle (1995, p. 1), SEM is a comprehensive statistical approach for testing hypotheses concerning the relationships between observed and latent variables. The model represents the statistical statements concerning the relationships among the variables and can include the directionality of the relationship. In this study, the PLS method was used to

assess the specifications of the model, using SmartPLS 2.0. The PLS method is suitable for use with SEM when the model is complex and involves a greater number of degrees of freedom that influence the model fit indices (Hoyle, 1999, p. 310). The PLS approach produces results reflecting the covariance structure between the predictor and the response variables, which makes the method appropriate for complex models with many latent variables (Hill & Lewicki, 2006, p. 396).

When compared to other approaches to SEM analysis, PLS has a limitation because it lacks a goodness-of-fit measure to determine how well the statistical model fits the set of observations. An approach to determining goodness-of-fit commonly used by researchers employing PLS relies on the coefficient of determination, R^2, which is used with linear regression models (Anderson-Sprecher, 1994). While the coefficient of determination is not a fully accurate representation of the goodness of fit when used with PLS, it nonetheless explains the majority of the variation captured by the model. The analysis of the overall model used in this study is decomposed into two parts. The first part of the model shown in Figure 6.1 examined the goodness of fit among the Users with the analysis indicating that the model accounted for approximately 59% of the variation ($R^2 = .587$). The second part of the model shown in Figure 6.2 examined the goodness of fit among the Providers with the analysis indicating approximately 88% of the variation ($R^2 = .881$). The closer the coefficient of determination is to 1, the better the goodness-of-fit and the amount of variation explained by the model (Asadoorian & Kantarelis, 2005, p. 160). Based on the analysis, the model provides a moderate explanation of the variation among the Users and a strong explanation of the variation among the Providers, demonstrating goodness-of-fit for both groups.

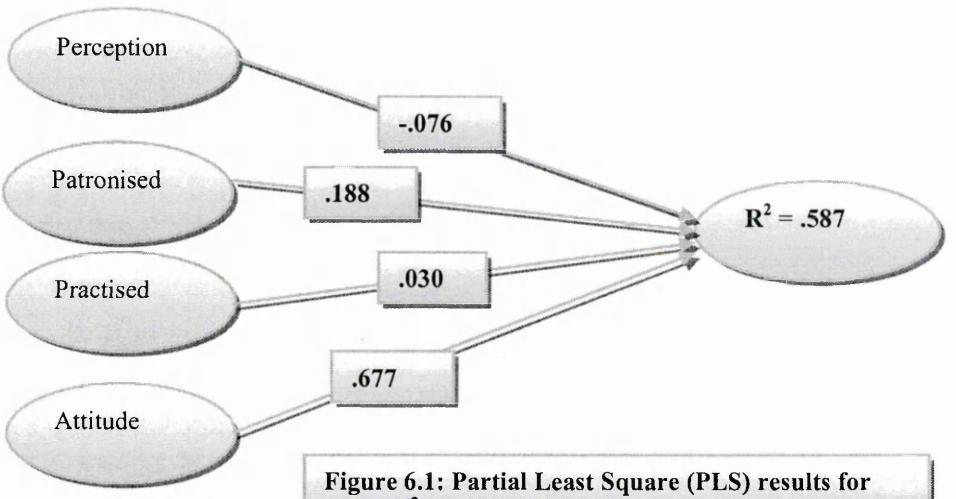


Figure 6.1: Partial Least Square (PLS) results for Users R^2 are presented and β values.

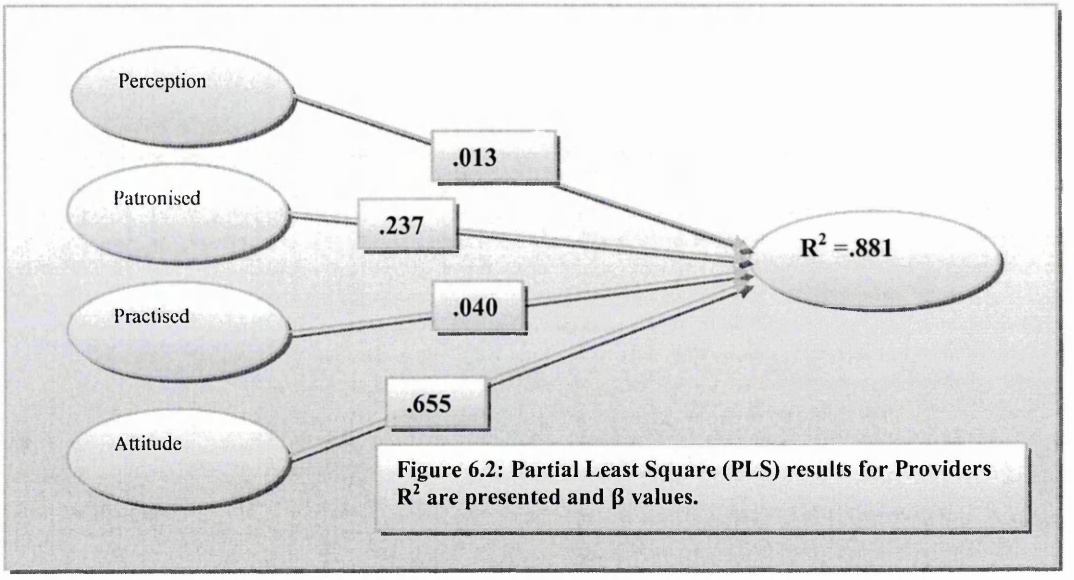


Figure 6.2: Partial Least Square (PLS) results for Providers R^2 are presented and β values.

Based on the analysis, the model provides a moderate explanation of the variation among the Users with R^2 = .587 and a strong explanation of the variation among the Providers R^2 =.881, demonstrating goodness-of-fit for both groups. However, it was expected that the Providers would have a stronger explanation than the Users because earlier in Chapter Five the demographic profile showed that the Providers are more experienced in computer usage. Moreover, it is highly likely that Providers would have a more positive attitude to E-learning (Inal, Karakus & Cagiltay, 2008).

6.3 Analysis steps

This section describes the analytic stages taken to answer and test the hypotheses of the study presented in Chapter Three, and examines the way in which the predictor variables combine to influence the dependent variables. Table 6.1 shows the stages that were undertaken, type of analysis performed for each hypothesis and the independent and dependent variables related to the hypotheses. Moreover, Figure 6.3 presents a graphical depiction of the research model with hypotheses related to the variables.

Stage	Type of Analyses	Hypothesis	Independent Variable	Dependent Variable
1	Stepwise multiple regression analysis	**H1:** Users and Providers Perception, Patronised, Practised and Attitude have a positive effect upon the Prediction of E-Learning.	**Perception, Patronised, Practised and Attitude**	**Prediction (E-Learning)**
	Single Linear Regression	**H2**: Users and Providers Attitudes have a positive effect upon the prediction of (E-Learning).	**Attitude**	**Prediction (E-Learning)**
	Single Linear Regression	**H10:** Users and Providers Patronised have a positive effect upon Prediction.	**Patronised**	**Prediction (E-Learning)**
2	Single Linear Regression	**H3:** Users and Providers Perception have a positive effect upon Attitude.	**Perception**	**Attitude**
	Single Linear Regression	**H4:** Users and Providers Patronised (degree of support) have a positive effect upon Attitude towards using ICT.	**Patronised**	**Attitude**
	Single Linear Regression	**H5**: Users and Providers Practised (Previous use) have a positive effect upon Attitude towards using.	**Practised**	**Attitude**
	Multiple Linear Regression	**H6**: Users and Providers Perception, Patronised and Practised have a positive effect upon Attitude towards using.	**Perception, Patronised and Practised**	**Attitude**
3	Multiple Linear Regression	**H7:** Users and Providers Patronised and Practised have a positive effect upon Perception.	**Patronised and Practised**	**Perception**
	Multiple Linear Regression	**H8:** Users and Providers Perception and Practised have positive effect upon Patronised.	**Perception and Practised**	**Patronised**
	Multiple Linear Regression	**H9:** Users and Providers Perception, Patronised have a positive effect upon Practised.	**Perception and Patronised**	**Practised**

Table 6-1: Summary of analysis types and hypothesis undertaken in this investigation.

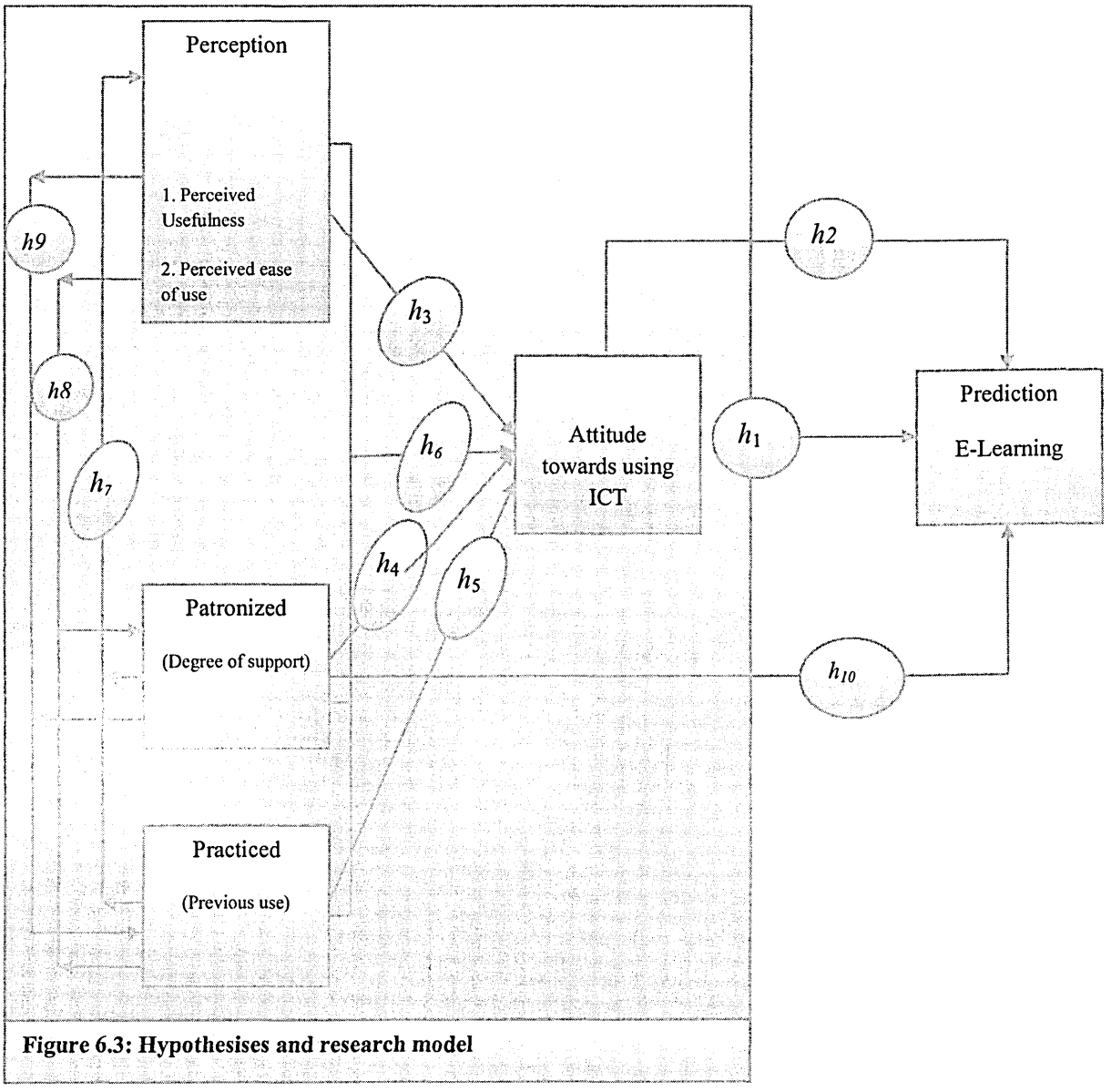
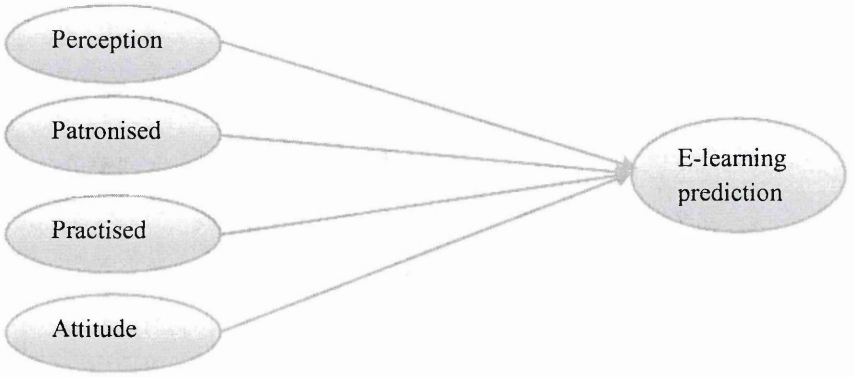


Figure 6.3: Hypothesises and research model

6.4 Analyses Stage-1 Part (1)

Stage-1 is applied here to assess the effect of Users' and Providers' responses on the four individual factors (Perception, Practised, Patronised and Attitude) as well as the cumulative effect on E-Learning Prediction.



6.4.1 Hypothesis testing for both Users and Providers

Respondents' Perceptions have a positive effect on E-learning Prediction.

Respondents' Patronised have a positive effect on E-learning Prediction.

Respondents' Practised have a positive effect on E-learning Prediction.

Respondents' Attitude has a positive effect on E-learning Prediction.

6.4.2 Testing the underlying assumptions

Testing the underlying assumptions for the multiple stepwise regression approach was the first step in the analysis. The purpose of the stepwise regression was to select from among the group of variables in each stage the one that makes the largest contribution to the value of R^2 (Cohen, 2001, p. 161). Testing the underlying assumptions in a multiple regression model is critical for ensuring that important independent variables are not left out of the model. It is also important for ensuring that the dependent variable does not affect any of the independent variables included in the model (Allison, 1999, p. 52). The failure to test

the underlying assumptions of the model can lead to erroneous conclusions concerning the relationships among the data. The underlying assumptions are inherent in the model and include: linearity, homoscedasticity, normality of residuals, multicollinearity, and residual independence. These assumptions are briefly discussed in the following subsections.

Linearity and Homoscedasticity

The assumption of linearity in regression models is that the independent variables have a linear effect on the dependent or target variables (Nisbet, Elder, & Miner, 2009, p. 264). The assumption of linearity suggests that a plot of the relationship between the independent variables (Perception, Patronised, Practised and Attitude) and the dependent or predictor variable (E-Learning Prediction) will appear as a straight line. The scatter plot functions as an indicator of linearity in the model. A linear relationship between the predictor and the dependent variables appears as an oval with a linear and positive relationship between the predictor variable and the dependent variable (Warner, 2008, p. 265). The scatter plot for the model as shown in Figure 6.4 supports the assumption of linearity with the characteristic oval shape and a positive relationship between the predictor (Perception, Patronised, Practised and Attitude) and dependent variable (E-Learning).

Homoscedasticity is an assumption of regression models in which the dependent variable exhibits equal levels of variance across the range of predictor variables. A higher level of homoscedasticity is desirable for a regression model because the variance in the dependent variable explained by the predictor variable should not be confined to a narrow range of values for the predictor variable (Stamatis, 2003, p. 140). The analysis assessed homoscedasticity by examining the residual plots of the standardised values of the dependent variable against the predicted residual values of the dependent variable

(Stamatis, 2003, p. 141). Homoscedasticity is indicated by equal dispersions across all data values. The normal plot of standardised and predicted residuals show in Figure 6.4 indicates that the model under investigation has a high degree of homoscedasticity.

The finding support that there is a linear and positive relationship between Perception, Patronised, Practised, Attitude and E-Learning Predication. Moreover, homoscedasticity is not an issue.

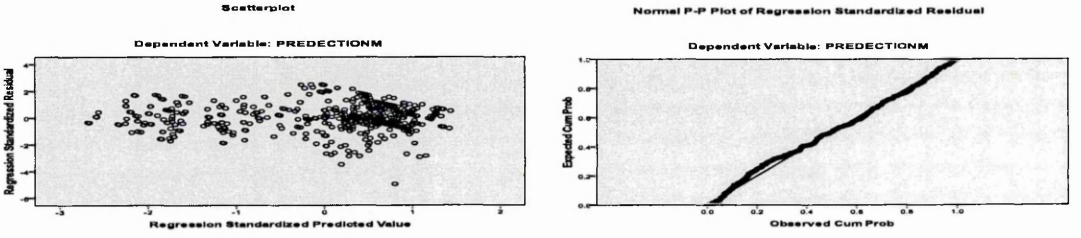


Figure 6.4: Scatter Plot and Normal Plot of Standardised Residuals

Normality of residuals

The normality of residuals is based on the assumption that the data in the model follow a normal distribution pattern around the mean (Nisbet, Elder, & Miner, 2009, p. 262). With regression analysis, normality is assessed by examining the residuals rather than the raw scores. There is no agreement concerning the appropriate approach for testing for normality of residuals, with researchers often relying on histograms and assessments of skew and kurtosis in the data (Cohen, 2001, p. 137).

The large sampling used in this investigation reasonably supports the assumption of normality of residuals, with non-normal residuals more likely to occur with small samplings ($n < 100$) (Peck, Olsen, & Devore, 2009, p. 417).

Multicollinearity

Multicollinearity refers to the correlation that may exist among the independent or predictor variables in a multiple regression model (Anderson, Sweeney, & Williams, 2009, p. 644). A high degree of multicollinearity can increase the possibility of a Type II error in which the null hypothesis is accepted when it is in fact false, and poses a threat to the internal validity of the study (Schwab, 2005, p. 256). To determine the effect of multicollinearity, De Vaus (2002, p. 382) recommended using the variable inflation factor (VIF) and the tolerance value. A VIF less than 10 and a tolerance less than .1 are indicators that multicollinearity has a substantial influence on the model. The analysis of the collinearity statistics for Users as shown in Table 6.2 determined that the tolerances for the predictor variables Perception, Patronised, Practised, and Attitude are above .1 and the VIF for each of the variables is below 10, indicating that multicollinearity is not significant in the model. Similarly, the analysis of the collinearity statistics for Providers as shown in Table 6.3 determined that the tolerances for the predictor variables Perception, Patronised, Practised, and Attitude are above .1 and the VIF for each of the variables is below 10.

Table 6-2: Collinearity statistic: For independent variables Predictor Variable of Users

Predictor Variable	**Collinearity Statistics**	
	Tolerance	**VIF**
ATTITUDE	.668	1.497
PERCEPTION	.252	3.964
PATRONISED	.202	4.951
PRATISED	.711	1.407

Table 6-3: Collinearity statistic: For independent variables Predictor Variable of Providers

Predictor Variable	Collinearity Statistics	
	Tolerance	VIF
ATTITUDE	.331	3.021
PERCEPTION	.226	4.431
PATRONISED	.144	6.924
PRATISED	.309	3.239

We can conclude that multicollinearity is not present within the dependent variables Perception, Patronised, Practised, and Attitude in both Users and Providers. Hence, these variables are independent of each other.

Independence of residuals for both Users and Providers

The assumption of independence of residuals examines whether the residuals in a regression analysis are the result of random error, which usually occurs with random sampling. Clustering or linking in residuals, however, is evidence that the residuals are not independent (Cohen, 2001, p. 120). The Durbin-Watson statistic is commonly used to test whether consecutive residuals are independent of each other. The closer the statistic is to 2, the more likely that the consecutive residuals are independent and the closer the statistic is to 0 the more likely that positive dependence exists among the residuals (Mimmack, Manas, & Meyer, 2001, p. 385).

The Durbin-Watson statistic for this study shows that the Users (DW = 1.176) is at an acceptable level to indicate the residuals for this group are independent, while the Durbin-Watson statistic for Providers is higher (DW = 1.526), indicating a greater degree of independence of residuals.

Outlier analysis for both Users and Providers

No standard definition exists for an outlier, with the existence of an outlier dependent on the nature of specific regression models (De Vaus, 2003, p. 94). Outliers are data points that can significantly distort the fitted response in a regression analysis and should be removed from the analysis. The Cook's distance statistic is a measure for each data point of the extent of change in the model estimate when the data point is omitted from the model. The Cook's distance statistic is acceptable when it is less than 1 (Maindonald & Braun, 2007, p. 183). The Centred Leverage Value examines the distance of the outlier from the mean and is acceptable when it is close to 0.0 (Maindonald & Braun, 2007, p. 183).

The Cook's distance statistic for the model under investigation was less than 1 (CD = .028) and the Centred Leverage Value approached 0 (CLV = .034), indicating that the outliers did not significantly distort the model.

Regression analysis and interpreting of results

The beta coefficients were compared to assess the importance of each variable in the research model. The value of the beta coefficient was an indicator of the strength of the relationship between the independent and dependent variables by showing the relative rate of change in the relationship. The value of the beta coefficient also identified whether the relationship between the independent and dependent variables was positive or negative. When using the common approach in regression of using a one-tailed test of significance, the output indicates the level of significance at the three levels of highly significant ($p < .001$), significant ($p < .01$), and intermediate significance ($p < .05$) (Tarling, 2009, p. 119).

Selecting the best model by stepwise regression analysis

Stepwise regression was used to identify the best model for predicting the effect of stakeholders' Attitudes towards ICT on the adoption of E-Learning. The stepwise regression procedure enters all independent variables (Perception, Patronised, Practised, and Attitude) upon the dependent variable (E-Learning Prediction) into the model at the same time, which is used to identify the largest R^2 for the model based on forward selection criteria. The R^2 indicates the amount of variance in the dependent variable accounted for by the independent variable (Ho, 2006, p. 246). Each model introduces a new variable based on the inclusion criteria, producing a new model for each set of variables.

Results of hypothesis testing

The stepwise regression analysis was used to assess the roles of the variables of Perception, Patronised, Practised and Attitude on the prediction of E-Learning and to determine the most appropriate model. The objective of the stepwise regression analysis was intended to identify the variables that are significant as predictors of E-Learning.

The stepwise analysis for Users as shown in Table 6.4 indicates that model 1, which is a simple correlation between Attitude and Prediction of E-Learning adoption, accounts for a substantial amount of the variance in the prediction of E-Learning adoption (R^2 = .574). The R^2 increased to the fourth model, but the small amount of increase in models 2, 3 and 4 suggests that the addition of these variables accounted for only a small percentage of the increase in variance in the Prediction of E-Learning. The analysis of the coefficients for Users in model 4 as shown in Table 6.4 indicates that Perception (sig. = .248) and Practised (sig. = .439) are not statistically significant for the Prediction of E-Learning. In addition, the analysis of the individual coefficients in model 4 for Users indicates that Perception has

a low negative correlation (R^2 = -.090) with E-Learning. As a result, the findings with respect to Users of E-Learning do not support hypothesis h_1. Only the two variables of Attitude and Patronised contribute significantly to the prediction of E-Learning. In addition, the variable of Perception has a negative rather than positive effect on Users in the adoption of E-Learning.

The stepwise analysis for Providers as shown in Table 6.4, also indicted that model 1, which is a simple correlation between Attitude and prediction of E-Learning adoption, accounts for a very high amount of the variance in the prediction of E-Learning adoption (R^2 = .784). The R^2 increased in model 2, but did not increase in models 3 and 4, which indicates that the addition of the variables of Perception and Practised did not account for any additional variance in the model. The analysis of the coefficients for Providers in model 4 as shown in Table 6.4 also indicates as the results for Users that Perception (sig. = .813) and Practised (sig. = .422) are not statistically significant contributors to the variance in prediction of E-Learning adoption. As for the finding for Users, these findings with respect to Providers do not support hypothesis h_1 and only the two variables of Attitude and Patronised contribute significantly to the prediction of E-Learning.

Table 6-4: Results of stepwise linear regression analysis for Perception, Patronised, Practised and Attitude dimensions (independent variable) upon Prediction (dependent variable).

Type	Model	R	R^2	Adjusted R^2	Std. Error of the Estimate	F	Sig.	DurbinWatson
Users	1	.758	.574	.573	.58580	509.6	.000	1.176
	2	.776	.587	.585	.57774	11.61	.001	
	3	.767	.588	.585	.57738	1.471	.226	
	4	.768	.589	.585	.57769	.601	.439	
Provider	1	.885	.784	.783	.47377	886.2	.000	
	2	.900	.881	.809	.44456	34.11	.000	
	3	.900	.881	.808	.44543	.056	.813	1.526
	4	.901	.881	.808	.44575	.646	.422	

Coefficients[a]

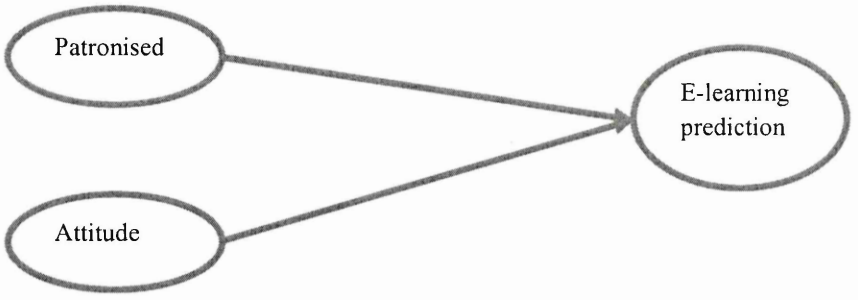
Type	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
Users	1 (Constant)	.828	.130		6.393	.000
	ATTITUDE	.767	.034	.758	22.575	.000
	2 (Constant)	.581	.147		3.951	.000
	ATTITUDE	.687	.041	.678	16.760	.000
	PATRONISED	.150	.044	.138	3.407	.001
	3 (Constant)	.637	.154		4.135	.000
	ATTITUDE	.687	.041	.679	16.776	.000
	PATRONISED	.225	.076	.207	2.968	.003
	PERCEPTION	-.095	.078	-.080	-1.213	.226
	4 (Constant)	.607	.159		3.819	.000
	ATTITUDE	.686	.041	.677	16.724	.000
	PATRONISED	.204	.080	.188	2.553	.011
	PERCEPTION	**-.090**	**.078**	**-.076**	**-1.156**	**.248**
	PRACTISED	**.029**	**.038**	**.030**	**.775**	**.439**
Providers	1 (Constant)	.420	.107		3.927	.000
	ATTITUDE	.877	.029	.885	29.769	.000
	2 (Constant)	.261	.104		2.508	.013
	ATTITUDE	.658	.047	.665	14.143	.000
	PATRONISED	.258	.044	.274	5.840	.000
	3 (Constant)	.249	.115		2.157	.032
	ATTITUDE	.656	.047	.663	13.940	.000
	PATRONISED	.248	.062	.264	3.994	.000
	PERCEPTION	.016	.067	.014	.237	.813
	4 (Constant)	.242	.116		2.085	.038
	ATTITUDE	.648	.048	.655	13.464	.000
	PATRONISED	.223	.069	.237	3.223	.001
	PERCEPTION	**.015**	**.067**	**.013**	**.224**	**.823**
	PRACTISED	**.038**	**.047**	**.040**	**.804**	**.422**

a. Dependent Variable: PREDECTION

In summary, from the results it is clear that Perception and Practised do not play a key role in E-learning Prediction whereas Patronised and Attitude do play a key role in E-learning Prediction.

6.5 Analyses Stage-1 Part (2)

Stage-1 Part (2) is applied here to assess the effect of Users' and Providers' responses on the two individual factors (Patronised and Attitude) as well as the cumulative effect on E-Learning Prediction.



Hypothesis testing for both Users and Providers involves testing hypothesis H2 and H10 which are:

H2: Users'/Providers' Attitudes have a positive effect upon prediction of (E-Learning).

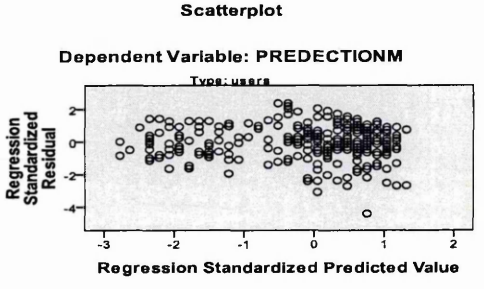
H10: Users' and Providers' Patronised have a positive effect upon Prediction.

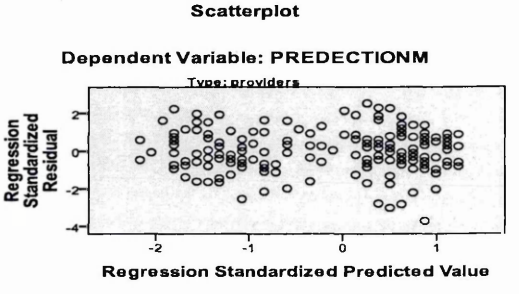
Regression analysis was used to test for the existence of a relationship between the independent variable Attitude and the dependent variable E-Learning Prediction, with the coefficient of correlation (R) used to assess the existence of the relationship and the coefficient of determination (R^2) used to assess the strength of the relationship. Tests were performed for each of the remaining hypotheses of the study. The assumptions underlying the regression model were also tested for the hypotheses. The first test involved the second hypothesis of the study in its alternative form: ***H2: Users' and Providers' Attitudes affect the prediction of (E-learning).***

6.5.1 Testing the underlying assumption for single linear regressions H2:

The testing of the underlying assumptions for single linear regression is necessary to ensure that linear regression is an appropriate method for the analysis of the data (McKillup, 2006, p. 202). The underlying assumptions are inherent in the model and include: linearity, homoscedasticity, normality of residuals, and residual independence. Because single linear regression involves the relationships between a single independent variable and the dependent variable, multicollinearity is not a consideration.

The scatter plot for the independent variable Attitude and the dependent variable E-Learning Prediction as shown below supports the assumption of linearity with the characteristic oval shape and a positive relationship between the predictor and dependent variable for both Users and Providers. Moreover, the residual plots of the standardised values of the dependent variable against the predicted residual values of the dependent variable as shown below also indicates that the single linear regression has homoscedasticity for both Users and Providers.





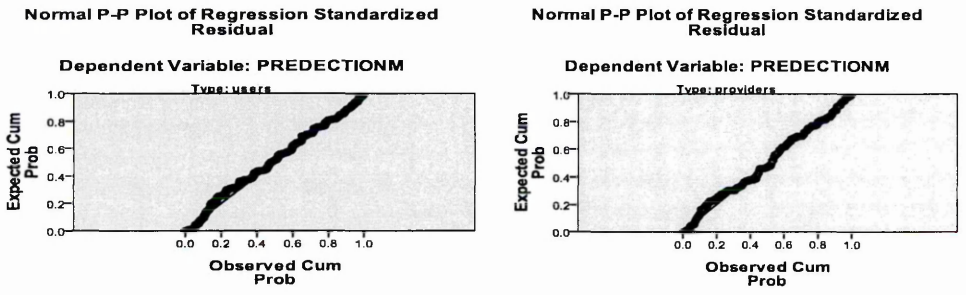


Figure 6.5: Scatter Plot and Normal Plot of Standardised Residuals

Independence of residuals for both Users and Providers

The Durbin-Watson statistic for the single linear regression preformed between independent variable (Attitude) and the dependent variable (E-Learning Prediction) indicates that the residuals for both Users and Providers are relatively independent, although the statistic for Users (DW = 1.190) is substantially lower than the statistic for Providers (DW = 1.544). However, the statistic for both Users and Providers is sufficiently distant from 0 to support the assumption of independence of residuals (Mimmack, Manas, & Meyer, 2001, p. 385).

Outlier analysis for both Users and Providers

The outlier analysis for independent variable Attitude and the dependent variable E-Learning Prediction indicates that both Users and Providers did not significantly distort the fitted response of the residuals. Cook's distance statistic for both Users and Providers (0.04 and 0.05) is below 1 and the Centred Leverage Value for both groups (0.02 and 0.019) is close to 0.

Testing the Results of H2

The results from the single linear regression as shown in Table 6.5 provide support for accepting hypotheses H2. The coefficient of correlation for Users (R = .758) indicates that a strong correlation exists between Attitude and E-Learning Prediction while the coefficient of determination (R^2 = .574) indicates moderate goodness of fit. Among the Providers the correlation between Attitude and prediction is stronger than among the Users (R = .885, R^2 = .784). Moreover, the finding shows that Attitude is a key component in predicting the model under investigation.

Table 6-5: Results of linear regression analysis for Attitude (independent variable) and Prediction (dependent variable).

Type Model	R	R^2	Adjusted R^2	Std. Error of the Estimate	F	Sig.	DurbinWatson
Users	.758	**.574**	**.573**	**.58580**	**509.6**	**.000**	**1.190**
Providers	.885	**.784**	**.783**	**.47377**	**886.2**	**.000**	**1.544**

Coefficients[a]

Type	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
Users	1 (Constant)	.828	.130		6.393	.000
	ATTITUDE	.767	.034	.758	22.575	.000
Providers	1 (Constant)	.420	.107		3.927	.000
	ATTITUDE	.877	.029	.885	29.769	.000

a. Dependent Variable: PREDECTION

It clearly shows again that attitude plays a major role in prediction of the dependent variable E-learning Prediction.

6.5.2 Analysis of Users and Providers Patronised on E-learning Prediction H10

The next test involving single linear regression was for hypothesis H10 stated in its alternative form as: **H10: Users' and Providers' Patronised have a positive effect upon E-learning Prediction.** The hypothesis testing initially examined the underlying assumptions for single linear regressions followed by regression analysis.

6.5.3 Testing the underlying assumption for single linear regressions for H10:

The scatter plot for the independent variable Patronised and the dependent variable E-learning Prediction as shown below supports the assumption of linearity by showing the expected oval shape, indicating a positive relationship between the independent and dependent variables for both Users and Providers. Nevertheless, the residual plots of the standardised values of the dependent variable against the predicted or expected residual values of the dependent variable as shown below also indicate that the single linear regression has homoscedasticity for both Users and Providers.

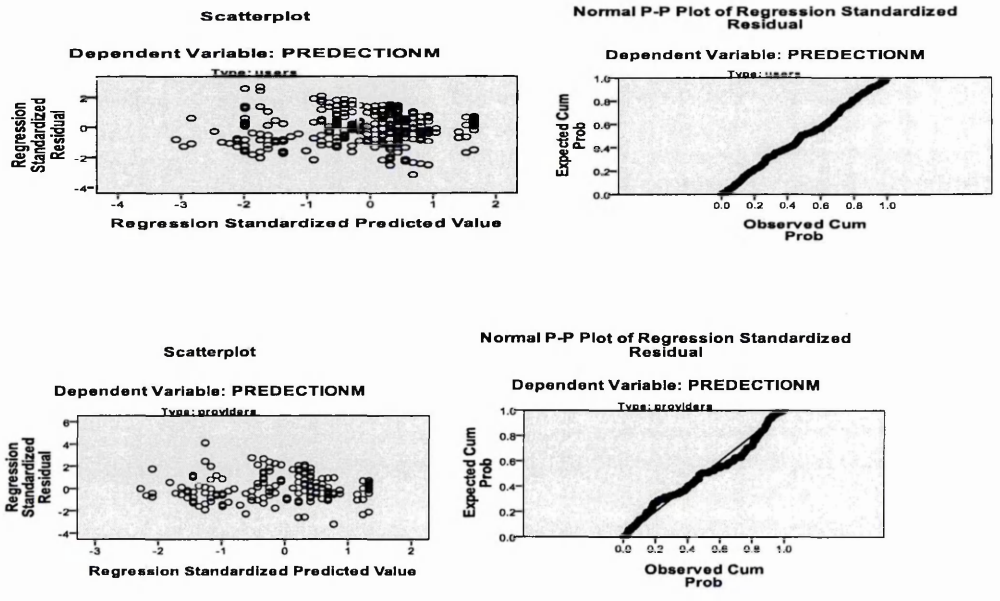


Figure 6.6: Scatter Plot and Normal Plot of Standardised Residuals

Independence of residuals for both Users and Providers

The Durbin-Watson statistic for the single linear regression as shown below indicates that the residuals for both Users and Providers are independent in the relationship between the independent variable (Patronised) and the dependent variable of (E-Learning Prediction). The statistic for Users (DW = 1.077) is substantially lower than the statistic for Providers (DW = 1.405), but the statistic for both groups is well above 0 and supports the assumption of independence of residuals (Mimmack, Manas, & Meyer, 2001, p. 385).

Outlier analysis for both Users and Providers

The outlier analysis for both Users and Providers independent variable Patronised indicate that the outliers did not significantly distort the fitted response of the residuals for either group. Cook's distance statistic for both Users and Providers (0.045 and 0.025) is well below 1 and the Centred Leverage Value (0.091 and 0.021) for both groups is close to 0.

Testing the Results of H10

Table 6-6: Results of single linear regression analysis for Patronised as independent variable and E-learning Prediction as dependent variable.

Type Model	R	R^2	Adjusted R^2	Std. Error of the Estimate	F	Sig.	DurbinWatson
Users	.528	**.279**	**.277**	**.76220**	**146.23**	**.000**	**1.077**
Providers	.809	**.655**	**.655**	**.59903**	**462.93**	**.000**	**1.405**

Coefficients[a]

Type	Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
Users	1 (Constant)	1.584	.177		8.942	.000
	PATRONISED	.574	.047	.528	12.095	.000
Providers	1 (Constant)	.759	.132		5.759	.000
	PATRONISED	.762	.035	.809	21.516	.000

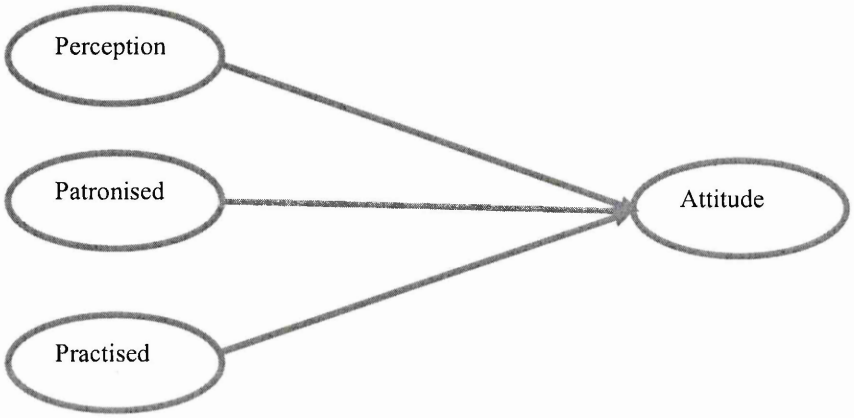
a. Dependent Variable: PREDECTION

The results from the single linear regression as shown in Table 6.6 provide support for accepting hypotheses H10 by showing there is a positive correlation between the independent variable of Patronised and the dependent variable of E-Learning Prediction for both Users and Providers. The coefficient of correlation for Users (R = .528) indicates that a weak correlation exists between Patronised and Prediction with a relatively low coefficient of determination (R^2 = .279). The findings suggest that Patronised accounts for only a small amount of the variance in Prediction. Among the Providers the correlation between Patronised and Prediction was strong, suggesting that Patronised accounts for a larger amount of the variance in prediction than among the Users (R = .809, R^2 = .655).

In Stage One stepwise regression was used to find the best appropriate model for this investigation. The findings indicated that out of the four key factors (Perception, Patronised, Practised and Attitude) only two of the variables, namely Attitude and Patronised, contribute in E-learning Prediction, while Perception and Practised were excluded from the model because they are not statistically significant. Therefore, additional tests should be carried out to find if the two excluded variables have an effect on the two components that predict E-learning prediction (presented in Stage 2).

6.6 Stage-2

This stage is employed here to assess the effect of Users' and Providers' responses on the three individual factors (Perception, Patronised and Practised) and the cumulative effect of these factors on Attitude.



Hypothesis testing for both Users and Providers involves testing hypothesis H3, H4, H5, and H6 which are:

***H3*: Users' and Providers' Perceptions have a positive effect upon Attitude.**

***H4*: Users' and Providers' Patronised (degree of support) have a positive effect upon attitude towards using ICT.**

***H5*: Users' and Providers' Practised (Previous use) have a positive effect upon attitude towards using ICT.**

***H6*: Users' and Providers' Perception, Patronised and Practised have a positive effect upon attitude towards using ICT.**

The next test involving single linear regression was for hypothesis **H3: *Users' and Providers' Perceptions have a positive effect upon Attitude.*** Before testing the hypothesis testing, the analysis determined if the underlying assumptions for single linear regression were valid

6.6.1 Testing the underlying assumption for single linear regressions:

The scatter plot for the independent variable Perception and the dependent variable Attitude as shown below generally supports the assumption of linearity, although the plot is deformed from the expected oval shape at the lower end of scale for some Users' responses. We can conclude that the residual plots of the standardised values of the dependent variable Attitude against the predicted or expected residual values of the dependent variable as shown below also indicates that the single linear regression has homoscedasticity for both Users and Providers

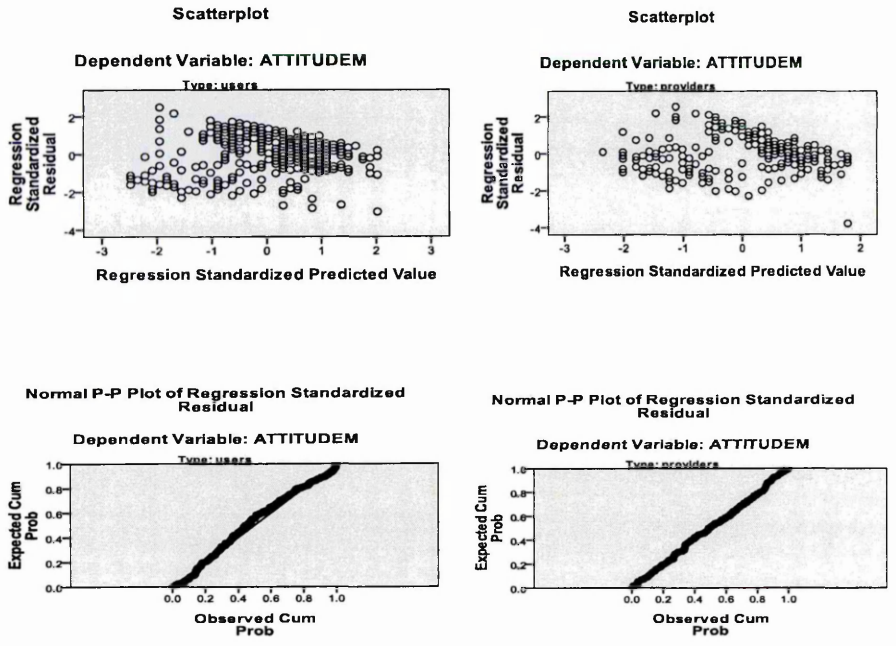


Figure 6.7: Scatter Plot and Normal Plot of Standardised Residuals

Independence of residuals for both Users and Providers

The Durbin-Watson statistic for the single linear regression as shown below indicates that the residuals for both Users and Providers are independent in the relationship between the independent variable of Perception and the dependent variable of E-Learning Prediction. As

with the other tests of the Durbin-Watson statistic, the statistic for Users (DW = 1.017) is substantially lower than the statistic for Providers (DW = 1.309). The statistics for both groups, however, remain well above 0 and support the assumption of independence of residuals.

Outlier analysis for both Users and Providers

The outlier analysis for both Users and Providers for the data related to the hypothesis H3 indicated that the outliers did not significantly distort the fitted response of the residuals for either group. Cook's distance statistic (0.065 and 0.013) for both Users and Providers is well below 1 and the Centred Leverage Value (0.016 and 0.023) for both groups is close to 0.

Hypotheses testing of H3

The results from the single linear regression as shown in Table 6.7 provide support for accepting hypotheses $\boldsymbol{h_3}$ by showing there is a positive correlation between the independent variable of Perception and the dependent variable of Attitude for both Users and Providers. With respect to Users, however, the coefficient of correlation indicates that there is only a moderate correlation (R = .438) of Perception that explains only a small percentage of the variance in Attitude among the Users (R^2 = .191). Despite the weak correlation between Perception and Attitude, it remains statistically significant and supports accepting the hypothesis in its alternative form. Among the Providers, however, the correlation between Perception and Attitude was strong, indicating that Perception accounts for a larger amount of the variance in Attitude than among the Users (R = .740, R^2 = .547).

Table 6-7: Results of single linear regression analysis for Perception (independent variable) and Attitude (dependent variable).

Type Model	R	R^2	Adjusted R^2	Std. Error of the Estimate	F	Sig.	DurbinWatson
Users	.438	**.191**	**.189**	**.80718**	**89.5**	**.000**	**1.017**
Providers	.740	**.547**	**.546**	**.68595**	**295.2**	**.000**	**1.309**

Coefficients[a]

		Unstandardized Coefficients		Standardized Coefficients		
Type Model		B	Std. Error	Beta	t	Sig.
user	1 (Constant)	1.870	.195		9.588	.000
	PERCEPTION	.519	.055	.438	9.460	.000
provider	1 (Constant)	.608	.172		3.527	.001
	PERCEPTION	.842	.049	.740	17.179	.000

Clearly Perception plays some role in determining attitude for both respondents but it plays a much stronger role among Providers

6.6.2 Analysis of Users' and Providers' Role of Patronised on Attitude H4

The next single linear regression analysis tested hypothesis **H4: Users' and Providers' Patronised (degree of support) have a positive effect upon Attitude towards using ICT**. Before testing the hypothesis testing, the analysis determined if the underlying assumptions for single linear regression were valid.

6.6.3 Testing the underlying assumption for single linear regressions:

The scatter plot as shown below for the independent variable Patronised and the dependent variable Attitude generally supports the assumption of linearity, although the plot provides some evidence that linearity may not be present for some data for both Users and Providers. However, the residual plots of the standardised values of the dependent variable Attitude against the predicted or expected residual values of the dependent variable as shown below

also indicates that the single linear regression has homoscedasticity for both Users and Providers.

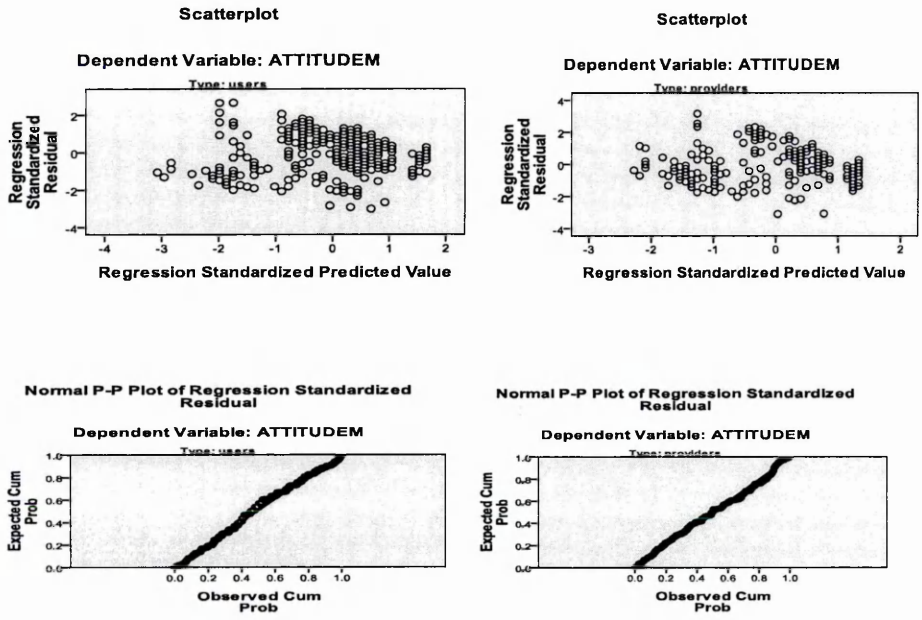


Figure 6.8: Scatter Plot and Normal Plot of Standardised Residuals

Independence of residuals for both Users and Providers

The Durbin-Watson statistic for both Users and Providers is sufficient to establish independence of residuals. The test result for Users was 1.148 while the Providers' score was 1.408.

Outlier analysis for both Users and Providers

The Cook's distance statistics for both Users and Providers (0.047 and 0.054) are less than 1, and the centred leverage values for Users and Providers (0.025 and .021) are close to 0, indicating that outliers did not influence the relationship between the variables.

Testing the Results of H4

The results from the single linear regression as shown in Table 6.8 provide support for accepting hypotheses H4 by showing there is a positive correlation between the independent variable of Patronised and the dependent variable of Attitude for both Users and Providers. For the Users, there was a moderate correlation (R = .582), which explains only a small percentage of the variance in Attitude among the Users (R^2 = .227). Among the Providers, the correlation between Patronised and Attitude was strong, indicating that Patronised accounts for a larger amount of the variance in Attitude for the Providers with R = .809 than for the Users with R^2 = .655.

Table 6-8: Results of linear regression analysis for Patronised (independent variable) and Attitude (dependent variable).

Type Model	R	R^2	Adjusted R^2	Std. Error of the Estimate	F	Sig.	Durbin-Watson
user	.528	**.227**	**.227**	**.76220**	**146.3**	**.000**	**1.077**
provider 1	.809	**.655**	**.653**	**.59903**	**462.2**	**.000**	**1.309**

Coefficients[a]

Type Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
user	1 (Constant)	1.584	.177		8.942	.000
	PATRONISED	.574	.047	.528	12.095	.000
provider 1	(Constant)	.759	.132		5.759	.000
	PATRONISED	.762	.035	.809	21.516	.000

a. Dependent Variable: PREDICTION

In this case Patronised plays some role in determining Attitude; however, it plays a much stronger role amongst Providers

6.6.4 Analysis of Users' and Providers' Practised on Attitude H5

The next analysis tested hypothesis ***H5: Users and Providers Practised (Previous use) have a positive effect upon Attitude towards using ICT.*** The assumptions underlying the linear regression model were assessed prior to the hypothesis test.

6.6.5 Testing the underlying assumption for single linear regressions

The scatter plot shown below for the independent variable Practised and the dependent variable Attitude generally supports the assumption of linearity with the anticipated oval shape. The residual plots of the standardised values of the dependent variable Attitude against the predicted or expected residual values of the dependent variable as shown below also indicates that the single linear regression has homoscedasticity for both Users and Providers.

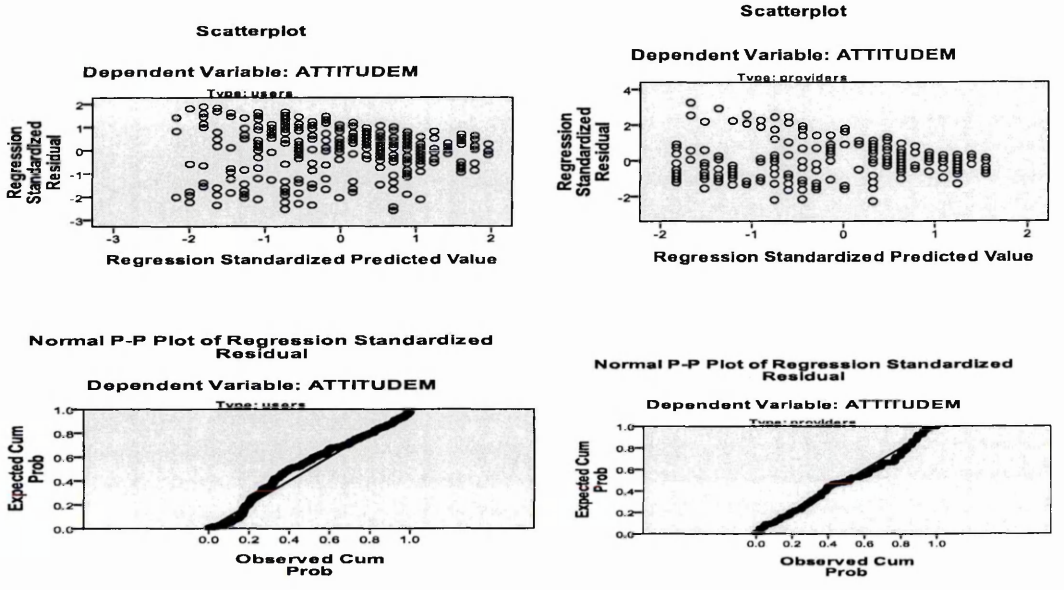


Figure 6.9: Scatter Plot and Normal Plot of Standardised Residuals

Independence of residuals for both Users and Providers

The Durbin-Watson statistic for Users suggests that the assumption of independence may not be valid for the data set testing the relationship between the variable of Practised and the variable of Attitude. The statistic is marginally acceptable for the provider with 0.958. The weakness of the assumption of independence of residuals for the User group with 0.766 suggests that the standard error in the model may be influenced and the findings should be treated with caution (Lomax, 2007, p. 399)

Outlier analysis for both Users and Providers

The Cook's distance statistics for both Users and Providers (0.034 and 0.085) are less than 1 and the centred leverage values for Users and Providers (0.020 and 0.014) are close to 0, which suggests that outliers did not influence the relationship between the variables of Practised and Attitude.

Hypotheses testing of H5

The results from the single linear regression as shown in Table 6.9 provide support for accepting hypotheses H5 by showing there is a positive correlation between the independent variable of Practised and the dependent variable of Attitude for both Users and Providers. For the Users, there was a weak correlation ($R = .334$), which explains only a very small percentage of the variance in Attitude ($R^2 = .112$). Among the Providers, the correlation between Practised and Attitude was strong ($R = .733$), indicating that Practised accounts for a substantial amount of the variance in Attitude ($R^2 = .535$).

Table 6-9: Results of linear regression analysis for Practised (independent variable) and Attitude (dependent variable).

Type Model	R	R^2	Adjusted R^2	Std. Error of the Estimate	F	Sig.	Durbin-Watson
user	.334	**.112**	**.109**	**.83567**	**47.51**	**.000**	**.766**
provider	.733	**.537**	**.535**	**.70071**	**283.2**	**.000**	**.958**

Coefficients

Type	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
Users	1 (Constant)	2.694	.153		17.563	.000
	PRATISED	.319	.046	.334	6.893	.000
provider	1 (Constant)	1.181	.144		8.214	.000
	PRATISED	.693	.041	.733	16.828	.000

Once again Practised clearly plays some role in determining Attitude, and similar to Patronised, Practised plays a much stronger role among Providers.

6.6.7 Analysis of Users' and Providers' Perception, Patronised and Practised on Attitude H6

The next test used multiple regression analysis for hypothesis ***H6: Users' and Providers' Perception, Patronised and Practised have a positive effect upon Attitude towards using.*** Prior to the hypothesis testing, the underlying assumptions of the multiple regression model was tested.

6.6.8 Testing the underlying assumption for multiple regressions:

The scatter plot shown below for the independent variables of Practised, Patronised and Practice and the dependent variable Attitude generally supports the assumption of linearity with the expected shape. The residual plots of the standardised values of the dependent variable Attitude against the predicted or expected residual values of the dependent variable

as shown below also indicates that homoscedasticity is present for both Users and Providers.

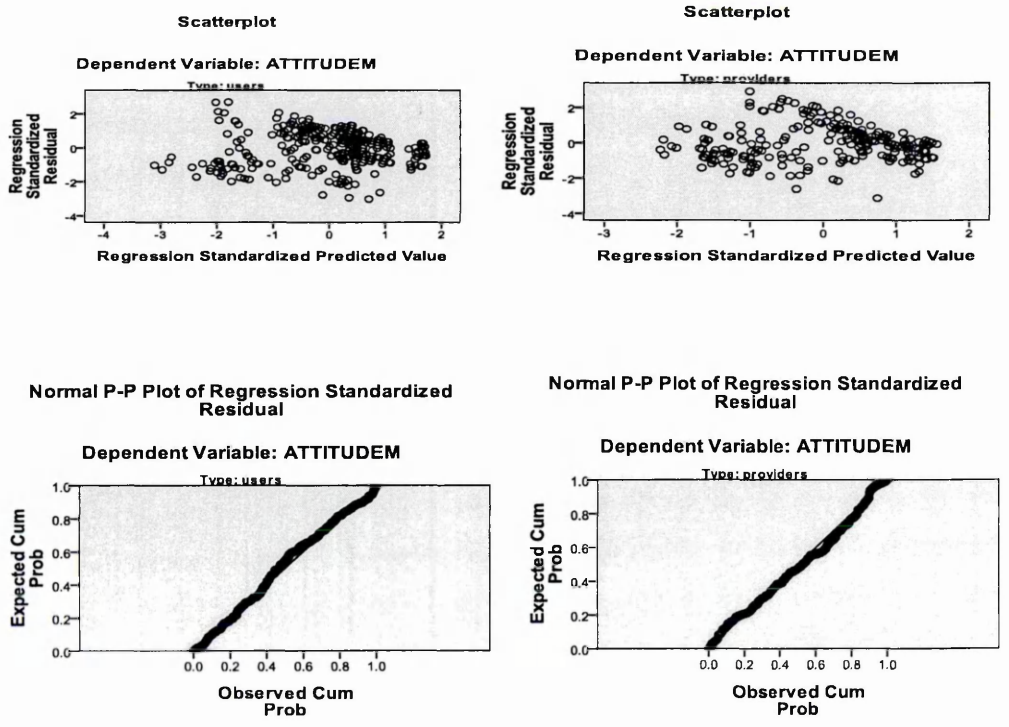


Figure 6.10: Scatter Plot and Normal Plot of Standardised Residuals

Independence of residuals for both Users and Providers

The Durbin-Watson statistic for both Users and Providers is sufficient to establish independence of residuals for the multiple regression analysis. The results are (1.130 and 1.256).

Outlier analysis for both Users and Providers

The Cook's distance statistics for both Users and Providers (0.068 and 0.11) are less than 1 and the centred leverage values for Users and Providers (0.60 and 0.075) are close to 0, which suggests that outliers did not influence the relationship between the variables of Practices and Attitude.

Hypotheses testing of H5

The results from the multiple linear regression analysis as shown in Table 6.10 provide support for accepting hypotheses H6 by showing there is a positive correlation between the independent variables of Perception, Patronised, and Practised, and the dependent variable of Attitude for both Users and Providers. For Users, the model had a statistically significant and moderate correlation (R = .575), and explained approximately 33% of the variance in Attitude (R^2 = .332). Among the Providers, the correlation of Perception, Patronised and Practised with Attitude was statistically significant and strong (R = .818), with the three independent variables accounting for approximately 67% of the variance in Attitude (R^2 = .669). The analysis of the individual coefficients in the model, however, indicates that Patronised is the most significant variable for the correlation.

Table 6-10 Results of multiple regression analysis for Perception, Patronised, Practised (independent variable) and Attitude (dependent variable).

Type Model	R	R^2	Adjusted R^2	Std. Error of the Estimate	F	Sig.	DurbinWatson
User	.575	**.332**	**.327**	**.72650**	**62.331**	**.000**	**1.130**
Provider	.818	**.669**	**.665**	**.59499**	**163.057**	**.000**	**1.256**

Coefficients[a]

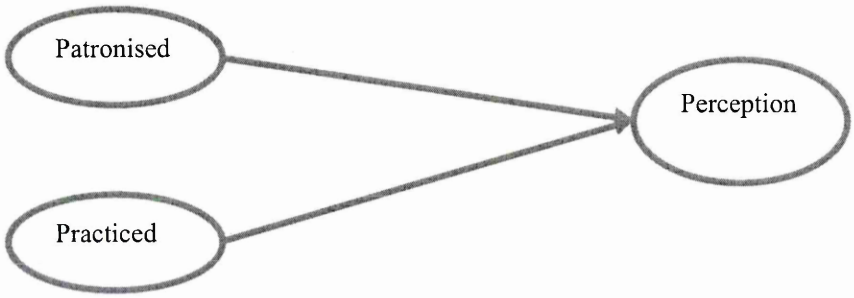
Type	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
Users	1 (Constant)	1.416	.186		7.616	.000
	PERCEPTION	.014	.098	.012	.146	.884
	PATRONISED	.585	.096	.544	6.084	.000
	PRATISED	.037	.048	.038	.768	.443
Providers	1 (Constant)	.528	.151		3.501	.001
	PERCEPTION	.188	.089	.164	2.123	.035
	PATRONISED	.461	.088	.485	5.263	.000
	PRATISED	.202	.062	.214	3.279	.001

a. Dependent Variable: ATTITUDE

It appears from the table above that the only independent variable that contributes to Attitude is Patronised. Therefore additional examination was considered to check whether there is a relationship between the three external variables Perception, Patronised, and Practised (presented in Stage 3).

6.7 Stage 3

6.7.1 Analysis of Users' and Providers' Patronised and Practised upon Perception H7



Multiple regression analysis was also used for testing the next hypothesis ***H7: Users' and Providers' Patronised and Practised have a positive effect upon Perception.*** Prior to performing the regression, the underlying assumptions for regression were tested.

6.7.2 Testing the underlying assumption for multiple regressions:

The scatter plot shown below for the independent variables of Patronised and Practised and the dependent variable Perception generally supports the assumption of linearity with the expected shape. The residual plots of the standardised values of the dependent variable Perception against the predicted or expected residual values of the dependent variable as shown below also indicates that the data has homoscedasticity for both Users and Providers.

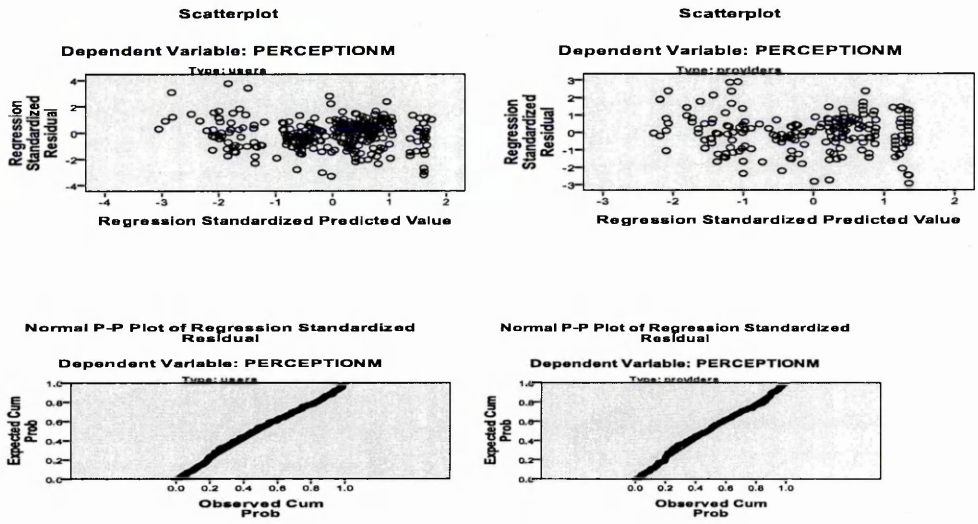


Figure 6.11: Scatter Plot and Normal Plot of Standardised Residuals

Independence of residuals for both Users and Providers

The Durbin-Watson statistic for both Users and Providers is very high resulting in (1.714 and 1.958). The finding suggests that the consecutive residuals are independent.

Outlier analysis for both Users and Providers

Both Cook's distance statistic for both stakeholders (0.13 and 0.14) and the centred leverage value (0.037 and 0.066) are low enough to indicate that the findings have not been affected by outliers.

Hypotheses testing of H7

The results from the multiple linear regression analysis as shown in Table 6.11 provide support for accepting hypotheses H7 by showing there is a positive correlation between the independent variables of Patronised and Practised, and the dependent variable of Perception for both Users and Providers. For Users, the model had a statistically significant and strong

correlation (R = .865), with the independent variables explaining approximately 75% of the variance in Perception (R^2 = .748). Among the Providers, the correlation of the variables Patronised and Practised with Perception was statistically significant and strong (R = .878), with the two independent variables accounting for 77% of the variance in Attitude (R^2 = .770).

Table 6-11: Results of multiple regression analysis for Patronised and Practised (independent variable) and Perception (dependent variable).

Type Model	R	R^2	Adjusted R^2	Std. Error of the Estimate	F	Sig.	DurbinWatson
User	.865	**.748**	**.746**	**.38048**	**558.579**	**.000**	**1.714**
Provider 1	.878	**.770**	**.768**	**.43037**	**407.043**	**.000**	**1.958**

a. Predictors: (Constant), PRACTISEDM, PATRONISED

b. Dependent Variable: PERCEPTION

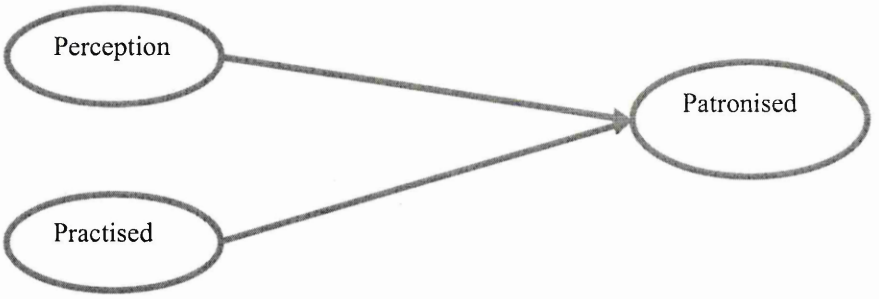
Coefficients[a]

Type	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
user	1 (Constant)	.626	.092		6.816	.000
	PATRONISED	.812	.028	.886	28.956	.000
	PRACTISED	-.033	.025	-.041	-1.333	.183
provider	1 (Constant)	.805	.096		8.379	.000
	PATRONISED	.700	.045	.847	15.643	.000
	PRACTISED	.031	.045	.037	.692	.490

a. Dependent Variable: PERCEPTION

This clearly shows that for both Users and Providers Patronised and Practised taken together have a strong association with Perception.

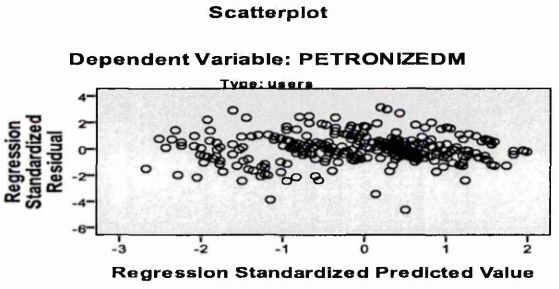
6.7.3 Analysis of Users' and Providers' *Perception and Practised upon Patronised* H8

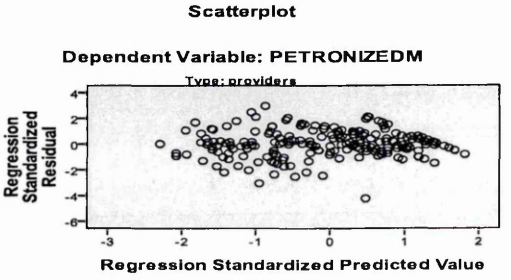


The next analysis used multiple regression analysis to test hypothesis ***H8: Users' and Providers' Perception and Practised have a positive effect upon Patronised.*** As with the other hypotheses, an initial test of the underlying assumptions was also performed.

6.7.4 Testing the underlying assumption for multiple regressions:

The scatter plots shown below for the independent variables of Perception and Practised and the dependent variable Patronised as shown below support the assumption of linearity with the expected shape. The residual plots of the standardised values of the dependent variable Perception against the predicted or expected residual values of the dependent variable as shown below also indicate that the data has homoscedasticity for both Users and Providers





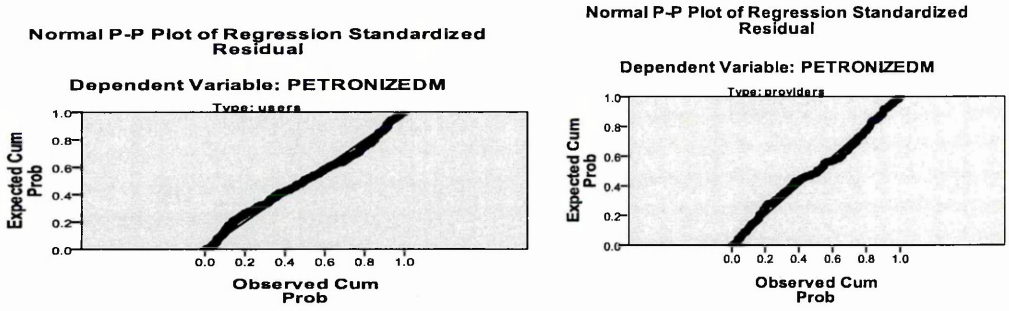


Figure 6.12: Scatter Plot and Normal Plot of Standardised Residuals

Independence of residuals for both Users and Providers

The Durban-Watson statistics for both Users and Providers are high (1.582 and 1.730), supporting the assumption of independence of residuals for both groups.

Outlier analysis for both Users and Providers

The Cook's distance statistic (0.49and 0.073) and the centred leverage value (0.029 and 0.063) for both groups are well within the parameters that support the assumption that outliers did not influence the data.

Hypotheses testing of H8

The results from the multiple regression analysis as shown in Table 6.12 provide support for accepting hypotheses H8 by showing there is a positive correlation between the independent variables of Perception and Practised and the dependent variable of Patronised for both Users and Providers. For Users, the model had a statistically significant and a strong correlation (R = .882), with the independent variables explaining approximately 78% of the variance in Perception (R^2 = .778). Among the Providers, the correlation of the variables Perception and Practised with Patronised was statistically significant and very

strong (R = .916), with the two independent variables accounting for approximately 84% of the variance in Attitude (R^2 = .839).

Table 6-12: Results of linear regression analysis for Perception, Practised (independent variable) and Patronised (dependent variable).

Type Model	R	R^2	Adjusted R^2	Std. Error of the Estimate	F	Sig.	Durbin-Watson
Users	**.882[a]**	**.778**	**.777**	**.38939**	**661.183**	**.000**	**1.582**
Providers	**.916[a]**	**.839**	**.838**	**.43542**	**633.337**	**.000**	**1.730**

a. Predictors: (Constant), PRACTISED, PERCEPTION

b. Dependent Variable: PATRONISED

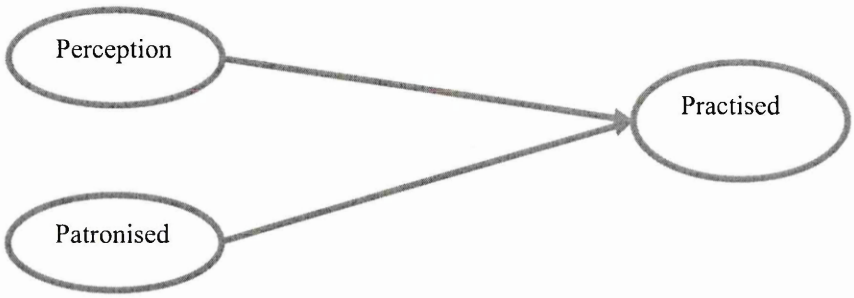
Coefficients[a]

		Unstandardized Coefficients		Standardized Coefficients		
Type	Model	B	Std. Error	Beta	t	Sig.
Users	1 (Constant)	.128	.099		1.289	.198
	PERCEPTION	.850	.029	.779	28.956	.000
	PRACTISED	.175	.024	.197	7.335	.000
Providers	1 (Constant)	-.156	.110		-1.416	.158
	PERCEPTION	.717	.046	.593	15.643	.000
	PRACTISED	.386	.038	.388	10.233	.000

a. Dependent Variable: PATRONISED

Once again for both Users and Providers the role of Perception and Practised has a strong association with Patronised.

6.7.5 Analysis of Users' and Providers' *Perception and Patronised upon Practised* H9



The final analysis used linear regression to test hypothesis ***H9: Users' and Providers' Perception, Patronised have a positive effect upon Practised***. The underlying assumptions for linear regression were also tested.

6.7.6 Testing the underlying assumption for linear regressions.

The scatter plot for both Users and Providers showed the expected oval form although there was some distortion to the plot, supporting the assumption of linearity. The residual plots of the standardised values of the dependent variable against the predicted or expected residual values of the dependent variable as shown below also support the assumption of homoscedasticity for both Users and Providers.

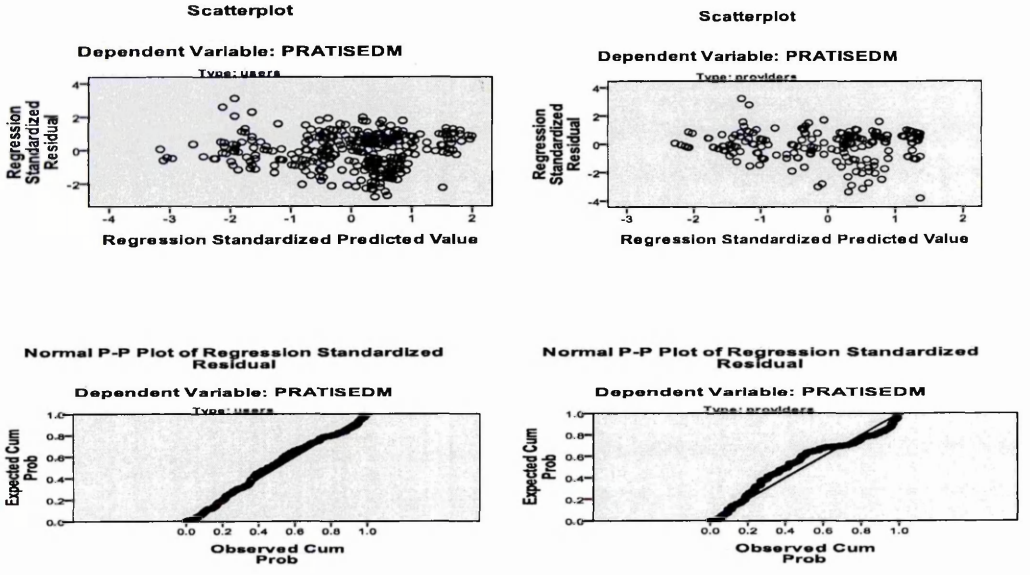


Figure 6.13: Scatter Plot and Normal Plot of Standardised Residuals

Independence of residuals for both Users and Providers

The Durban-Watson statistic for both Users and Providers are sufficient to support the assumption of independence of residuals for both groups. The result for Users was 1.350 and for Providers was 1.390.

Outlier analysis for both Users and Providers

The Cook's distance statistics for both Users and Providers (0.11 and 0.14) are below 1 and the centred leverage values for both groups (0.047 and 0.043) are close to 0, supporting the assumption that outliers did not influence the data.

Hypothesis testing of H9

The results from the multiple regression analysis as shown in Table 6.13 provide general support for accepting hypothesis $\boldsymbol{h_9}$ by showing there is a positive correlation between the independent variables of Perception and Patronised and the dependent variable of Practised for both Users and Providers. For Users, the variables of Perception and Patronised had a moderate correlation with Practised (R = .537), with the variables explaining approximately 29% of the variance in Practised (R^2 = .288). For the Users, however, the Perception had a negative correlation and no statistical significance in the regression model, suggesting that Patronised exerted strong moderating influence on the model. For the Providers, the correlation of Perception and Patronised with Practised was strong (R = .823), with the variables accounting for approximately 68% of the variance in Practised (R^2 = .678).

Table 6-13: Results of linear regression analysis for Practised (independent variable) and Patronised (dependent variable).

Type Model	R	R^2	Adjusted R^2	Std. Error of the Estimate	F	Sig.	Durbin-Watson
Users	**.537**	**.288**	**.284**	**.78477**	**76.291**	**.000**	**1.350**
Providers	**.823**	**.678**	**.675**	**.61963**	**255.3**	**.000**	**1.390**

Coefficients[a]

		Unstandardized Coefficients		Standardized Coefficients		
Type	Model	B	Std. Error	Beta	t	Sig.
Users	1 (Constant)	1.082	.193		5.609	.000
	PERCEPTION	-.141	.106	-.115	-1.333	.183
	PATRONISED	.712	.097	.633	7.335	.000
Providers	1 (Constant)	.320	.156		2.057	.041
	PERCEPTION	.064	.092	.052	.692	.490
	PATRONISED	.781	.076	.777	10.233	.000

a. Dependent Variable: PRACTISED

The remaining relationship for both Users and Providers involving Perception and Patronised has a strong association with Practised.

6.15 Summary

This chapter examined Users' and Providers' Attitudes towards E-Learning Prediction using the extended TAM. The analysis results suggest that the TAM is an appropriate theoretical framework for the underlying investigation. Both PLS and stepwise regression was applied to test the model of the study, with the findings indicating that the model accounted for 58% of the variance in Prediction among Users and 88% of the variance among Providers. The findings of the hypothesis tests indicated that all the hypothesis of the study should be accepted.

Specifically the analysis of the three stages is summarized as follow:

The first stage assessed the role of the four factors as independent variables on E-learning Prediction, involving hypothesis H1, H2, H10, and the result revealed that, of the four factors, Patronised and Attitude had a strong association with E-learning Prediction for both Users and Providers.

The second stage involved looking at the three factors of Perception, Patronised, and Practised as independent variables on Attitude; the result revealed that the strength of association was different for Users and Providers; they can be seen in the table 6-14 below.

Hypothesis	Independent Variables	Users	Providers
H3	Perception	Low	Strong
H4	Patronised	Moderate	Strong
H5	Practised	Low	Strong
H1	Perception, Patronised and Practised	Moderate	Strong

Table 6-14: Strength of Association

Stage Three involved assessing the strength of association in the interrelationships between Perception, Patronised and Practised (i.e. hypotheses H7, H8, and H9). The results revealed that interrelationships between Perception, Patronised and Practised have a strong

association for both Users and Providers. The one exception was for Users who had a low correlation for Patronised and Perception on Practised.

In relation to the tables we have for our purpose adopted the following term involves for low, moderate, and strong association then respectively compared to:

$$0.0 < \text{Low} < 0.2$$

$$0.2 \leq \text{moderate} \leq 0.05$$

$$0.5 \leq \text{High} \leq 1.0$$

Chapter 7 : Discussion and Conclusion

7.1 Introduction

This chapter contains a discussion of the findings from the data analysis presented in the previous two chapters. The discussion is based on interpreting the findings in relationship to previous research examining ICT adoption in E-Learning. The discussion also identifies the critical factors influencing adoption of E-Learning among students and administrators.

7.2 Overview of the Study

ICT adoption in higher education can provide numerous benefits for students and institutions including increased access to education, personalization of learning, and lower costs (Shurville & Brown, 2006). Despite the benefits, university students and faculties often fail to exploit ICT as an instructional medium (Selwyn, 2007). The purpose of this quantitative, empirical study was to examine the relationships between the independent variables of Perception, Practised, Patronised and Attitude and the dependent variable of Perception of E-Learning among a population of student (Users) and administrator (Providers) of E-Learning from a single university in Jordan. The research was based on the theoretical model in which these independent variables influence the adoption of E-Learning in universities. The main research question for the study was: To what extent does the proposed model, and in particular the role of components: Perception, Patronised, and Practised, play in the adoption of E-Learning? The data was collected with a survey questionnaire designed for the study, and regression analysis was used to test the hypotheses of the study.

7.3 Discussion

7.3.1 Findings from the Descriptive Analysis

This section discusses the main findings from the descriptive analysis of the data obtained with the survey questionnaire from Users and Providers of ICT. The questionnaire obtained data about the four demographic variables of: gender; age; computer experience; and role, which were used to sort Users and Providers. Frequency analysis was used to determine if notable differences existed in the group of Users and Providers.

As indicated in 5.3.1, the study population consisted of a majority of males for Users (58.2%). Among the Providers, the percentage of males was very high (78.5%), indicating that only a small number of women have administrative or staff positions in the universities in Jordan. The smaller number of female Users and Providers is similar to the findings of Jensen (2006) indicating that fewer women than men have access to higher education in Jordan. The analysis of the age of the population described in section 5.3.2 shows that the majority of the Users were in the under 25 age demographic while all the Providers were over the age of 25. This finding was expected because university students generally are in a younger age demographic while administrators and staff members of higher educational institutions were expected to be older than student Users. The findings with respect to computer experience described in section 5.3.4 also indicated that the majority of Users have five years or less experience using computers (84.7%) while most of the Providers have more than five years experience using computers (64.6%). The amount of computer experience among Users and Providers can influence Perceptions about the benefit and ease of use of E-Learning (Selwyn, Marriott, & Marriott, 2002). The greater amount of computer experience among Providers when compared to Users was expected, although a substantial minority of the Providers had five years or less experience with computers.

7.3.2 Model Testing

Model testing is necessary to address the main research question of the study, which is: To what extent does the proposed model, and in particular the role of components: Perception, Patronised, Practised, and Attitude, play in the adoption of E-Learning? In Chapter 5, the statistical findings indicated that the measurement model as defined in the survey questionnaire had sufficient reliability and validity with the retained items able to measure the constructs under investigation. In Chapter 6, the findings from a statistical testing of the model using structural equation modelling (SEM) were presented. A substantial amount of literature has considered the advantages of using SEM in social and behavioural research (Hoyle, 1995, p. 13). SEM has an advantage of providing an overall assessment of complex models with many variables that produce a greater number of degrees of freedom that influence the model fit indices (Hoyle, 1999, p 310). In this study, SEM was applied using the Partial Least Squares (PLS) method using SmartPLS 2.0. The PLS approach is appropriate for complex models with many latent variables, particularly when coupled with the use of the coefficient of determination to assess goodness-of-fit (Anderson-Sprecher, 1994; Hill & Lewicki, 2006, p. 396).

The analysis of the model using SEM and the PLS approach indicated that the overall TAM-EL explains approximately 59% of the variance in the prediction or intention to use E-Learning among Users (R^2 = 58.7%), and approximately 88% of the variance among Providers (R^2 = 88.1%). The percentages for the goodness-of-fit for the TAM-EL model are even better than the findings of other researchers investigating the model in other contexts, for instance, Park, Lee, & Cheong, (2007). Their percentages for the goodness-of-fit finding was (R^2 = 66%). The overall model included the construct of attitude, which is considered an intermediate variable influenced by Perception, Patronised, and Practised.

The analysis of the model found a substantial difference in the amount of variance explained by the model between the user and provider groups. The relatively low goodness-of-fit for the user group suggests that a variable not accounted for in the TAM-EL model may have influenced the perceptions of the user group. In contrast, the model has high predictive validity for the provider group. The analysis of the model also provides findings that address the third research sub-question of the study by indicating that the stakeholder group of Providers plays a strong role in the development of E-Learning. The prediction of E-Learning among Providers is critical for the development of E-Learning programs in institutions of higher education.

7.3.3 Hypothesis Testing

To provide answers to the main research question and the three research sub-questions, the study formulated and tested ten hypotheses. The analysis and results from the testing of the hypotheses were presented in Chapter 6. This section discusses and interprets the results of the hypotheses testing.

Hypotheses h_1 was tested separately from the other hypotheses of the study using stepwise regression analysis, with the results of this testing presented in Chapter 6. The hypothesis tested the proposition that the four independent variables of Perception, Patronised, Practised and Attitude had a positive effect on the dependent variable of Prediction of E-Learning. The findings of the analysis reject the hypothesis. For both the user and provider groups, only the variables of Attitude and Patronised had a statistically significant effect on Prediction of E-Learning. The finding that the variables of Perception and Practised are not statistically significant is contrary to the implications of the findings of previous researchers. Gallien and Ooomen-Early (2008) found that previous online experience contributed to overall student satisfaction with E-Learning, which presumably increases

willingness to adopt E-Learning. Ojo and Olakulehin (2006), however, found that students generally have a positive perception of E-Learning. While the analysis of the TAM-EL does not address the reasons for the lack of significance of the variables of Perception and Practised, however, it does in a distinct manner put forward the importance of Patronised (the degree of support), and Attitude. Both Users and Providers may have a positive attitude towards E-Learning when it has sufficient support regardless of their level of experience using ICT. Figure 7.1 shows the analysis of the model and the significance of the variables for both Users and Providers.

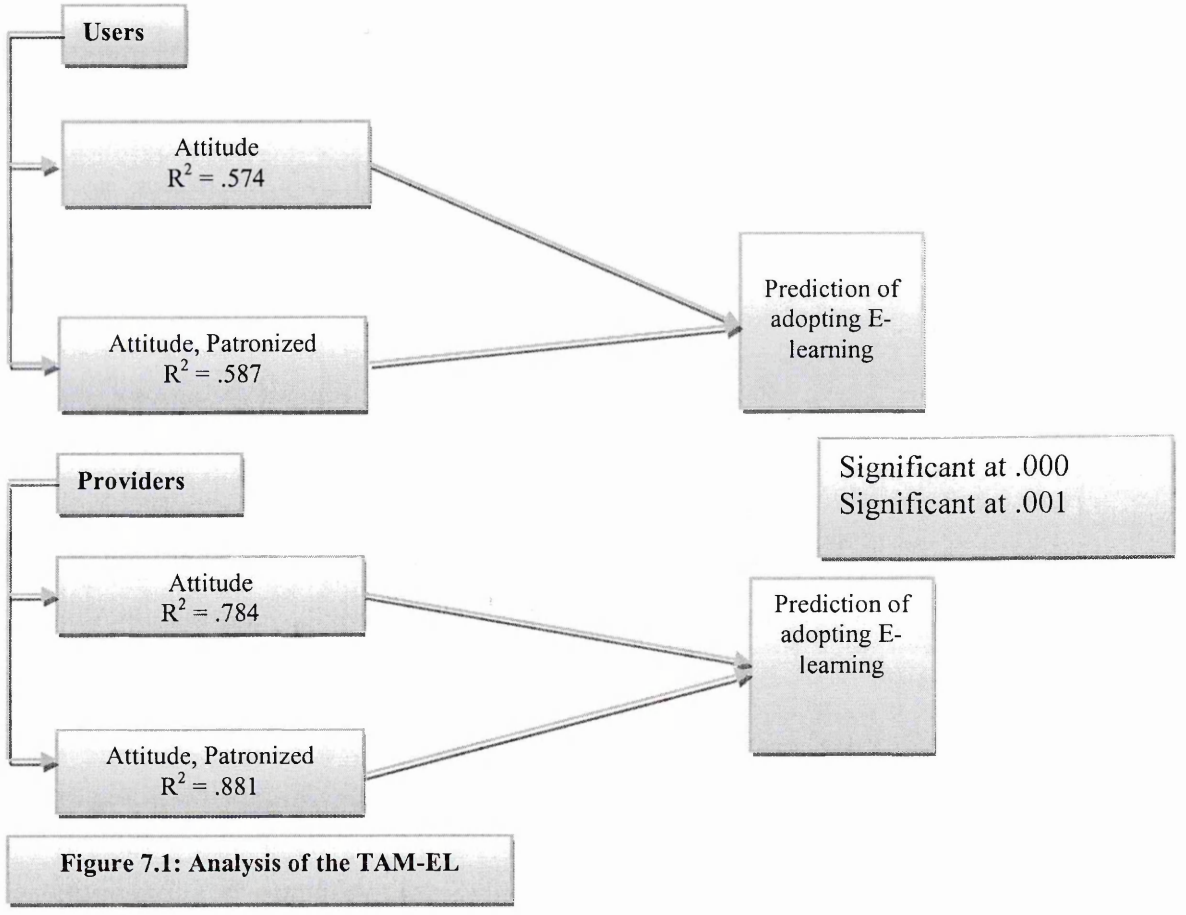


Figure 7.1: Analysis of the TAM-EL

Let us consider developing the two models i.e. for Users and Providers and developers, taking note of the strength of associations obtained. For the Users group there is clearly a strong association between Patronised and Attitude and E-learning Prediction. However, the individual factors have a low association with Attitude, but the three taken together

have a moderate association. The nature of the inter-relationship between Practised, Perception and Patronised has some strong association and a more accurate model would be as shown in Figure 7.2.

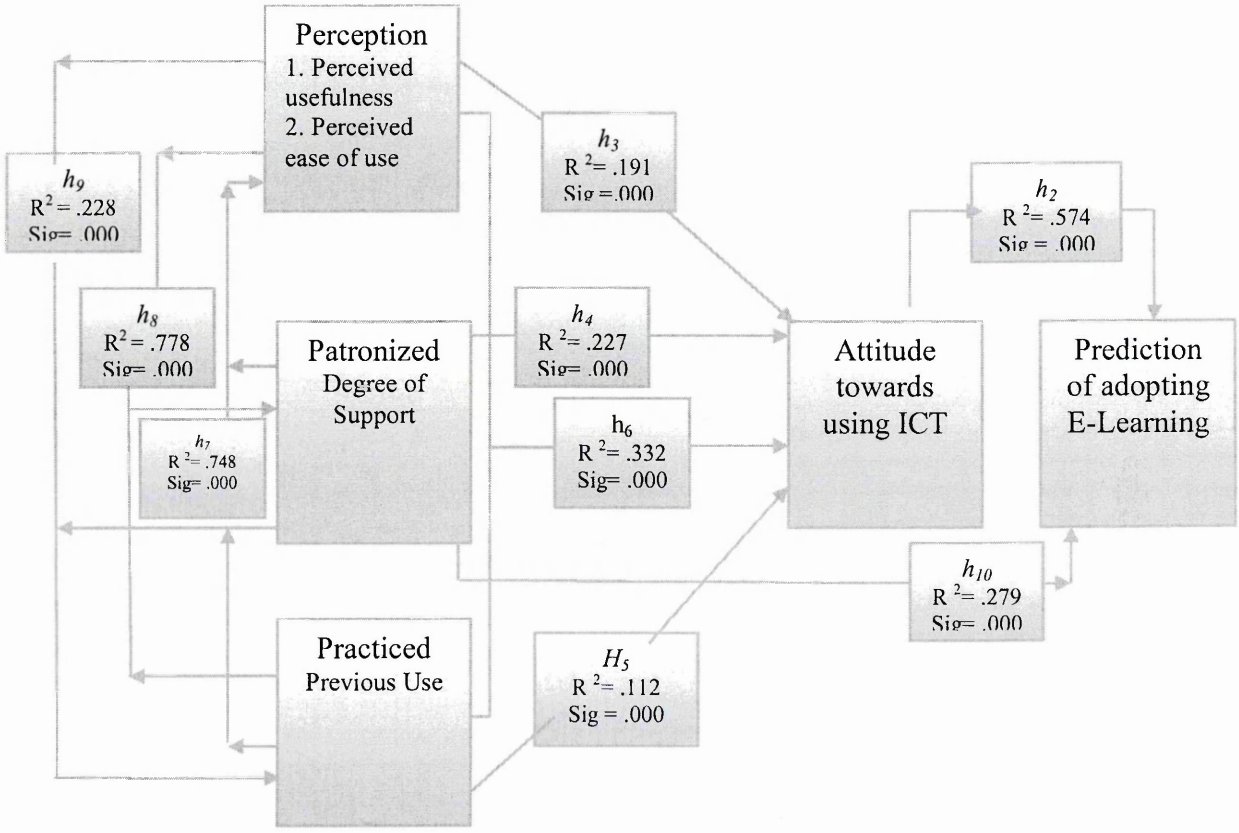


Figure 7.2: Hypotheses Testing for the User Group

Therefore, the model indicates that the three factors taken together moderately shapes Attitude and Attitude itself is strongly associated with E-learning Prediction.

For the Providers group all the relationships tested had strong measures of association and Figure 7.3 is an accurate representation.

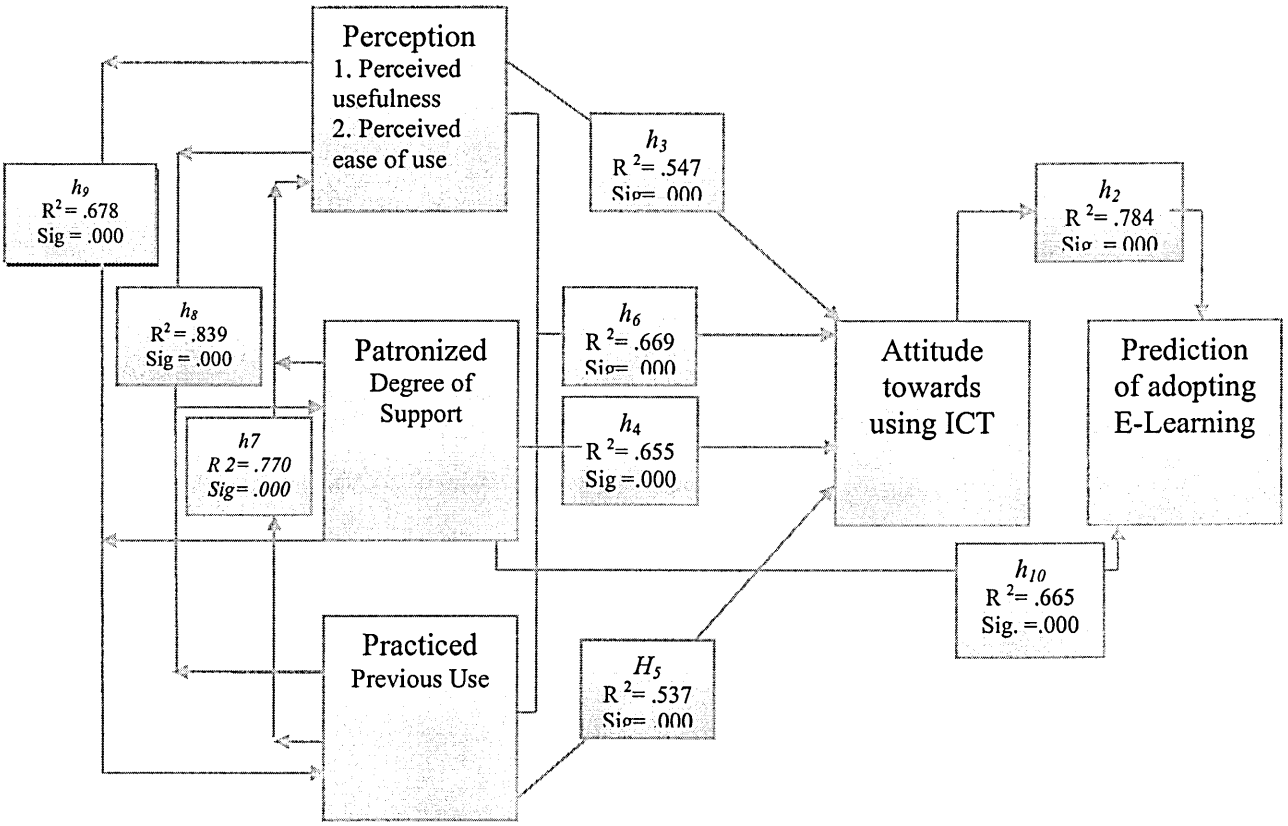


Figure 7.3: Hypotheses Testing for the Provider Group

As Figures 7.2 and 7.3 shows, attitude towards ICT examined in hypothesis h_2 accounted for a substantial amount of the variance in the prediction of E-Learning for both the Users and Providers. The goodness-of-fit for both groups is high and significant (Users R^2 = .574, sig. = .000; Providers R^2 = .784, sig. = .000). The finding of the importance of attitude for the prediction of E-Learning provides further support for the determination that attitude is the key variable in the model as analyzed through stepwise regression. The finding of a strong relationship between positive attitude towards ICT and prediction of E-Learning is also similar to the findings of researchers in other nations examining the relationship between attitude and adoption of E-Learning (Inal, Karakus & Cagiltay, 2008). The findings also show that the correlation between attitude and prediction is slightly different for both user and provider groups, which suggests that attitude is a key factor for

developing and implementing E-Learning in Jordan. This conclusion is also similar to the findings of previous researchers concerning the importance of attitude towards ICT among educators and administrators as a determinant of ICT adoption (Adams, 2008; Jimoyiannis & Komis, 2007). The findings also conform to the proposition of the TAM-EL model, that attitude is the most significant predictor for the intention to adopt a technology (Shin & Kim, 2008).

The analysis also identified a significant relationship between the variable of Patronised and Prediction of E-Learning, which was assessed with hypothesis h_{10}. The amount of support with ICT systems accounted for approximately 28% of the variance in Prediction of E-Learning among Users (R^2 = .279) and approximately 66% of the variance in Prediction of E-Learning among Providers (R^2 = .665). The variable of Patronised also contributes to the variance in Prediction of E-Learning by influencing Attitude, which has an effect on Prediction of E-Learning as an intermediate variable. The findings of a stronger relationship between the variables of Patronised and Prediction among the Providers when compared to Users provides some support for the argument of Fusilier and Durlabhji (2008) and might explain how ICT has become embedded to the degree of support in the general infrastructure of institutions of higher education. Moreover, Bhattacherjee and Hikmet (2008) argued that organizational support is capable of influencing perceptions of usefulness and ease of use, in turn influencing the acceptance of technology.

Hypotheses h_3, h_4, and h_5 assessed the direct relationship of the variables of Perception, Patronised and Practised on the variable of Attitude, while hypothesis h_6 evaluated the combined effect of these three variables on attitude. The purpose of the analysis was to determine the degree to which these three variables influenced Attitude, which was established by hypotheses h_2 as significant for Prediction of E-Learning. The TAM-EL

model proposes that these three variables account for the majority of the variance in attitude (Schneberger, Amoroso & Durfee, 2008).

With respect to the findings for the Users, the analysis as shown in Figure 7.2 indicated that the variables of Perception and Practised did not account for a significant amount of the variance in Attitude based on goodness-of-fit (R^2 Perception = .191; R^2 Practised = .112), although a weak correlation was found with both variables. The variable of Perception is composed of perceived usefulness of ICT and perceived ease of use. Based on the studies conducted by previous researchers, the low relationship between Perception and Attitude may be attributed to factors such as the absence of a university-led drive to encourage students to use computers in the learning process (Breen, et al., 2001). The findings suggest that the user population examined in this study had only a very low perception that ICT was useful and could easily be used in E-Learning. Similarly, the finding of a very weak correlation for Practised did not conform to the findings of previous researchers. Students with higher levels of experience with computers generally have more positive attitudes towards ICT and E-Learning (Breen, Lindsay, Roger, et al., 2001). In contrast to the findings concerning Perception and Practised, the Patronised variable had a stronger effect through model on Attitude among the user group (R^2 = .227, sig. = .000).

When the three variables of Perception, Patronised and Practised were considered together in a multiple regression analysis, they had a moderate effect on Attitude (R^2 = .332, sig. = .000). While these findings were significant, they nonetheless showed that the three variables accounted for only approximately 33% of the variance in Attitude among the user group. The low amount of variance accounted for by these three variables suggests that other variables not accounted for by the model may have influenced the relationship between Perception, Patronised, and Practised with Attitude. Deepwell and Malik (2008) as

well as Kirkwood (2008) noted that factors such as difficulty with ICT equipment could be a contributing factor influencing attitudes towards ICT and E-Learning, which may have influenced the Users in this study. Nonetheless, the findings generally confirm the validity of the TAM-EL model with respect to the factors influencing attitude among university students in Jordan, but the relationships are weaker than expected based on the findings of previous researchers (Schneberger, Amoroso & Durfee, 2008). The findings are also similar to those of Lam and Bordia (2008) concerning the importance of educational institutions providing sufficient support services to ensure that students and faculties can use ICT systems.

The analysis of the effect of the combined variables of Perception, Patronised, and Practised on Attitude among the provider group showed much stronger relationships than among the user group. As shown in Figure 7.3, the three variables were significant at .000 and had a moderate to strong effect on attitude (Perception R^2 = .547; Patronised R^2 = .655; Practised R^2 = .537). In addition, the three variables when considered together accounted for approximately 67% of the variance in attitude in the provider group (R^2 = .669). These findings confirm the validity of the proposition of the TAM-EL model that the perception of usefulness, the degree of support, and the amount of computer experience have a significant effect on the attitude towards ICT adoption for E-Learning. These findings were expected because previous research has identified perception of usefulness, the amount of support for ICT, and the amount of computer experience as significant factors influencing the attitude of administrators towards E-Learning (Enyon, 2008; Jimoyiannis & Komis, 2007; Kanuka & Rourke, 2008).

The data were also analyzed to test the interaction between the variables of Perception, Patronised and Practised using hypotheses h_7, h_8 and h_9. The analysis showed that there is a

high degree of interaction among the variables, with Perception, Patronised and Practised exerting cross-influences on each other in both the user and provider groups. The findings from the analysis as shown in Figure 7.2 and Figure 7.3 showed that the variable of Patronised and Practised accounted for the majority of the variance in Perception among Users (R^2 = .748) and among Providers (R^2 = .770). Similarly, Perception and Practised accounted for most of the variance in Patronised among Users (R^2 = .778) and Providers (R^2 = .839). A significant relationship also existed between the variables of Perception and Patronised and the variable of Practised. Among the Users, however, the two variables only accounted for approximately 29% of the variance in Practised among Users (R^2 = .228) while among the Providers, it accounted for approximately 68% of the variance (R^2 = .678). The findings generally suggest that the variable of Practised may be an important influence on the variables of Perception and Patronised. In particular the large amount of variance accounted for in the variable of Practised by Perception and Patronised among the Providers indicates that the perception of usefulness and the degree of support may influence the degree of use of ICT systems that increases experience. These findings are similar to those of Jimoyiannis and Komis (2007) who determined that experience with using ICT systems is a significant factor influencing perceptions of the usefulness of ICT in the learning environment.

The findings and the analysis provide an answer to the sub-research questions of the study by suggesting that the attitudes of Providers have a strong role in establishing E-Learning in institutions of higher education in Jordan. The attitudes of the Providers towards E-Learning are a very strong predictor of the adoption of E-Learning by the institution, and accounted for approximately 78% of the variance in Prediction of E-Learning. In addition, the degree of support of Providers as measured by the Patronised variable accounted for

approximately 66% of the variance in Prediction of E-Learning, suggesting that this variable is a significant factor contributing to Attitude and to Prediction. If the institution adopts E-Learning, it is likely that the availability of instruction through ICT will have a positive influence on the perception of usefulness of ICT among students, and thereby increase the strength of the relationship between Perception and Attitude among students. At the same time, the attitudes of the Users towards E-Learning can influence the degree that students actually avail themselves of opportunities to use E-Learning programs offered by universities.

The findings and the analysis concerned indicate that the Users also have an important role as stakeholders in the adoption of E-Learning in Jordan. While the variable of Attitude contributes to approximately 57% of the variance in the Prediction of E-Learning, the variable of Patronised contributes only approximately 28% of the variance in the Prediction of E-Learning. The findings with respect to Users also suggest that variables other than Perception, Patronised and Practised influence Attitude towards E-Learning and contribute to the variance in Attitude. A conclusion supported by these findings is that efforts to improve the variables of Perception and Patronised among university students in Jordan will have a beneficial effect on Attitude. This conclusion generally conforms to the findings of Breen, Lindsay, Roger, et al., (2001) regarding the importance of considering customer or end-user attitudes when developing and implementing E-Learning courses.

The findings with respect to the Users and Providers of E-Learning suggest that there is significant interaction between the two stakeholder groups when implementing E-Learning in universities in Jordan. The Providers have a relatively high perception of usefulness and ease of use of ICT systems when compared to Users. The Providers as administrators and educators are responsible for ensuring that students have the necessary skills and access to

ICT for E-Learning, which can contribute to an increase in the positive perception of student Users in Jordan towards E-Learning. The Providers also have a substantially higher level of perceived degree of support than Users as measured by the Patronised variable. This finding suggests that administrators and educators in the study population in Jordan may have access to ICT support that may not be extended to student Users of E-Learning systems. By increasing the amount of support available to students, institutions of higher education can foster a positive improvement in user attitudes towards E-Learning. The substantially larger correlation between the variable of Practised and Attitude and between Patronised and E-Learning among the provider group when compared to the user group suggests that Users could benefit from additional training and experience in the use of ICT systems for E-Learning.

7.4 Contribution of the Study

7.4.1 Theoretical contributions

The findings of the study contribute to theory by validating the application of a TAM-like model in the specific area of adoption of E-Learning in the developing nation of Jordan. The TAM-EL model is based on the premise that attitude towards a technology is the best predictor for adoption of that technology. However, from our research, whilst different in the model, Perceptions of the usefulness and ease of use of a technology, the degree of support for the technology, and experience using the technology or similar technologies influence attitude towards the technology. Additionally, Attitude and Patronised degree of support account for the majority of the variance among both Users and Providers in the intention to adopt E-Learning in a university in Jordan. Therefore, the findings suggest that

for Provider the model that is applicable to Jordan is a refined version of TAM-EL model see (figure 7.4).

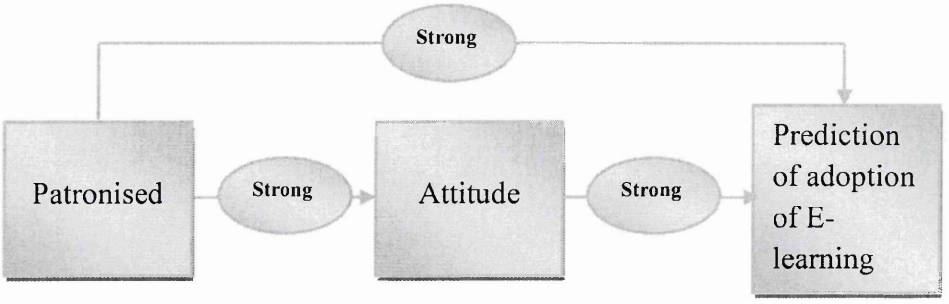


Figure 7.4: Theoretical TAM-EL Model for Providers

Similarly the finding suggests that for Users the model that is applicable to Jordan is a refined version of TAM-EL model see (figure 7.5).

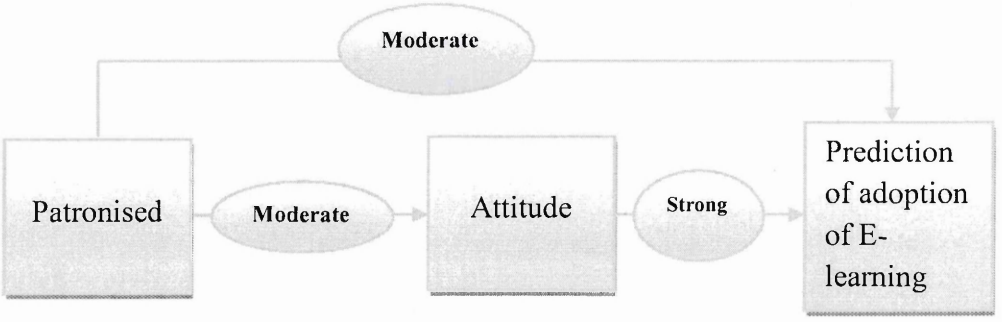


Figure 7.5: Theoretical TAM-EL Model for Users

Hence, we can see from these figures that contribution 1&2 (see section 1.4) have been fulfilled in that the evidence for these models along with the strength of association have been obtained through regression analysis. We also note the difference in association between the two independent variables Patronised and Attitude upon Prediction of adoption of E-learning in both groups. For Patronised the strength of association for Users it is moderate whilst for Providers it is strong. The same results are true for Patronised upon Attitude in that for Providers the strength of association whilst the strength of association is

moderate for Users. Clearly Attitude has strong strength of association for both Users and Providers upon prediction of adoption of E-learning.

This is to be expected in the context of any diffusion of technology, but particularly E-learning in the context of a developing country, because the degree of support, both organisational and in terms of infrastructure is a major factor that influences the adoption of E-learning. The study also contributes to the general theory related to the development of pedagogical models for implementing ICT and E-Learning in institutions of higher education by demonstrating that Users and Providers of E-Learning have different strength of association of critical variables influencing attitude. These findings have theoretical implications because they suggest that the degree of support (**Patronised**) in an institution of higher education may affect attitudes and intention to adopt E-Learning. Prior research examining the TAM model has not examined its application in this specific setting involving E-Learning.

7.4.2 Practical Contribution of the Study

This study made a practical contribution to institutions of higher education by identifying factors contributing to the adoption of E-Learning. The research question in this study considered the role of Providers and Users as stakeholders in adoption of E-Learning in institutions of higher education in Jordan. The findings of the study identified the factors that contribute to a positive attitude towards the adoption of E-Learning among both Users and Providers. The findings and conclusions of the study indicate that institutions considering implementing an E-Learning model should consider using methods to foster more positive attitudes among Users. Some of these methods include increasing user support and ensuring that the ICT systems supporting E-Learning are easy to use from the

perspective of students. This contribution is significant because of the increased need for universities in developing nations such as Jordan to adopt approaches to increases access to higher education. The following two figures represent the strength of association between the three external variables that have been added to the original TAM model; to structure a model that would work for the adoption of E-learning within the higher education institutions in Jordan.

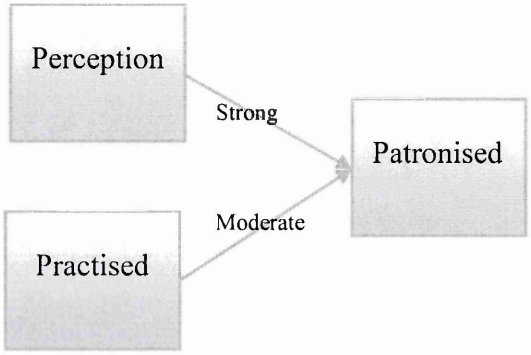


Figure 7.6: Providers Strength of Association External Variables.

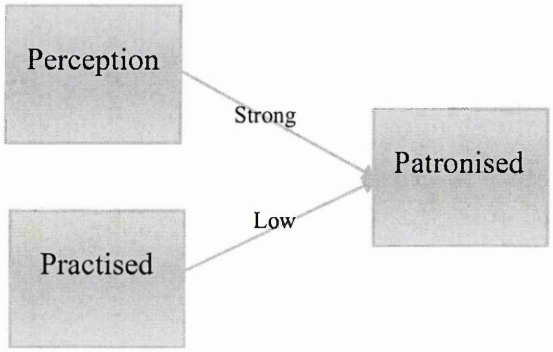


Figure 7.7: Users Strength of Association External Variables

Taking perception as the independent variable upon Patronised the result of the regression analysis shows that both Providers and Users have a strong association. Hence, we have provided a rich explanation of enablers and barriers thereby contribution 3 has been fulfilled (see section 1.4).

Taking Practised, as independent variable upon Patronised (degree of support), clearly shows that Providers have moderate strength of association whilst Users have low association. It could be that surveyed population of the Providers is quite competent in ICT, whilst the survey population of the Users are expressing their attitude in relation to the general.

It could be argued that for the surveyed population for the Users mainly students are quite competent of the importance in ICT use and therefore their perception of the importance of Practised is low. Whereas, for the providers Perception is based upon their attitude in relation to the population in general and therefore require a moderate level of ICT Practised.

7.5 Limitations

The focus of the study was on the variables described by the TAM-EL to explain the adoption of E-Learning in universities in Jordan. The TAM-EL established the boundaries for the research that precluded the investigation of additional variables that could influence attitudes towards E-Learning and the prediction of E-Learning adoption. The substantial differences between the user and provider groups for the relationship of important variables such as perception of usefulness, ease of use, and previous experience with attitude suggest that the Users may have been influenced by variables not considered in the research model.

Although the findings of the study validated the TAM-EL in the specific context of higher education in Jordan, the lack of available literature in the context of E-Learning was a major challenge for this investigation. Moreover, the empirical evidence in this area is even

more limited. It is necessary to consider a review of technology development and use in institutions of higher education in the Middle East.

Even so, the sample was obtained from Al-Balqa Applied University in Jordan. Al-Balaq Applied University contains 10 university colleges and 4 community colleges around the Hashemite kingdom of Jordan and to get a representative sample participants were required from all these university colleges, which involved considerable time and effort, especially given that a single researcher was responsible for the whole study.

7.6 Future Work

A possible direction for future research is to use a longitudinal study to examine the effect of interventions on the attitudes of Users towards E-Learning adoptions. As discussed in the preceding sections, institutions of higher education can possibly improve user adoption of E-Learning by improving perceptions of usefulness, ease of use of ICT systems, availability of support, and experience with ICT systems. Future research should examine the effectiveness of separate and discrete interventions intended to improve adoption of E-Learning over an extended period of time. Because factors such as ICT competencies and experience with ICT systems cannot be acquired rapidly by students, it is necessary to examine the effect of interventions over time.

Another possible direction for future research is a qualitative, exploratory investigation to identify the specific factors perceived by Users and Providers as barriers to E-Learning adoption in institutions of higher education in Jordan and other Arab nations. While this study identified factors contributing to the attitude towards E-Learning adoption, it did not examine the difficulties that Users and Providers perceive concerning E-Learning implementation. Institutions of higher education considering adopting E-Learning should

understand the nature of the specific difficulties it may encounter based on stakeholder perspectives. This type of information would be beneficial for developing strategies to reduce barriers and resistance to E-Learning implementation among Users and Providers.

7.7 Conclusion

Despite the limitations of this study, it has made a significant contribution to the theoretical and practical literature by applying the TAM-EL to the specific topic of stakeholder attitudes towards ICT in E-Learning adoption in universities in Jordan and other Arab nations. This area has been overlooked by previous researchers, but has substantial importance for understanding the factors influencing the adoption of E-Learning by institutions of higher education. The findings of the study demonstrated the importance of perceptions of usefulness and ease of use, the perception of support for ICT, and the prior ICT experience of stakeholders for attitudes towards E-Learning. The research model and the findings of the study can serve as a model for developing instructional programs to improve ICT skills among students and other stakeholders, which are a prerequisite for influencing attitudes positively towards E-Learning. The findings of the study also demonstrate the importance of investigating the interrelationship between the attitudes towards E-Learning among the various stakeholders in universities prior to developing and implementing E-Learning programs to ensure that the institution meets the perceived needs of stakeholders.

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Appendix 1-A: The Development of the Survey Questionnaire

The questions that have been used in this investigation were an English version derived from the literature; however, the actual questionnaire was translated from English to Arabic. Both the covering letter and the English version of the questionnaire are provided here.

Appendix 1-B: A Covering Letter

Dear Participant,

I am a PhD student under the supervision of Prof. Jawed Siddiqi, School of Art, Computing and Engineering Science (C3RI), Sheffield Hallam University, United Kingdom. I would like to invite you to be part of a research study. This research is entitled "Evaluating Stakeholders' Attitudes to Information Communication Technology in the adoption of E-learning in Jordan". The aim of the study is to identify the effect of perception of ICT, support for ICT, experience using ICT, and attitude, on the intention to adopt E-Learning among student Users and administrator and educator Providers of E-Learning in higher education in Jordan.

The following survey is purely academic and is part of the study. The survey is intended to obtain information regarding your opinions about Information Communication Technology and E-learning practices. Although there is no compensation for responding to the questions in this survey, the information that you provide will be important for developing a better understanding of stakeholders' attitudes in higher education, which will in turn provide a great contribution to the adoption of E-learning as well as to academic study.

Your participation in this survey is completely voluntary. It will require 15 to 20 minutes of your valuable time. There are no particular right or wrong answers to these questions. Please feel comfortable stating your own opinions in completing the survey questionnaire.

Sincerely,
Mazen Qteishat

Appendix 1-C: Questionnaire

Part1: demographical data:

1. What is your gender? (1) Male. (2) Female.
2. What is your age? (1) 25-35. (2) 35-45. (3) 45-55. (4) 55-65. (5) Over 65.
3. What is your position in the organization?
   (1) Student. (3) Staff Member. (4) Administrator.
4. How long have you been using computers? 1-5 6-10 11-15 16-20 over 20 years

Part 2: Perception of ICT by Stakeholder.	strongly disagree	Disagree	neutral	agree	strongly agree
1. My work would be difficult to perform without computers.	1	2	3	4	5
2. Using computers gives me greater control over my work.	1	2	3	4	5
3. Using computers improves my work performance.	1	2	3	4	5
4. Information communication technology addresses my work-related needs.	1	2	3	4	5
5. Using information communication technology saves me time.	1	2	3	4	5
6. Information communication technology enables me to accomplish tasks more quickly.	1	2	3	4	5
7. Electronic mail supports critical aspects of my job.	1	2	3	4	5
8. ICT provides helpful guidance in performing tasks.	1	2	3	4	5
9. Using electronic mail improves the quality of the work I do.	1	2	3	4	5
10. Using information communication technology improves my productivity.	1	2	3	4	5
11. My interaction with information communication technology is easy for me to understand.	1	2	3	4	5
12. I find it easy to get the electronic mail system to do what I want it to do.	1	2	3	4	5
13. I find it easy to recover from errors encountered while using computers.	1	2	3	4	5
14. Overall, I find the electronic information communication technology is easy to use.	1	2	3	4	5

Part 3: Patronised of ICT by Stakeholder.	strongly disagree	Disagree	neutral	agree	strongly agree
15. My university provides adequate IT to support my learning.	1	2	3	4	5
16. My university provides links to web resources.	1	2	3	4	5
17. I find it easy to interact effectively with the IT support staff concerning my problems.	1	2	3	4	5
18. My university would provide additional IT products to improve the quality of my work.	1	2	3	4	5
19. My university provides any time (24/7) access to learning materials.	1	2	3	4	5
20. My university provides technical training.	1	2	3	4	5
21. My university helps to organise and manage programmes.	1	2	3	4	5
22. My university provides access to learning materials from distance.	1	2	3	4	5
23. My university is aware of E-Learning benefits.	1	2	3	4	5
24. My university provides additional resources required for the development of technology.	1	2	3	4	5

Part4: Practised of ICT by Stakeholder.	strongly disagree	Disagree	neutral	agree	strongly agree
25. Computer use fits well into curriculum goals.	1	2	3	4	5
26. Computer use is limited.	1	2	3	4	5
27. Computer use suits students learning preferences.	1	2	3	4	5
28. Internet is used to access education material.	1	2	3	4	5
29. Laptops and other ICT equipment are encouraged to use.	1	2	3	4	5
30. Assignments require internet search.	1	2	3	4	5
31. Animated material is used in lectures.	1	2	3	4	5
32. Surfing the web, check your e-mail, etc. is frequently used in learning.	1	2	3	4	5
33. Authoring package to develop e-material is used.	1	2	3	4	5
34. Computers are used for grading purposes.	1	2	3	4	5

Part5: Attitudes to ICT by Stakeholder.	strongly disagree	Disagree	neutral	agree	strongly agree
35. Using E-Learning is a good idea.	1	2	3	4	5
36. Using E-Learning is beneficial for learning purpose.	1	2	3	4	5
37. Using E-Learning makes learning easy.	1	2	3	4	5
38. Using E-Learning in education makes students more productive.	1	2	3	4	5
39. Using E-Learning in education makes teachers more productive.	1	2	3	4	5
40. Greater learning takes place in doing web-based activities.	1	2	3	4	5
41. Submission of assignments electronically (through e-mail or other web based tools) is encouraged.	1	2	3	4	5
42. E-Learning should be offered fully online to reach everybody that lives in remote area.	1	2	3	4	5
43. E-Learning allows for off campus interaction between students and educators.	1	2	3	4	5
44. E-Learning should be a priority in education.	1	2	3	4	5

Part6: Prediction of E-Learning by Stakeholder.	strongly disagree	Disagree	neutral	agree	strongly agree
45. You would like to use web-based teaching.	1	2	3	4	5
46. You would like to use e-material like LMS, and HTM.	1	2	3	4	5
47. You would like to use e-exams.	1	2	3	4	5
48. You would like to be able to access e-library.	1	2	3	4	5
49. You would like to be able to use discussion board like black board, chat rooms, etc.	1	2	3	4	5
50. You would like to be able to access your courses electronically.	1	2	3	4	5
51. You would like to be able to use online features.	1	2	3	4	5
52. You would like to be able to list your course syllabus on line.	1	2	3	4	5
53. You would like to be able to embrace electronic conferences.	1	2	3	4	5
54. You would like to receive more training in E-Learning.	1	2	3	4	5

Appendix 1-D: The Refined Survey Questionnaire Used For the Analysis

Part1: demographical data:

1. What is your gender? (1). Male. (2). Female.
2. What is your age? (1) 25-35. (2) 35-45. (3) 45-55. (4) 55-65. (5) Over 65.
3. What is your position in the organization?
   (1). Student. (3). Staff Member. (4). Administrator.
4. How long have you been using computers? 1-5 6-10 11-15 16-20 over 20 years

Part 2: Perception of ICT by Stakeholder.	strongly disagree	Disagree	neutral	agree	strongly agree
1. My work would be difficult to perform without computers.	1	2	3	4	5
2. Using computers gives me greater control over my work.	1	2	3	4	5
3. Using computers improves my work performance.	1	2	3	4	5
4. Information communication technology addresses my work-related needs.	1	2	3	4	5
5. Using information communication technology saves me time.	1	2	3	4	5
6. Information communication technology enables me to accomplish tasks more quickly.	1	2	3	4	5
7. Electronic mail supports critical aspects of my job.	1	2	3	4	5
8. ICT provides helpful guidance in performing tasks.	1	2	3	4	5
9. Using electronic mail improves the quality of the work I do.	1	2	3	4	5
10. Using information communication technology improves my productivity.	1	2	3	4	5

Part 3: Patronised of ICT by Stakeholder.	strongly disagree	Disagree	neutral	agree	strongly agree
11. My university provides adequate IT to support my learning.	1	2	3	4	5
12. My university provides links to web resources.	1	2	3	4	5
13. I find it easy to interact effectively with the IT support staff concerning my problems.	1	2	3	4	5
14. My university would provide additional IT products to improve the quality of my work.	1	2	3	4	5
15. My university provides any time (24/7) access to learning materials.	1	2	3	4	5
16. My university provides technical training.	1	2	3	4	5
17. My university helps to organise and manage programmes.	1	2	3	4	5
18. My university provides access to learning materials from distance.	1	2	3	4	5
19. My university is aware of E-Learning benefits.	1	2	3	4	5
20. My university provides additional resources required for the development of technology.	1	2	3	4	5

Part4: Practised of ICT by Stakeholder.	strongly disagree	Disagree	neutral	agree	strongly agree
21. Computer use fits well into curriculum goals.	1	2	3	4	5
22. Computer use is limited.	1	2	3	4	5
23. Internet is used to access education material.	1	2	3	4	5
24. Animated material is used in lectures.	1	2	3	4	5
25. Surfing the web, check your e-mail, etc is frequently used in learning.	1	2	3	4	5
26. Computers are used for grading purposes.	1	2	3	4	5

Part5: Attitudes to ICT by Stakeholder.	strongly disagree	Disagree	neutral	agree	strongly agree
27. Using E-Learning is a good idea.	1	2	3	4	5
28. Using E-Learning is beneficial for learning purpose.	1	2	3	4	5
29. Using E-Learning makes learning easy.	1	2	3	4	5
30. Using E-Learning in education makes students more productive.	1	2	3	4	5
31. Using E-Learning in education makes teachers more productive.	1	2	3	4	5
32. Greater learning takes place in doing web-based activities.	1	2	3	4	5
33. Submission of assignments electronically (through e-mail or other web based tools) is encouraged.	1	2	3	4	5
34. E-Learning allows for off campus interaction between students and educators.	1	2	3	4	5

Part6: Prediction of E-Learning by Stakeholder.	strongly disagree	Disagree	neutral	agree	strongly agree
35. You would like to use web-based teaching.	1	2	3	4	5
36. You would like to use e-material like LMS, and HTM.	1	2	3	4	5
37. You would like to use e-exams.	1	2	3	4	5
38. You would like to be able to access e-library.	1	2	3	4	5
39. You would like to be able to use discussion board like black board, chat rooms, etc.	1	2	3	4	5
40. You would like to be able to access your courses electronically.	1	2	3	4	5
41. You would like to be able to use online features.	1	2	3	4	5
42. You would like to be able to list your course syllabus on line.	1	2	3	4	5
43. You would like to be able to embrace electronic conferences.	1	2	3	4	5
44. You would like to receive more training in E-Learning.	1	2	3	4	5

Appendix 2: Cook's Distance for Users' Attitude, Perception, Patronised, and Practised upon E-Learning Prediction (H1).

.00006	.00003	.00585	.00113	.00015	.00647	.01202
.00025	.00078	.00120	.00019	.00000	.00187	.00122
.00025	.00003	.00039	.00065	.00350	.00039	.00652
.00301	.00001	.00022	.00361	.00135	.00023	.00001
.00006	.00002	.00014	.00001	.00385	.00236	.00000
.00142	.00000	.00001	.00000	.00134	.00532	.00007
.00004	.00238	.00054	.00217	.00005	.00074	.00192
.00000	.00004	.00164	.00849	.00061	.00062	.00000
.00007	.01258	.00742	.00344	.00049	.00357	.00067
.00001	.00179	.00174	.00006	.00000	.00258	.00007
.00010	.00237	.00128	.00533	.03129	.00295	.00002
.00000	.00055	.00044	.00003	.00437	.00036	.00430
.00023	.00066	.00055	.00040	.00000	.00006	.00297
.00051	.00615	.01016	.00054	.00231	.00001	.00164
.00036	.00048	.00064	.00011	.00023	.00070	.01147
.00191	.02949	.00162	.00041	.00354	.00082	.00038
.00173	.00001	.00109	.00001	.00100	.00235	.00160
.00027	.00002	.00124	.01085	.00000	.00429	.00012
.00016	.00009	.00057	.00290	.00065	.02281	.00160
.00005	.00073	.00135	.00167	.00361	.00022	.00028
.00011	.00060	.00383	.00015	.00049	.00056	
.00290	.00070	.00000	.00001	.00001	.00284	
.00035	.00145	.00001	.00064	.00125	.00037	
.00138	.00037	.00025	.00128	.00427	.00009	
.00009	.00042	.00056	.00742	.00127	.00431	
.00020	.00009	.00699	.00117	.00006	.00115	
.00091	.00700	.00000	.00128	.00533	.00450	
.00006	.00007	.00055	.00044	.00003	.00189	
.00149	.00128	.00406	.00040	.00046	.00041	
.00003	.00007	.00118	.01016	.00053	.00588	
.00071	.00763	.00021	.00066	.00634	.00053	
.00077	.00112	.00013	.00162	.00307	.00006	
.00088	.00705	.00021	.00109	.02076	.00006	
.00018	.00291	.00000	.00124	.00001	.00015	
.00394	.00499	.00462	.00066	.00003	.02037	
.00019	.01774	.00087	.00135	.00001	.01239	
.00113	.00515	.00366	.00328	.00008	.01398	
.00024	.00252	.00313	.00000	.00012	.00085	
.00013	.00000	.00328	.00000	.00848	.00442	
.00121	.00391	.00287	.00025	.00467	.00195	
.00064	.00014	.00101	.00148	.01082	.00008	
.00019	.00923	.00001	.00699	.01628	.02236	
.00003	.00423	.00006	.00026	.00680	.01412	
.00011	.01133	.00042	.00055	.00940	.00714	
.00000	.00316	.00042	.00175	.00514	.01847	
.00001	.00004	.00067	.00064	.00728	.00432	
.00063	.00028	.00361	.00050	.00012	.00000	
.00063	.00008	.00187	.00013	.00023	.00189	
.00093	.00001	.00106	.00045	.00055	.00545	
.00001	.00141	.00052	.00000	.00015	.00138	
.00059	.00092	.00005	.00462	.00632	.00193	
.00175	.00172	.00118	.00082	.00296	.00012	
.00036	.02375	.00018	.00099	.00333	.01761	
.00099	.00221	.00000	.00313	.00161	.00463	
.00050	.00058	.03129	.00375	.00002	.00451	
.00003	.00291	.00916	.00287	.00014	.00420	
.00122	.00528	.00002	.00101	.00497	.00052	
.00030	.00204	.00408	.00001	.00467	.00244	
.00083	.00162	.00023	.00008	.00010	.01150	
.00045	.01905	.00354	.00042	.00274	.00031	

Appendix 3: Central Leverage for Users' Attitude, Perception, Patronised, and Practised upon E-Learning Prediction (H1).

.00503	.00422	.01971	.00974	.00811	.02131	.00609
.01847	.00838	.01629	.00745	.00500	.00993	.00657
.01622	.00193	.02528	.00158	.00759	.00581	.02439
.01078	.00225	.01496	.00793	.00615	.02316	.00465
.00740	.00330	.00619	.01584	.00202	.01541	.00255
.01736	.00365	.00348	.01454	.00263	.00655	.01051
.00343	.01265	.00469	.00830	.00157	.01947	.01014
.00584	.00296	.00268	.01766	.00268	.01565	.00867
.00904	.02084	.00695	.01366	.00815	.00466	.00971
.00577	.02280	.01111	.01218	.00690	.01180	.01409
.00642	.02906	.02436	.01663	.02899	.00719	.00457
.00330	.01675	.00385	.00183	.00433	.00204	.02447
.01179	.00837	.00237	.00229	.00583	.01642	.02973
.01109	.03750	.01229	.01102	.00193	.00684	.01581
.02986	.01233	.00704	.01452	.00139	.00358	.03153
.03777	.06056	.00995	.00681	.00600	.00951	.01029
.00815	.00135	.01187	.00886	.01072	.00719	.01122
.00297	.00187	.00985	.01290	.00595	.00481	.00748
.00744	.01638	.00545	.01325	.00158	.01583	.02661
.00252	.01622	.00796	.00185	.00793	.00444	.00337
.00760	.00780	.01278	.00387	.00816	.00608	
.01416	.01438	.00764	.00348	.00719	.02276	
.00570	.01591	.00126	.00818	.00355	.00808	
.00637	.01670	.00864	.00121	.00934	.03342	
.00171	.01118	.00267	.00695	.00337	.01409	
.00454	.00350	.01074	.00790	.01218	.00817	
.01591	.01437	.00581	.02436	.01663	.01786	
.00462	.01398	.00751	.00385	.00183	.00193	
.00672	.02779	.00807	.00150	.00249	.01068	
.00372	.01381	.00275	.01229	.00901	.03151	
.00942	.01600	.00477	.00673	.03844	.00713	
.00879	.00755	.00476	.00995	.00879	.00551	
.01705	.02076	.00756	.01187	.01359	.00723	
.00859	.02536	.00642	.00985	.02356	.00392	
.03263	.00992	.01075	.01218	.01355	.01136	
.01046	.01791	.01002	.00796	.02015	.00730	
.01520	.01407	.02594	.01414	.01117	.01488	
.00181	.01174	.01236	.00726	.00317	.01307	
.00718	.00956	.01260	.00270	.00565	.00732	
.01297	.01560	.00328	.00864	.00448	.00618	
.01185	.01749	.00237	.00273	.00935	.00209	
.00274	.01040	.00127	.01074	.01214	.01238	
.00139	.03736	.00068	.00312	.00929	.00953	
.01770	.05075	.00374	.00751	.03075	.00083	
.00063	.01407	.01397	.01019	.00783	.00181	
.00508	.00774	.01068	.00745	.01054	.00267	
.00822	.00135	.00364	.00926	.00346	.00228	
.00822	.02914	.00416	.00476	.00161	.00873	
.00674	.02132	.00276	.01031	.01685	.00575	
.00198	.02207	.00295	.00642	.01291	.02073	
.01352	.02029	.00157	.01075	.00524	.01688	
.01581	.02336	.00378	.00762	.00505	.00823	
.01694	.04736	.00326	.02073	.00312	.01014	
.00788	.02801	.00690	.01236	.00439	.00199	
.00324	.02406	.02899	.01071	.00583	.01012	
.00243	.02536	.01195	.00328	.00302	.00731	
.00902	.02043	.01010	.00237	.00237	.00410	
.00262	.02305	.00504	.00127	.01924	.00327	
.00798	.03037	.00139	.00039	.01752	.00751	
.00308	.01919	.00600	.00374	.00556	.00878	

Appendix 4: Cook's Distance for Providers' Attitude, Perception, Patronised, and Practised upon E-Learning Prediction (H1).

.00090	.00066	.00989	.00361	.00021
.00003	.00562	.00039	.00009	.03220
.00122	.00028	.00200	.00295	.03429
.00002	.00004	.00031	.01133	.00413
.00012	.00007	.00001	.00155	.00260
.00156	.00003	.00074	.00000	.00002
.00001	.00469	.00052	.01622	
.00023	.00009	.00446	.09051	
.00081	.01265	.02668	.01597	
.00197	.00115	.00243	.01095	
.00076	.00390	.00261	.02294	
.00012	.00004	.00080	.00062	
.00081	.00038	.00159	.00169	
.00337	.04359	.02206	.00515	
.00031	.00124	.00054	.00184	
.00142	.06874	.00705	.00025	
.00262	.00012	.00565	.00363	
.00045	.00012	.00815	.01813	
.00135	.00009	.00284	.00043	
.00001	.00062	.00758	.00264	
.00018	.00190	.01143	.00009	
.00156	.00044	.00016	.00035	
.00002	.00069	.00003	.00011	
.00332	.00125	.00015	.00009	
.00000	.00024	.00134	.00197	
.00018	.00077	.02726	.00044	
.00007	.01533	.00146	.00119	
.00003	.00143	.00091	.00445	
.00388	.00032	.00764	.00011	
.00002	.00045	.00241	.00809	
.00009	.00845	.00064	.00274	
.00159	.00249	.00044	.00314	
.00011	.02415	.00017	.00285	
.00010	.00764	.00035	.00080	
.00220	.01302	.01854	.00000	
.00011	.04508	.00815	.00002	
.00119	.00497	.00349	.00081	
.00036	.00453	.01144	.00002	
.00090	.00013	.01289	.00032	
.00109	.00782	.01047	.01067	
.00095	.00153	.00258	.00000	
.00008	.01813	.00001	.00214	
.00032	.00784	.00017	.00040	
.00052	.03413	.00223	.00264	
.00030	.00279	.00008	.00545	
.00009	.00012	.00185	.00031	
.00216	.00117	.00501	.00532	
.00128	.00059	.00708	.00055	
.00078	.00071	.00523	.00431	
.00001	.00070	.00229	.00143	
.00004	.00394	.00006	.00014	
.00057	.00078	.00376	.00228	
.00121	.04743	.00096	.00211	
.00188	.00075	.00074	.00268	
.00120	.00160	.17285	.00593	
.00055	.00764	.05001	.01191	
.00192	.01339	.00001	.00063	
.00001	.00927	.02289	.00002	
.00022	.00024	.00140	.00046	
.00127	.09527	.01477	.00014	

Appendix 5: Central Leverage for Providers' Attitude, Perception, Patronised, and Practised upon E-Learning Prediction (H1).

.00396	.01052	.01468	.02483	.02572
.00939	.00900	.01180	.02732	.03777
.01023	.00511	.02175	.00575	.03463
.00195	.00365	.01212	.02510	.01349
.00381	.00339	.01516	.06137	.01164
.00292	.00543	.00579	.05417	.01766
.00242	.01053	.01552	.02985	
.01777	.00455	.00591	.05312	
.00429	.01757	.02123	.02831	
.00471	.02393	.01465	.03582	
.00395	.03206	.07561	.03914	
.00381	.01441	.00451	.00308	
.01340	.00792	.00419	.00686	
.01377	.07681	.02010	.02717	
.01528	.01748	.01272	.01110	
.01109	.07559	.01662	.00518	
.01219	.00210	.01369	.01508	
.00259	.00210	.01430	.01759	
.00560	.01712	.01601	.02846	
.00516	.02074	.02010	.00140	
.00511	.00871	.01816	.00734	
.00546	.01692	.01726	.03205	
.00611	.01248	.00494	.01352	
.00968	.01408	.01444	.00700	
.00485	.01268	.00343	.00850	
.00167	.00608	.01939	.03500	
.00339	.01087	.01119	.00975	
.01190	.01623	.02429	.01391	
.00853	.02569	.02043	.01352	
.00199	.01221	.01503	.01938	
.00734	.01280	.01671	.01276	
.01048	.01069	.00805	.01365	
.01352	.03326	.02508	.00934	
.00917	.02111	.01660	.00559	
.00972	.01108	.01584	.00569	
.00991	.03843	.02694	.01141	
.00975	.01020	.05459	.01493	
.00455	.01865	.02421	.00199	
.00396	.00837	.01995	.00371	
.00865	.02026	.01181	.01967	
.00686	.02327	.00360	.00800	
.00332	.01759	.00395	.02867	
.00391	.03909	.00285	.00996	
.00637	.06362	.00775	.00140	
.00339	.01676	.02546	.02278	
.01883	.01110	.03004	.00684	
.01048	.00591	.01066	.00360	
.00437	.02183	.01523	.02780	
.01211	.01598	.01952	.00797	
.00344	.02596	.01129	.01623	
.01210	.03442	.00532	.01495	
.01131	.02526	.01408	.03549	
.04553	.04478	.01302	.01557	
.01630	.02096	.02429	.02201	
.00374	.01525	.06527	.03075	
.00362	.02111	.02988	.02478	
.01002	.01963	.03141	.01820	
.00921	.02304	.02068	.01125	
.00700	.02156	.01131	.02287	
.00365	.05203	.01322	.01746	

Appendix 6: Cook's Distance for Users' Attitude upon E-Learning Prediction (H2).

.00000	.00015	.01186	.00140	.00005	.00553	.02620
.00060	.00037	.00456	.00040	.00000	.00144	.00182
.00060	.00004	.00001	.00161	.00349	.00015	.01607
.00333	.00005	.00129	.00540	.00123	.00080	.00000
.00000	.00005	.00021	.00004	.00616	.00048	.00003
.00207	.00000	.00003	.00005	.00211	.00766	.00022
.00004	.00161	.00114	.00220	.00018	.00019	.00140
.00005	.00004	.00250	.00361	.00090	.00025	.00003
.00015	.01955	.00788	.00174	.00019	.00349	.00096
.00015	.00149	.00258	.00001	.00005	.00199	.00017
.00033	.00197	.00071	.00421	.00482	.00174	.00005
.00000	.00197	.00059	.00004	.00322	.00060	.00718
.00060	.00157	.00090	.00036	.00003	.00016	.00303
.00144	.00183	.00551	.00028	.00388	.00004	.00433
.00090	.00105	.00019	.00037	.00040	.00064	.00809
.00258	.00164	.00090	.00134	.00268	.00051	.00020
.00107	.00003	.00123	.00003	.00140	.00168	.00343
.00017	.00003	.00071	.01269	.00004	.00390	.00001
.00028	.00049	.00016	.00190	.00161	.00773	.00009
.00004	.00197	.00084	.00378	.00540	.00008	.00038
.00000	.00174	.00063	.00021	.00101	.00036	
.00101	.00245	.00012	.00003	.00005	.00127	
.00019	.00518	.00000	.00114	.00220	.00080	
.00100	.00003	.00033	.00250	.00361	.00044	
.00019	.00020	.00069	.00788	.00174	.00123	
.00021	.00020	.00272	.00258	.00001	.00104	
.00021	.01124	.00004	.00071	.00421	.00161	
.00004	.00003	.00090	.00059	.00004	.00307	
.00161	.00029	.00276	.00090	.00036	.00015	
.00004	.00003	.00198	.00551	.00028	.00048	
.00121	.01517	.00069	.00019	.00168	.00020	
.00139	.00157	.00025	.00090	.00227	.00010	
.00121	.00538	.00005	.00123	.00773	.00028	
.00060	.00132	.00004	.00071	.00005	.00033	
.00028	.00907	.00325	.00016	.00003	.01196	
.00084	.00834	.00028	.00084	.00003	.01751	
.00220	.01217	.00433	.00063	.00014	.01000	
.00049	.00190	.00259	.00012	.00014	.00060	
.00033	.00003	.00301	.00000	.00931	.00587	
.00140	.00762	.00519	.00033	.00481	.00252	
.00094	.00041	.00144	.00186	.00725	.00004	
.00034	.01269	.00005	.00272	.00843	.02290	
.00004	.00344	.00016	.00019	.00309	.00667	
.00003	.01771	.00034	.00090	.00084	.01259	
.00004	.00401	.00061	.00123	.00378	.04047	
.00005	.00028	.00069	.00048	.00426	.00576	
.00049	.00036	.00430	.00069	.00008	.00000	
.00049	.00256	.00198	.00025	.00033	.00198	
.00101	.00015	.00139	.00005	.00001	.00629	
.00004	.00256	.00104	.00004	.00000	.00144	
.00090	.00035	.00018	.00325	.00430	.00069	
.00229	.00197	.00155	.00028	.00268	.00008	
.00090	.00594	.00019	.00140	.00309	.00763	
.00258	.00861	.00005	.00259	.00161	.00788	
.00051	.00002	.00482	.00387	.00004	.00425	
.00000	.00132	.00322	.00519	.00020	.00474	
.00078	.00783	.00003	.00144	.00551	.00036	
.00059	.00253	.00388	.00005	.00161	.00255	
.00094	.00833	.00040	.00016	.00004	.00834	
.00049	.00834	.00268	.00034	.00267	.00017	

Appendix 7: Central Leverage for Users' Attitude upon E-Learning Prediction (H2).

.00028	.00001	.01462	.00169	.00058	.00365	.00457
.00001	.00002	.01132	.00058	.00149	.00282	.00282
.00001	.00058	.02035	.00149	.00098	.00038	.01292
.00115	.00028	.00983	.00210	.00210	.00098	.00015
.00028	.00028	.00149	.00058	.00038	.00365	.00015
.00169	.00058	.00015	.00210	.00028	.00282	.00310
.00058	.00210	.00282	.00282	.00058	.00098	.00169
.00058	.00098	.00001	.00210	.00098	.00282	.00015
.00001	.01132	.00058	.00058	.00098	.00098	.00015
.00001	.01132	.00365	.00365	.00210	.00457	.00028
.00002	.01462	.00210	.00396	.00009	.00058	.00015
.00028	.01462	.00002	.00098	.00009	.00149	.00599
.00149	.00599	.00098	.00001	.00001	.00001	.00396
.00282	.00717	.00001	.00149	.00058	.00098	.00717
.00098	.00983	.00098	.00002	.00058	.00009	.00717
.00365	.00071	.00149	.00492	.00098	.00098	.00396
.00015	.00115	.00210	.00599	.00169	.00038	.00492
.00028	.00115	.00210	.00396	.00009	.00001	.00310
.00149	.00983	.00001	.00396	.00149	.00002	.01132
.00098	.01462	.00282	.00115	.00210	.00149	.00028
.00098	.00717	.00001	.00149	.00210	.00009	
.00210	.00983	.00282	.00015	.00210	.00098	
.00098	.01292	.00038	.00282	.00282	.00098	
.00009	.00845	.00002	.00001	.00210	.00098	
.00098	.00396	.00028	.00058	.00058	.00210	
.00149	.00234	.00028	.00365	.00365	.00149	
.00149	.01132	.00009	.00210	.00396	.00149	
.00098	.00845	.00149	.00002	.00098	.00058	
.00210	.00599	.00028	.00098	.00001	.00365	
.00098	.00492	.00098	.00001	.00149	.00365	
.00058	.00845	.00365	.00098	.00038	.00058	
.00098	.00599	.00282	.00149	.00038	.00210	
.00058	.00983	.00015	.00210	.00002	.00365	
.00149	.01462	.00149	.00210	.00282	.00002	
.00365	.00845	.00234	.00001	.00038	.00058	
.00282	.00028	.00149	.00282	.00015	.00282	
.00282	.00845	.00717	.00001	.00015	.00149	
.00149	.00396	.00599	.00282	.00002	.00149	
.00002	.00599	.00717	.00038	.00071	.00149	
.00015	.01292	.00098	.00002	.00015	.00098	
.00002	.01462	.00002	.00002	.00038	.00028	
.00001	.00396	.00002	.00028	.00038	.00365	
.00058	.00310	.00009	.00098	.00001	.00002	
.00002	.01462	.00001	.00149	.00282	.00001	
.00009	.00396	.00282	.00210	.00071	.00149	
.00058	.00115	.00365	.00365	.00038	.00009	
.00149	.00001	.00028	.00365	.00149	.00210	
.00149	.01834	.00098	.00282	.00002	.00098	
.00210	.01462	.00098	.00015	.00365	.00098	
.00009	.01834	.00149	.00149	.00282	.00009	
.00098	.00983	.00058	.00234	.00028	.00028	
.00149	.01462	.00028	.00149	.00098	.00149	
.00098	.01132	.00098	.00492	.00001	.00001	
.00365	.01462	.00210	.00599	.00149	.00058	
.00071	.01462	.00009	.00599	.00009	.00210	
.00001	.01462	.00009	.00098	.00058	.00149	
.00058	.01642	.00001	.00002	.00001	.00009	
.00002	.01292	.00058	.00002	.00149	.00071	
.00002	.02035	.00058	.00009	.00028	.00028	
.00149	.00028	.00098	.00001	.00210	.00028	

Appendix 8: Cook's Distance for Providers' Attitude upon E-Learning Prediction (H2).

.00086	.00024	.01714	.00338	.00151
.00035	.00450	.00223	.00144	.02882
.00039	.00086	.00440	.00320	.01817
.00006	.00030	.00193	.01699	.00792
.00024	.00030	.00002	.00394	.00791
.00284	.00030	.00199	.00049	.00008
.00007	.00582	.00105	.00375	
.00003	.00030	.00636	.01324	
.00086	.01876	.02276	.00406	
.00394	.00013	.00405	.00275	
.00086	.00223	.00101	.00946	
.00024	.00008	.00151	.00151	
.00275	.00081	.00180	.00092	
.00613	.00083	.01388	.00034	
.00180	.00523	.00007	.00020	
.00405	.00383	.00334	.00079	
.00069	.00020	.00563	.00926	
.00059	.00020	.00406	.01625	
.00169	.00017	.00042	.00035	
.00002	.00008	.00105	.00591	
.00003	.00582	.00162	.00097	
.00203	.00086	.00001	.00101	
.00036	.00232	.00000	.00097	
.00162	.00120	.00085	.00097	
.00001	.00001	.00160	.00188	
.00035	.00084	.00784	.00105	
.00030	.02823	.00086	.00375	
.00030	.00120	.00334	.00643	
.00582	.00000	.00206	.00097	
.00006	.00063	.00032	.00758	
.00097	.01560	.00004	.00188	
.00406	.00081	.00155	.00563	
.00097	.01516	.00017	.00672	
.00097	.00833	.00039	.00155	
.00188	.02144	.00714	.00036	
.00105	.02335	.00034	.00084	
.00375	.01187	.00421	.00003	
.00086	.00161	.00182	.00006	
.00086	.00019	.00322	.00086	
.00039	.00451	.01564	.00935	
.00039	.00508	.00332	.00033	
.00030	.01625	.00009	.00275	
.00086	.00389	.00049	.00180	
.00014	.04472	.00084	.00591	
.00086	.00423	.00289	.01539	
.00035	.00026	.00344	.00079	
.00203	.00092	.00375	.01093	
.00203	.00003	.00206	.00002	
.00024	.00097	.00101	.00358	
.00001	.00003	.00192	.00120	
.00097	.00307	.00071	.00032	
.00219	.00008	.00180	.00002	
.00180	.01746	.00086	.00276	
.00405	.00476	.00049	.00307	
.00069	.00262	.01230	.00399	
.00059	.00833	.00818	.00177	
.00169	.02610	.00008	.00476	
.00002	.01074	.00953	.00085	
.00003	.00253	.00144	.00019	
.00203	.04973	.00613	.00151	

Appendix 9: Central Leverage for Providers' Attitude upon E-Learning Prediction (H2).

.00228	.00160	.00849	.00090	.00207
.00104	.00104	.00998	.00160	.00474
.00308	.00228	.01925	.00308	.00060
.00104	.00228	.00587	.00400	.01333
.00160	.00228	.00160	.00400	.00587
.00228	.00228	.00049	.00400	.01333
.00060	.00400	.00308	.00505	
.00228	.00228	.00028	.00104	
.00228	.00998	.00160	.00160	
.00400	.00998	.00621	.00160	
.00228	.00998	.00400	.00284	
.00160	.01333	.00008	.00008	
.00160	.00474	.00228	.00028	
.00228	.00587	.00028	.00308	
.00228	.00849	.00060	.00049	
.00621	.00021	.00308	.00373	
.00021	.00049	.00160	.00998	
.00104	.00049	.00160	.00284	
.00160	.00712	.00028	.00712	
.00160	.01333	.00505	.00049	
.00228	.00587	.00028	.00308	
.00308	.00849	.00505	.00400	
.00028	.01159	.00004	.00308	
.00028	.00712	.00008	.00308	
.00104	.00284	.00104	.00621	
.00060	.00142	.00104	.00505	
.00228	.00998	.00228	.00505	
.00228	.00712	.00308	.00060	
.00400	.00474	.00400	.00308	
.00104	.00373	.00621	.00008	
.00308	.00712	.00228	.00621	
.00160	.00474	.00505	.00160	
.00308	.00849	.00021	.00308	
.00308	.01333	.00308	.00000	
.00621	.00712	.00142	.00028	
.00505	.00104	.00308	.00060	
.00505	.00712	.00373	.00228	
.00228	.00284	.00474	.00104	
.00228	.00474	.00474	.00228	
.00308	.01159	.00228	.00000	
.00308	.01333	.00008	.00505	
.00228	.00284	.00008	.00160	
.00228	.00207	.00060	.00228	
.00060	.01333	.00028	.00049	
.00228	.00284	.00505	.01159	
.00104	.00049	.00621	.00373	
.00308	.00028	.00505	.00142	
.00308	.01715	.00400	.00849	
.00160	.01333	.00400	.00284	
.00104	.01715	.00308	.00712	
.00308	.00849	.00160	.00142	
.00505	.01333	.00228	.00142	
.00228	.00998	.00228	.00284	
.00621	.01333	.00400	.00849	
.00021	.01333	.00060	.00849	
.00104	.01333	.00060	.00474	
.00160	.01518	.00028	.01333	
.00160	.01159	.00160	.00712	
.00228	.01925	.00160	.00587	
.00308	.00308	.00228	.00207	

Appendix 10: Cook's Distance for Users' Patronised upon E-Learning Prediction (H10).

.00035	.00009	.02014	.00034	.00135	.00009	.00211
.00040	.00092	.00936	.00023	.00014	.00229	.00001
.00040	.00001	.00887	.00182	.00290	.00031	.00170
.00004	.00008	.00462	.00000	.00334	.01079	.00000
.00000	.00004	.00000	.00022	.00182	.00868	.00013
.00047	.00013	.00013	.00020	.00112	.00215	.00023
.00000	.00024	.00001	.00304	.00010	.00000	.00009
.00001	.00004	.00089	.00347	.00104	.00035	.00034
.00019	.02246	.00125	.00151	.00009	.00538	.00005
.00019	.00663	.00255	.00085	.00138	.00340	.00001
.00019	.00997	.00018	.00000	.03950	.00611	.00005
.00000	.01004	.00004	.00001	.00710	.00143	.00063
.00002	.00347	.00115	.00119	.00041	.00026	.00009
.00102	.01550	.00194	.00226	.00282	.00072	.00085
.00002	.00183	.00192	.00086	.00009	.00087	.00028
.00255	.01038	.00201	.00257	.00556	.00128	.00233
.00139	.00009	.00147	.00136	.00034	.00263	.00051
.00017	.00009	.00164	.01167	.00023	.00233	.00113
.00073	.00393	.00115	.00306	.00182	.00906	.01079
.00004	.01027	.00397	.00301	.00000	.00144	.00001
.00002	.00061	.01152	.00000	.00022	.00040	
.00035	.00689	.00002	.00013	.00020	.00022	
.00009	.01211	.00032	.00001	.00304	.00056	
.00092	.00113	.00035	.00089	.00347	.01314	
.00001	.00153	.00067	.00125	.00151	.00868	
.00008	.00009	.01300	.00255	.00085	.00101	
.00004	.00082	.00035	.00018	.00000	.00182	
.00013	.00113	.00042	.00004	.00001	.00239	
.00024	.00244	.00286	.00115	.00119	.00335	
.00004	.00059	.00206	.00194	.00226	.03218	
.00008	.01753	.00035	.00192	.00005	.00292	
.00018	.00378	.00014	.00201	.00153	.00035	
.00008	.00032	.00161	.00147	.01291	.00048	
.00008	.00069	.00135	.00164	.00039	.00000	
.00021	.00022	.00531	.00115	.00026	.00306	
.00051	.00113	.00349	.00397	.00034	.00323	
.00170	.01480	.00166	.01152	.00001	.00080	
.00000	.00306	.00661	.00002	.00000	.00104	
.00035	.00136	.00657	.00032	.00192	.00009	
.00040	.01123	.00038	.00035	.00182	.00009	
.00040	.00437	.00097	.00067	.00166	.00006	
.00004	.01167	.00002	.01300	.00216	.00178	
.00000	.00330	.00003	.00035	.00497	.00582	
.00047	.00129	.00098	.00042	.04463	.00928	
.00000	.00393	.00135	.00286	.00292	.01920	
.00001	.00008	.00014	.00206	.00064	.00217	
.00019	.00063	.00290	.00035	.00080	.00039	
.00019	.00955	.00334	.00014	.00008	.00166	
.00019	.00580	.00182	.00161	.00340	.00061	
.00000	.01460	.00112	.00135	.00095	.00252	
.00002	.00138	.00010	.00531	.00928	.00226	
.00102	.00997	.00104	.00349	.00272	.00023	
.00002	.00474	.00009	.00166	.00611	.00805	
.00255	.01487	.00138	.00661	.00397	.00317	
.00139	.00421	.03950	.00657	.00003	.00002	
.00017	.00069	.00710	.00038	.00044	.00092	
.00073	.00088	.00041	.00097	.00538	.00135	
.00004	.00088	.00282	.00002	.00251	.00446	
.00002	.02209	.00009	.00003	.00006	.00249	
.00035	.00113	.00556	.00098	.00459	.00007	

Appendix 11: Central Leverage for Users' Patronised upon E-Learning Prediction (H10).

.00288	.00170	.00919	.00083	.00075	.00051	.00051
.00523	.00051	.01312	.00075	.00122	.00051	.00027
.00523	.00027	.01459	.00051	.00027	.00158	.00027
.00051	.00027	.01042	.00113	.00022	.01042	.00022
.00051	.00051	.00122	.00007	.00001	.00212	.00027
.00170	.00010	.00027	.00083	.00170	.00225	.00113
.00051	.00170	.00083	.00010	.00007	.00051	.00075
.00170	.00051	.00045	.00027	.00051	.00027	.00083
.00225	.00803	.00212	.00027	.00170	.00045	.00225
.00225	.00273	.00719	.00122	.00045	.00051	.00001
.00225	.00503	.00719	.00022	.00803	.00158	.00022
.00051	.01042	.00051	.00083	.00158	.00001	.00051
.00719	.00503	.00027	.00122	.00225	.00212	.00007
.00719	.00225	.00617	.00045	.00051	.00045	.00001
.00719	.00158	.00617	.00595	.00051	.00083	.00001
.00719	.00803	.00523	.00503	.00075	.00001	.00001
.00010	.00045	.00225	.00419	.00083	.00027	.00010
.00083	.00045	.00010	.00503	.00075	.00001	.00007
.00051	.00803	.00170	.00075	.00051	.00083	.00122
.00051	.00696	.00045	.00158	.00113	.00022	.00022
.00288	.00158	.00719	.00122	.00007	.00051	
.00288	.00696	.00719	.00027	.00083	.00051	
.00170	.01173	.00010	.00083	.00010	.00158	
.00051	.00803	.00288	.00045	.00027	.01042	
.00027	.00075	.00010	.00212	.00027	.00212	
.00027	.00113	.00617	.00719	.00122	.00225	
.00051	.01042	.00288	.00719	.00022	.00051	
.00010	.00803	.00075	.00051	.00083	.00027	
.00170	.00113	.00007	.00027	.00122	.00045	
.00051	.00342	.00010	.00617	.00045	.00803	
.00617	.01042	.00027	.00617	.01042	.00158	
.00719	.00022	.00122	.00523	.00075	.00225	
.00617	.01042	.00170	.00225	.00170	.00051	
.00617	.01613	.00075	.00010	.00083	.00051	
.00719	.00503	.00696	.00170	.00027	.00075	
.00719	.00803	.00113	.00045	.00083	.00083	
.00719	.01042	.00051	.00719	.00010	.00075	
.00051	.00075	.00027	.00719	.00027	.00051	
.00288	.00419	.00010	.00010	.00027	.00113	
.00523	.00212	.00045	.00288	.00001	.00007	
.00523	.00595	.00001	.00010	.00122	.00083	
.00051	.00503	.00075	.00617	.00122	.00010	
.00051	.00595	.00001	.00288	.00113	.00027	
.00170	.00001	.00075	.00075	.01042	.00027	
.00051	.00803	.00075	.00007	.00158	.00122	
.00170	.00696	.00122	.00010	.00083	.00022	
.00225	.00051	.00027	.00027	.00001	.00083	
.00225	.02501	.00022	.00122	.00001	.00122	
.00225	.01173	.00001	.00170	.00075	.00045	
.00051	.00803	.00170	.00075	.00010	.01042	
.00719	.00696	.00007	.00696	.00158	.00075	
.00719	.00503	.00051	.00113	.00001	.00170	
.00719	.02123	.00170	.00051	.00158	.00083	
.00719	.02123	.00045	.00027	.00045	.00027	
.00010	.01173	.00803	.00010	.00122	.00007	
.00083	.01613	.00158	.00045	.00010	.00051	
.00051	.00919	.00225	.00001	.00045	.00075	
.00051	.00919	.00051	.00075	.00001	.00051	
.00288	.02308	.00051	.00001	.00083	.00075	
.00288	.00803	.00075	.00075	.00022	.00022	

Appendix 12: Cook's Distance for Providers' Patronised upon E-Learning Prediction (H10).

.00083	.00015	.01511	.00057	.00033
.00133	.00171	.00233	.00161	.00479
.00133	.00018	.00150	.00532	.00006
.00025	.00046	.00060	.00053	.01511
.00006	.00025	.00001	.00129	.00233
.00094	.00072	.00011	.00072	.00150
.00006	.00046	.00010	.00930	
.00004	.00025	.00084	.01012	
.00041	.01933	.00057	.00475	
.00041	.00684	.00300	.00227	
.00041	.00845	.00002	.00013	
.00006	.00419	.00025	.00010	
.00007	.00150	.00372	.00241	
.00087	.03361	.00245	.00769	
.00007	.00144	.00514	.00633	
.00300	.03221	.00507	.00079	
.00256	.00000	.00319	.00020	
.00024	.00000	.00536	.01052	
.00235	.00083	.00241	.00404	
.00025	.00692	.01232	.00302	
.00008	.00015	.02588	.00000	
.00083	.00357	.00007	.00002	
.00015	.00504	.00039	.00000	
.00171	.00006	.00083	.00000	
.00018	.00157	.00250	.00116	
.00046	.00004	.02845	.00028	
.00025	.00926	.00083	.00177	
.00072	.00006	.00231	.00002	
.00046	.00261	.00931	.00000	
.00025	.00000	.00656	.00000	
.00000	.01102	.00139	.00116	
.00002	.00643	.00045	.00028	
.00000	.00686	.00339	.00177	
.00000	.00262	.00519	.00006	
.00116	.00326	.01933	.00083	
.00028	.00006	.01108	.00133	
.00177	.00838	.00332	.00133	
.00006	.00404	.01469	.00025	
.00083	.00020	.01447	.00006	
.00133	.01476	.00018	.00000	
.00133	.00187	.00144	.00002	
.00025	.01052	.00058	.00000	
.00006	.00103	.00000	.00000	
.00094	.00207	.00410	.00302	
.00006	.00083	.00519	.00645	
.00004	.00327	.00045	.00079	
.00041	.00110	.00859	.00564	
.00041	.00000	.01066	.00010	
.00041	.00084	.00607	.00326	
.00006	.01046	.00269	.00006	
.00007	.00000	.00080	.00036	
.00087	.00845	.00321	.00340	
.00007	.03528	.00015	.00150	
.00300	.00199	.00520	.00000	
.00256	.00022	.09119	.00845	
.00024	.00262	.01994	.03528	
.00235	.00033	.00089	.00199	
.00025	.00033	.00797	.00022	
.00008	.00479	.00008	.00262	
.00083	.00006	.01634	.00033	

Appendix 13: Central Leverage for Providers' Patronised upon E-Learning Prediction (H10).

.00308	.00190	.00747	.00101	.00747
.00536	.00067	.01084	.00046	.01949
.00536	.00040	.01211	.00067	.00648
.00067	.00040	.00852	.00075	.00747
.00067	.00067	.00142	.00001	.01084
.00190	.00020	.00040	.00101	.01211
.00067	.00190	.00101	.00020	
.00190	.00067	.00024	.00040	
.00245	.00648	.00153	.00040	
.00245	.00203	.00723	.00142	
.00245	.00394	.00723	.00009	
.00067	.00852	.00067	.00101	
.00723	.00394	.00040	.00142	
.00723	.00245	.00626	.00024	
.00723	.00110	.00626	.00472	
.00723	.00648	.00536	.00394	
.00020	.00024	.00245	.00323	
.00101	.00024	.00020	.00394	
.00067	.00648	.00190	.00046	
.00067	.00556	.00024	.00110	
.00308	.00110	.00723	.00626	
.00308	.00556	.00723	.00723	
.00190	.00965	.00020	.00626	
.00067	.00648	.00308	.00626	
.00040	.00046	.00020	.00723	
.00040	.00075	.00626	.00723	
.00067	.00852	.00308	.00723	
.00020	.00648	.00046	.00723	
.00190	.00075	.00001	.00626	
.00067	.00259	.00020	.00626	
.00626	.00852	.00040	.00723	
.00723	.00009	.00142	.00723	
.00626	.00852	.00190	.00723	
.00626	.01345	.00046	.00067	
.00723	.00394	.00556	.00308	
.00723	.00648	.00075	.00536	
.00723	.00852	.00067	.00536	
.00067	.00046	.00040	.00067	
.00308	.00323	.00020	.00067	
.00536	.00153	.00024	.00626	
.00536	.00472	.00001	.00723	
.00067	.00394	.00046	.00626	
.00067	.00472	.00007	.00626	
.00190	.00001	.00046	.00110	
.00067	.00648	.00046	.01787	
.00190	.00556	.00142	.00394	
.00245	.00067	.00040	.00323	
.00245	.02117	.00009	.01084	
.00245	.00965	.00007	.00394	
.00067	.00648	.00190	.00648	
.00723	.00556	.00001	.00009	
.00723	.00394	.00067	.00020	
.00723	.01787	.00190	.00394	
.00723	.01787	.00024	.00556	
.00020	.00965	.00648	.00394	
.00101	.01345	.00110	.01787	
.00067	.00747	.00245	.01787	
.00067	.00747	.00067	.00965	
.00308	.01949	.00067	.01345	
.00308	.00648	.00046	.00747	

Appendix 14: Cook's Distance for Users' Perception, Patronised, and Practised upon Attitude (H6).

.00017	.00028	.00351	.00245	.00156	.00793	.00156
.00237	.00040	.00089	.00198	.00049	.00273	.00151
.00212	.00008	.00547	.00024	.00047	.00020	.00523
.00165	.00003	.00077	.00195	.00135	.01157	.00000
.00004	.00000	.00043	.00345	.00011	.00486	.00015
.00429	.00016	.00022	.00273	.00001	.00051	.00110
.00005	.00032	.00103	.00244	.00029	.00205	.00071
.00000	.00014	.00019	.00479	.00025	.00275	.00090
.00080	.00233	.00170	.00114	.00021	.00111	.00118
.00041	.00581	.00009	.00331	.00181	.00383	.00058
.00067	.00831	.00001	.00297	.01184	.00169	.00000
.00000	.00270	.00019	.00009	.00084	.00041	.00941
.00034	.00051	.00020	.00010	.00044	.00360	.00562
.00000	.02753	.00240	.00282	.00009	.00180	.00465
.00078	.00258	.00022	.00237	.00005	.00003	.01511
.00053	.00219	.00005	.00030	.00121	.00185	.00239
.00034	.00007	.00017	.00071	.00238	.00051	.00253
.00000	.00010	.00135	.00005	.00101	.00007	.00130
.00050	.00243	.00030	.00197	.00024	.00031	.00707
.00014	.00382	.00180	.00001	.00195	.00105	.00042
.00000	.00120	.00215	.00038	.00267	.00003	
.00040	.00155	.00001	.00022	.00120	.00288	
.00001	.00172	.00014	.00145	.00075	.00236	
.00002	.00149	.00124	.00016	.00236	.02277	
.00017	.00136	.00006	.00170	.00027	.00513	
.00049	.00019	.00112	.00009	.00331	.00023	
.00137	.00155	.00036	.00001	.00297	.00304	
.00042	.00099	.00188	.00019	.00009	.00018	
.00025	.00437	.00049	.00018	.00009	.00312	
.00015	.00169	.00037	.00240	.00220	.01988	
.00048	.00086	.00115	.00020	.00690	.00171	
.00038	.00119	.00053	.00005	.00011	.00033	
.00088	.00187	.00096	.00017	.00092	.00199	
.00011	.00281	.00149	.00135	.00698	.00017	
.00047	.00125	.00011	.00088	.00053	.00188	
.00000	.00695	.00324	.00180	.00058	.00167	
.00000	.00057	.01438	.00316	.00060	.00615	
.00023	.00157	.00298	.00001	.00005	.00196	
.00097	.00065	.00216	.00022	.00054	.00196	
.00279	.00386	.00068	.00124	.00015	.00154	
.00213	.00413	.00000	.00005	.00125	.00000	
.00006	.00006	.00011	.00112	.00163	.00279	
.00005	.00017	.00004	.00000	.00127	.00038	
.00079	.03319	.00026	.00188	.01728	.00001	
.00000	.00002	.00504	.00224	.00000	.00014	
.00000	.00053	.00256	.00164	.00114	.00018	
.00006	.00002	.00002	.00247	.00057	.00031	
.00006	.00163	.00075	.00053	.00001	.00029	
.00019	.00314	.00057	.00091	.00840	.00119	
.00000	.00633	.00018	.00149	.00458	.00749	
.00080	.00319	.00029	.00011	.00112	.00214	
.00016	.00629	.00007	.00213	.00076	.00041	
.00064	.00075	.00009	.00901	.00041	.00042	
.00006	.00113	.00181	.00298	.00090	.00009	
.00038	.00373	.01184	.00182	.00001	.00258	
.00008	.00281	.00272	.00068	.00015	.00108	
.00005	.00415	.00057	.00000	.00021	.00062	
.00013	.00315	.00025	.00011	.00613	.00044	
.00112	.00345	.00005	.00004	.00036	.00126	
.00003	.00769	.00121	.00026	.00135	.00083	

Appendix 15: Central Leverage for Users' Perception, Patronised, and Practised upon Attitude (H6).

.00216	.00163	.00680	.00419	.00364	.01326	.00128
.00760	.00419	.00623	.00318	.00355	.00582	.00214
.00644	.00080	.00768	.00030	.00371	.00355	.00062
.00378	.00109	.00595	.00074	.00108	.00542	.00282
.00378	.00169	.00417	.00972	.00126	.00189	.00085
.00547	.00172	.00145	.01012	.00196	.00343	.00512
.00169	.00649	.00217	.00327	.00013	.01157	.00496
.00285	.00125	.00132	.01168	.00168	.00745	.00387
.00415	.00872	.00145	.00848	.00479	.00101	.00344
.00216	.00803	.00644	.00752	.00101	.00523	.00771
.00216	.01076	.01821	.00920	.01585	.00241	.00235
.00169	.00527	.00169	.00080	.00141	.00002	.00629
.00560	.00319	.00087	.00145	.00351	.00929	.01350
.00496	.01182	.00558	.00455	.00127	.00259	.00231
.01430	.00171	.00337	.00617	.00061	.00193	.01130
.01862	.03323	.00578	.00250	.00153	.00463	.00195
.00410	.00030	.00616	.00336	.00451	.00476	.00117
.00138	.00053	.00410	.00669	.00318	.00385	.00198
.00362	.00682	.00219	.00568	.00030	.01191	.00117
.00098	.00401	.00085	.00075	.00074	.00071	.00135
.00355	.00102	.00496	.00266	.00299	.00469	
.00679	.00519	.00382	.00145	.00460	.01668	
.00284	.00538	.00030	.00429	.00019	.00196	
.00349	.00663	.00375	.00054	.00535	.01412	
.00049	.00433	.00132	.00145	.00203	.00325	
.00171	.00116	.00558	.00439	.00752	.00580	
.00785	.00540	.00325	.01821	.00920	.01273	
.00199	.00609	.00199	.00169	.00080	.00141	
.00313	.01277	.00465	.00034	.00147	.00181	
.00169	.00682	.00092	.00558	.00339	.00609	
.00386	.00671	.00075	.00312	.02469	.00226	
.00377	.00036	.00169	.00578	.00581	.00351	
.00768	.00863	.00465	.00616	.00967	.00299	
.00389	.01013	.00122	.00410	.01571	.00169	
.01593	.00265	.00594	.00608	.00959	.00600	
.00469	.00625	.00271	.00085	.01197	.00419	
.00697	.00550	.00967	.00644	.00637	.00673	
.00036	.00467	.00126	.00381	.00241	.00761	
.00244	.00373	.00019	.00112	.00274	.00116	
.00377	.00255	.00018	.00375	.00233	.00299	
.00377	.00455	.00130	.00132	.00589	.00094	
.00125	.00510	.00053	.00558	.00797	.00501	
.00061	.01876	.00040	.00188	.00500	.00523	
.00864	.01652	.00199	.00199	.00528	.00032	
.00030	.00719	.00437	.00413	.00495	.00064	
.00259	.00344	.00526	.00174	.00703	.00123	
.00439	.00109	.00191	.00299	.00083	.00046	
.00439	.01180	.00108	.00169	.00083	.00454	
.00337	.00842	.00126	.00575	.00516	.00181	
.00103	.00609	.00196	.00122	.00712	.00636	
.00630	.00779	.00013	.00594	.00144	.00996	
.00727	.00753	.00231	.00138	.00258	.00588	
.00761	.02196	.00246	.00878	.00113	.00545	
.00358	.01154	.00101	.00126	.00024	.00087	
.00079	.00863	.01585	.00019	.00461	.00344	
.00094	.01013	.00614	.00018	.00138	.00495	
.00479	.00618	.00722	.00130	.00127	.00170	
.00098	.00950	.00389	.00053	.01108	.00036	
.00292	.01149	.00061	.00021	.01334	.00326	
.00153	.00726	.00153	.00199	.00071	.00471	

Appendix 16: Cook's Distance for Providers' Perception, Patronised, and Practised upon Attitude (H6).

.00000	.00002	.00116	.00245	.00052
.00068	.00000	.00089	.00198	.00153
.00003	.00024	.00547	.00027	.00567
.00001	.00019	.00014	.00195	.00269
.00005	.00014	.00005	.00776	.00004
.00003	.00030	.00066	.00273	.00249
.00001	.00029	.00045	.00244	
.00000	.00015	.00016	.00083	
.00000	.00224	.00170	.00066	
.00015	.00557	.00017	.00019	
.00000	.00566	.00001	.00297	
.00005	.00262	.00019	.00017	
.00102	.00055	.00020	.00009	
.00071	.02753	.00228	.00330	
.00080	.00262	.00117	.00025	
.00002	.00223	.00005	.00030	
.00095	.00009	.00007	.00274	
.00000	.00009	.00059	.00005	
.00005	.00143	.00088	.00572	
.00005	.00382	.00180	.00001	
.00001	.00120	.00215	.00009	
.00004	.00167	.00000	.00001	
.00034	.00164	.00022	.00014	
.00017	.00138	.00124	.00009	
.00002	.00144	.00006	.00004	
.00000	.00020	.00112	.00005	
.00014	.00124	.00000	.00000	
.00065	.00109	.00289	.00175	
.00033	.00380	.00224	.00014	
.00001	.00094	.00093	.00281	
.00009	.00077	.00080	.00002	
.00076	.00111	.00053	.00102	
.00014	.00345	.00207	.00024	
.00013	.00262	.00149	.00037	
.00003	.00133	.00011	.00047	
.00000	.00695	.00213	.00111	
.00000	.00057	.01248	.00018	
.00015	.00197	.00298	.00001	
.00000	.00071	.00182	.00014	
.00003	.00334	.00068	.00328	
.00004	.00471	.00000	.00000	
.00013	.00005	.00011	.00119	
.00016	.00021	.00004	.00033	
.00011	.03261	.00026	.00001	
.00014	.00000	.00352	.00028	
.00029	.00047	.00189	.00040	
.00015	.00002	.00099	.00000	
.00006	.00170	.00135	.00175	
.00000	.00253	.00112	.00008	
.00000	.00633	.00018	.00109	
.00027	.00552	.00029	.00115	
.00000	.00642	.00048	.00546	
.00106	.00096	.00009	.00022	
.00001	.00113	.00181	.00335	
.00033	.00267	.01125	.00410	
.00000	.00262	.00202	.00065	
.00005	.00415	.00057	.00086	
.00006	.00315	.00025	.00027	
.00001	.00300	.00025	.00001	
.00003	.01161	.00121	.00027	

Appendix 17: Central Leverage for Providers' Perception, Patronised, and Practised upon Attitude (H6).

.00216	.00490	.00680	.00419	.00995
.00377	.00419	.00623	.00318	.01836
.00547	.00130	.00768	.00048	.00625
.00098	.00080	.00595	.00074	.00425
.00169	.00098	.00301	.00972	.00637
.00135	.00123	.00098	.01012	.00837
.00125	.00462	.00213	.00327	
.00819	.00169	.00054	.01142	
.00226	.00753	.00145	.00535	
.00202	.00742	.00496	.00752	
.00216	.01310	.01821	.00920	
.00169	.00529	.00169	.00080	
.00536	.00330	.00087	.00177	
.00576	.01182	.00733	.00543	
.00630	.00168	.00337	.00418	
.00576	.03131	.00578	.00250	
.00385	.00061	.00551	.00336	
.00138	.00061	.00498	.00669	
.00231	.00596	.00608	.00568	
.00233	.00401	.00085	.00075	
.00270	.00102	.00496	.00394	
.00269	.00605	.00617	.01593	
.00215	.00569	.00112	.00677	
.00419	.00641	.00375	.00347	
.00226	.00442	.00132	.00462	
.00085	.00207	.00558	.01696	
.00098	.00511	.00325	.00508	
.00349	.00640	.00360	.00447	
.00325	.01022	.00413	.00677	
.00102	.00383	.00019	.00421	
.00394	.00636	.00404	.00633	
.00447	.00018	.00169	.00562	
.00677	.01486	.00465	.00462	
.00421	.00982	.00122	.00169	
.00508	.00368	.00594	.00171	
.00536	.00625	.00138	.00414	
.00508	.00550	.01466	.00760	
.00169	.00568	.00126	.00102	
.00216	.00336	.00019	.00125	
.00471	.00192	.00018	.00394	
.00377	.00507	.00130	.00423	
.00102	.00669	.00053	.01329	
.00114	.01873	.00040	.00421	
.00322	.01596	.00199	.00075	
.00098	.00713	.00297	.01158	
.00819	.00348	.00436	.00329	
.00481	.00109	.00191	.00201	
.00216	.01161	.00108	.01336	
.00597	.00671	.00126	.00335	
.00169	.00609	.00196	.00640	
.00608	.01405	.00013	.00630	
.00608	.00793	.00311	.01428	
.02167	.02260	.00246	.00672	
.00796	.01154	.00101	.00870	
.00056	.00629	.01528	.01310	
.00179	.00982	.00459	.01126	
.00451	.00618	.00722	.01006	
.00419	.00995	.00389	.00596	
.00347	.01075	.00441	.01213	
.00184	.00625	.00153	.00618	