

THE CRITICAL SUCCESS FACTORS FOR USER
SATISFACTION ON ADOPTION OF
E-LEARNING SYSTEM IN IRAQI
PUBLIC UNIVERSITIES

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ADOPTION OF E-LEARNING SYSTEM IN IRAQI PUBLIC UNIVERSITIES

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KHALDOON HUSSEIN ALIAWY

**DISERTASI YANG DIKEMUKAKAN UNTUK MEMENUHI
SEBAHAGIAN DARIPADA SYARAT MEMPEROLEHI IJAZAH
SARJANA SYSTEM MAKLUMAT**

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DECLARATION

I hereby declare that the work in this thesis is my own except for quotations and summaries which have been duly acknowledged.

02 January 2018

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Pusat Sumber
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ABSTRACT

E-learning is important in different educational organisations such as universities and schools, which supply a new technology to develop education or teaching service. Thus, it is essential to determine user satisfaction features to maximise the utilisation of e-learning systems in Iraqi public universities. Using e-learning involves facing many challenges which means it is difficult for universities to apply e-learning extensively due to problems such as slow Internet bandwidth, lack of experience and skills, especially in Iraqi public universities. There are three objectives in this research: first, to identify the critical success factors related to the utilisation of e-learning based on ICT. Second, to investigate the effects of those factors on user satisfaction to utilise e-learning systems on the basis of ICT in Iraqi public universities. Finally, the main objective of this study is to design a model for the e-learning system in Iraqi public universities. A quantitative study was done in two Iraqi public universities with a total of 182 survey responses from students who were studying in the Faculty of Computer Science. The collected data were analysed employing SPSS in testing the hypotheses by data regression and correlation of the research model. The results of this study determined the correct factors that affect user satisfaction in relation to the utilisation of the e-learning system. From the outcomes of this study, it was concluded that IT Infrastructure, openness, and service quality provide a high level of user satisfaction for students to utilise e-learning system as investigated within the scope of the study. On the other hand, it was found that ease-of-use, multimedia instruction, usefulness, system quality, and self-efficacy provide a moderate level of user satisfaction in enhancing the use of e-learning system based on ICT. Overall, there was positive effect and impact of these factors on students' satisfaction with the utilisation the e-learning system in Iraqi public universities. The model proposed in this study offers support and an overall enhancement of e-learning use in Iraqi public universities.

ABSTRAK

E-learning (E-Pembelajaran) adalah penting dalam organisasi pendidikan seperti universiti-universiti dan sekolah-sekolah, yang menyediakan teknologi baharu untuk membangunkan pendidikan atau perkhidmatan mengajar. Oleh itu, amatlah penting untuk mengenal pasti kepuasan pengguna untuk memaksimumkan penggunaan sistem e-pembelajaran di universiti awam Iraq. Penggunaan e-pembelajaran berdepan dengan pelbagai cabaran yang membawa pelbagai kesukaran bagi pihak universiti untuk mengaplikasikan dan menggunakan e-pembelajaran secara meluas disebabkan masalah seperti jalur lebar internet yang perlahan, kekurangan pengalaman dan kekurangan kebolehan, lebih-lebih lagi di universiti awam Iraq. Terdapat tiga objektif dalam kajian ini: pertama, untuk mengenal pasti faktor-faktor kritikal untuk kejayaan yang berkaitan dengan penggunaan e-pembelajaran berdasarkan ICT. Kedua, untuk menyiasat kesan faktor-faktor itu ke atas kepuasan pengguna untuk menggunakan sistem e-pembelajaran berdasarkan ICT di universiti awam Iraq. Akhirnya, objektif utama kajian ini adalah untuk mereka bentuk model bagi sistem e-pembelajaran di universiti awam Iraq. Satu kajian kuantitatif telah dijalankan di dua universiti awam Iraq dengan 182 maklum balas daripada pelajar yang belajar di Fakulti Sains Komputer. Data yang dikumpulkan dianalisis menggunakan SPSS untuk menguji hipotesis dengan regresi data dan korelasi model penyelidikan. Hasil kajian ini telah menentukan faktor-faktor sebenar yang memberi kesan ke atas kepuasan pengguna berhubung dengan penggunaan sistem e-pembelajaran. Daripada hasil penemuan kajian ini, boleh disimpulkan bahawa infrastruktur IT, keterbukaan dan kualiti perkhidmatan memberikan tahap kepuasan yang tinggi untuk pelajar bagi menggunakan sistem e-pembelajaran yang dikaji dalam skop kajian ini. Sebaliknya, didapati bahawa kemudahan penggunaan, arahan multimedia, kebergunaan, kualiti sistem, dan keberkesanan diri memberikan tahap kepuasan pengguna yang sederhana dalam meningkatkan penggunaan sistem e-pembelajaran berasaskan ICT. Secara keseluruhan, terdapat kesan positif dan impak faktor-faktor tersebut ke atas kepuasan pelajar-pelajar dengan penggunaan sistem e-pembelajaran di universiti awam Iraq. Model yang dicadangkan dalam kajian ini menyediakan sokongan dan penambahbaikan keseluruhan untuk penggunaan e-pembelajaran di universiti awam Iraq.

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LIST OF ABBREVIATIONS

UKM	Universiti Kebangsaan Malaysia
TRA	Theory of Reasoned Action
TPB	Theory of Planned Behaviour
C-TAM-TPB	Combined TAM and TPB
MPCU	Model of Personal Computer Utilisation
DOI	Diffusion of Innovation Theory
SCT	Social Cognitive Theory
TAM	Technology Acceptance Model
AHP	Analytic Hierarchy Process
ICT	Information and communication technology
UNESCO	United Nations Educational, Scientific and Cultural Organisation
IS	Information system
TTF	Theory with Task - Technologies Fit
UTAUT	The Unified Theory of Acceptance and Use of Technology.

CHAPTER I

INTRODUCTION

1.1 INTRODUCTION

E-learning has been described as an instructional approach that provides educational courses to students via the Internet, which allows access to learning anytime, anywhere with the use of personal computers (desktops and laptops), tablets, and mobile phones by connecting to electronic media, information and Internet technologies (Garrido et al., 2016).

Furthermore, e-learning on any new technology platform that is enabled is considered as a potentially effective education enabler of the current millennium that has had an enormous influence on education. In addition, e-learning system is an integral component of the infrastructural process of diffusing knowledge and achievements. It is a system that is both effective and far-reaching in 21st-century education (Aparicio et al., 2016).

In addition, e-learning system has been supported by open education, by the Internet or by funding the student's activities from any place and at any time, developing the interaction of class students beyond the class without any limitation of time (Martins et al., 2012).

In other word, those authors Fahad, et al., (2013), new technologies like e-learning system used on various institutions of higher learning for the simultaneous

development of students thinking and understanding. The world has changed from the perspective of education since 2011 (Amer Saleem Elameer, 2012). In addition, e-learning system is becoming progressively important in campuses, schools, public sector, and other establishments that offer educational or training services. (Alsabawy et al., 2016).

In tandem with the growth of information and communication technology (ICT) tools, Internet requests including e-mails, videos, and simulated reality all are usually used in the field of education. With the advent of the Internet, e-learning systems can be helpful in planning education programmes that need not be time. Such systems have rapidly and understandably accepted as very significant enhancements of the schooling and knowledge process (Hong-Ren Chen, 2012).

In light of this, e-learning has attracted much interest as it has the flexibility to be modified to conform with diverse educational models (Chow & Shi, 2014). Additionally, the advanced technology of e-learning is capable of assisting both instructors and students to develop their respective functions and attain better performance (Saeed Mazloumiyan, 2012). In recent years, some Iraqi public universities of the Ministry of Higher Learning have taken the initiative to introduce e-learning in parallel with conventional lecture room approach. To the best knowledge of the researcher, this particular research niche remains virtually ignored in Iraq primarily due to the fact that e-learning is a new experience and still undeveloped education approach for Iraqi students in general (Ahmed Al-Azawei, 2016).

According to Martins et al. (2012), from a technical point of view, the publishing services and communication and the Internet are important to the success of any new technology such as e-learning. In addition, it implies the presence of a typical interaction between educator and learner.

In addition, e-learning structures and developments are continuing to be expanded in various instructive conditions the world over (Dečman, 2015). In recent decades,

information and communication technology has facilitated e-learning in enhancing the pedagogical experience, and this has been generally acknowledged by programme instructors. Because of the improvement of e-learning innovation, college administrators have been significantly motivated to promote the use of e-learning systems (Chow et al., 2014).

1.2 BACKGROUND OF THE STUDY

Modern technologies such as e-learning system are a new way in education in developing countries and in particular a country like Iraq, where it is being implemented for teaching and learning. Unfortunately, the effort is being hampered by an inadequate IT infrastructure (Ahmed Al-Azawei & Lundqvist 2015). A UNESCO report (2011) has revealed that the wider use of ICT in educational institutions in Iraq has been limited (Basha et al., 2013).

UNESCO outlined different activities to develop a reasonable ICT infrastructure for training functions that would facilitate a change in the quality of instruction by concentrating on the utilisation of ICT (Basha et al. 2013).

On the other hand, the problems being faced by developing countries like Iraq, Libya, and others are due to a weakness in allocating adequate resources and experiences for the purpose of e learning (Ahmed 2013)

According to Ahmed Al-Azawei and Lundqvist (2015), the new strategy for universities have started a change to encourage education and knowledge in the all parts of education. In addition, Iraqi universities have continues to face challenges several problem to impact e-learning such as low bandwidth, lack of experience and they still not open to the global universities (Al-Husseini 2015).

Furthermore, for the development of a data-oriented society in Iraq, UNESCO has agreed that e-learning should be a fundamental platform which should be

introduced in the majority of segments involved in the provision of training for Iraq (Basha et al. 2013).

1.3 PROBLEM STATEMENT

Using e-learning especially in Iraq faces many challenges that make it difficult for universities to apply the system extensively. The literature review in the next chapter will reveal that there is low satisfaction in using the e-learning system in Iraq. Such low satisfaction to using e-learning system is particularly evident in public Iraqi universities. There is a lack of experience and weakness in ICT skills, possibly due to the fact that e-learning is still a new technology for Iraqi students. Among the challenges are: low Internet bandwidth even in public institutions of higher learning, and a lack of know-how regarding the Internet and web-based learning; poverty, and low income. Therefore, related major shortcomings have emerged in terms of accessibility, usability, and adaptability to perform of the available systems. (Ahmed Al-Azawei & Lundqvist 2015). The low Internet bandwidth, slow browsing and downloading may lead to the failure in introducing new technology such as the e-learning system. According to Basha et al. (2013), the majority of Iraqi institutions of higher learning do not have the critical skills.

Furthermore, during the war between Mar to April 2003, Iraq lost quite a lot of its foundation and would require time to restore the country to its pre-war level by using new technologies such as e-learning. But, public universities still have a weakness for the budget, experiences, and ICT still hard to apply (Amer Saleem Elameer, 2010).

In planning to achieve the objective of infrastructural development for the successful implementation of e-learning the challenge is capacity building and the development of human resources which constitute a crucial part of any e-learning project. There is also the necessity to recruit experienced senior academics to rectify the weaknesses in ICT skills among the populace, in particular in the institutions of higher learning in Iraq (Amer S. Elameer School, 2011).

Prior to the year 2003, Iraq had suffered considerably from various sanctions that deprived it of access to modern technologies while the rest of the modern world was enjoying the benefits of the IT revolution. The sanctions were from both inside and outside the country. Iraqis had to do without mobiles, satellites, wireless communication, computer networks, and Internet connectivity. It was an “unconnected” world as far as Iraqis were concerned.

The current research endeavours to investigate the crucial success elements that have a significant effect when implementing e-learning system of Iraqi public universities base on ICT. Moreover, an e-learning system should be reinforced and students and lecturers should be encouraged to use these technologies. To improve utilisation of e-learning systems this research approved the model to success using the e-learning systems based on ICT, to make e-learning extra motivating and useful.

1.4 RESEARCH OBJECTIVES

1. To determine the critical success factors associated with the utilisation of ICT e-learning systems in Iraqi public universities.
2. To investigate the effects factors of user satisfaction in utilizing e-learning systems based on ICT in Iraqi public universities.
3. To design a new model for an e-learning system based on ICT for Iraqi public universities.

1.5 RESEARCH QUESTIONS

1. How to determine the critical success factors associated with the utilisation of e-learning systems based on of ICT in Iraqi public universities?
2. What are the effects factors for utilises e-learning systems based on ICT in public universities?
3. How to design a new model for an e-learning system based on ICT for Iraqi public universities?

1.6 SIGNIFICANCE OF THE STUDY

The current research aimed to a systematic, method, was, adopted to achieve the goal, the major of the objective who to make a new model and determined the critical variables have impact effect on the modern technologies like e-learning. Furthermore, the advantage from this study to the researcher and practitioners give the details about the e-learning and method used. In addition, this research, also supports,, the body,, of knowledge,, in many, fields. Furthermore, this study discussed the future work and give the advice to researchers what should do in the future.

1.6.1 Body of Knowledge

There are three objectives for this research. First objective of the current research is to adopt an e-learning model which focuses on ICT, achieved by collected data and analysis to make sure this factor is important in an e-learning. The study will add new knowledge to the field of ICT in an e-learning system in Iraq public universities, particularly with its emphasis on the information and communication technology, in e-learning system.

1.6.2 Practical

The major contribution in this research is the designed model and tests of several, success factors utilised in changed case studies worldwide. Furthermore, this outcome can be viewed as a pragmatic contribution as well as a guide for university administrators' students and other faculty members in facilitating the adoption and use of ICT programmes in developing countries like Iraq.

This current work will be beneficial to researchers primarily due to the fact that the subject of study is viewed as new and ground breaking in Iraqi public universities. Furthermore, Iraq is confronted by a critical shortcoming of low Internet bandwidth and a dearth of ICT experience and expertise. In light of such a situation, supporting the use and

development of e-learning in Iraqi public universities would be a very significant step forward in encouraging both academics and students to help create more interest and wider use of ICT in general and e-learning in particular.

1.7 SCOPE OF STUDY

The current study focused on the adopted a new model to utilise e-learning system through user satisfaction, based on ICT, for Iraqi public universities. Furthermore, identified the critical factors that have impact significant on user satisfaction to implementation an e-learning base for user satisfaction, on for user satisfaction, ICT. The current paper selected the Iraqi public universities, because Iraqi universities have a novel skill in implementation an e-learning, which has been recently adopted by some public universities. The researcher designed this questionnaire for user satisfaction based on culture for user satisfaction and transparency of language. In addition, the questionnaire instrument was designed for the satisfaction of students studying in the Faculty of Computer Science who were the respondents.

The main focus of this study is on encouraging Iraqi students to gain more experience in the implementation of e-learning systems (Ahmed Al-Azawei et al. 2016). The first step of this study is to determine the critical success features in relation to the use of e-learning systems based on ICT in Iraqi public universities. The second step is the focus on the deterrent critical factors and displays how these variables impact implementation of an e-learning. In addition, investigated how those factors significant students satisfaction to utilization an e-learning systems. The current research founded solved to the problems and give solution the weakness for using an e-learning system for Iraqi public universities base on ICT and suggests practical resolutions to address these lack.

Furthermore, this research selected two universities (the University of Baghdad and AL Technology University) because they are the most significant and reputable in Iraq .Also, they are the first campuses to establish centres for e-learning system, and

served as role models for other universities in Iraq, helping to enrich them with this modern technology platform.

Finally, it is obvious that the investigation in e-learning field is an important norm that affects positively the educational process in Iraq and helps to determine how e-learning affects students' skills, and improves their performance in learning. Furthermore, the students get to understand, how they could respond to this new technology.

1.8 CHAPTER SUMMARY

The current chapter has planned the general idea of e-learning based on information and communication technology. It began with an introduction to the background of the research topic, and defined the research problem, identified the research objectives, and research questions. Overall, this first chapter of this thesis provides the reader with a general overview of the research intention and the direction of the research.

CHAPTER II

LITERATURE REVIEW

2.1 INTRODUCTION

The current chapter reviews a huge number of researches, conference, books, proceedings and thesis, dealing with the subject of the present research.

Many of the works found in the literature relate to experiences in Europe, Australia, and some in the Middle East countries, but in developing countries like Iraq no studies were found that investigated this field.

This chapter is divided into four sections; first, the introduction explains the type of literature, keywords used and databases. This is followed by a description of related previous models. The third section explains the related factors and what the critical factors are in the e-learning system. Finally, the theoretical approach adopted in this study is defined. Type Of literature

Methodology for the current study begun from the reports, papers, specialist literature relevant for the current research subject since 2007, Those and other relevant study articles or conference proceedings concerning to the critical success variables impact student satisfaction to utilise e-learning systems focus on ICT. Thus, this review could be viewed as a significant step in identifying the gaps, limitations, so as to make appropriate proposals for future research. .

2.1.1 Keywords Used

Several keywords are used in this research such as, “Technology acceptance model” (TAM), “Information and communication technology” (ICT), “e-learning systems.” “IT infrastructure services,” “Iraq public universities,” “e-learning model,” and “critical success factors.”

2.1.2 Databases Used

Numerous databases are involved in this research including IEEE, Scopus, Science Direct, and Google scholar.

2.2 Previous Models of e-Learning System

2.2.1 E-Learning Adoptions Models

Lim, Lee, and Nam (2007) in their research aimed to find the determinants of e-learning systems implementation by, preparing and uncovering g how those factors influence learning execution and exchange using. Case study for the paper involved workers of three organisations (Samsung, Hyundai, and LG) located in Korea. This study collected survey data from 151 participants who provided valid responses to the questionnaire. The outcome was higher e-taking in students' learning inspiration, and better learning execution and exchange execution in light of the examination. It has been found that individual, organisational and e-learning training design constructs are positively related to e-learning effectiveness constructs. Furthermore, trainees' motivation is a fairly significant variable in the level of learning achievement. Also, the limitation of this study focuses on seniors and does not cover students to show the effective self-efficacy and convenient usage of e-learning. (For more details see Appendix E, Figure 1.)

As highlighted by Sun, et al. (2008), the authors focused on the basic variables impacting e-learners' fulfilment. A coordinated model created from past examinations comprising 13 factors in six measurements. The technique utilized the survey and display. The outcomes demonstrated best practices to enhance student fulfilment and further fortify their e-learning usage. The limitation did not include an integrated model of factors which influenced e-learners' satisfaction. (For more details see Appendix E, Figure 2.)

A study by Liaw, (2008), suggested a conceptual model, and a specific goal to demonstrate the connection between effectiveness fulfilment and behavioural aim to use e-learning framework. Besides, e-learning adequacy can be affected by framework quality, media direction, and self-viability. The outcomes demonstrated that apparent framework quality, self-viability and sight and sound direction are basic factors that impact students' fulfilment with the e-learning framework. E-learning framework was directed in a college in Taiwan. A total of 424 college understudies were surveyed using a standard poll. (For more details see Appendix E, Figure 3.)

Hassanzadeh, et al. (2012) applied the model for the measurement of success factors for e-learning systems. The case study was conducted among students in five universities in Iran and eventually 369 sets of the questionnaire completed by the participants who used e-learning systems were analysed. The results for this paper presented the effects of factors such as system quality, service quality, user satisfaction, and when e-learning systems were used. Comparison was made of the results from the responses of the respondents, both individually and collectively. (For more details see Appendix E, Figure 4.)

Raouf and Naser (2012) the paper heightened to which factor important to success usage an e-learning in public Iraqi universities and to provide a future planning to make e-learning broadly applied on the public universities. It tested how technological, organisational, and environmental factors were relevant of operation success: internal integration and external diffusion. The instrument data were collected from 120 students.

The outcomes revealed to information sciences probable benefits were key factors of the use of e-learning success in terms of Internal “Integration and External Diffusion”. The limitation for this outcome focuses on Internal Integration and External distribution.

Islam (2013) examined how TAM variables impacted e-learning. It collected survey data from 249 university students. The results indicated the benefits of those factors, such as, perceptions of benefits, and convenient usage of e-learning. It studied the effects of the factors on e-learning system usage outcome related factors. The research proposed a few limitations, explored the impacts of the essential TAM factors on e-learning framework use results related variables. Future examinations ought to explore the effects of other imperative factors identified in earlier reception investigations on e-learning framework utilisation results, such as examining the variables. (For more details see Appendix E, Figure 5.)

Alsabawy et al. (2013) focused on the function of IT infrastructure services in expressing the successful performance of the e-learning systems. It involved a surveyed with two fundamental partners' gatherings, academics and undergraduate students from the University of Southern Queensland. It was utilised quantitatively to examine polls and the level of reaction from 110 individual academics and 720 undergraduates who used the e-learning framework. The major finding from these outcomes is that academics can recognize the function of IT infrastructure services in improving the effectiveness of their job (perceived efficacy). With regard to the undergraduate test, the IT framework was developed to mark the progress of the e-learning framework by means of its effect on the level of user satisfaction. The major constraint of this current work is the limitation of the sample to a single university. However, this researcher was unable to enlarge the sampling due to cost and time constraints. On the other hand, using a larger sample is an option for any further research. In further research, other factors that affect the value to the learners in e-learning systems should be taken into consideration. As such, the sample should include academics, undergraduates and ICT personnel. (For more details see Appendix E, Figure 6.)

According to Dečman (2015), the point is to appraise and assess the reasonableness of UTAUT under e-learning condition in colleges and to investigate the use of innovation and its success relative to gender or students' past experience. Information was gathered by using a review poll. The aggregate sample of 228 was from just one college. The outcomes were concentrated on the general relevance of the UTAUT demonstrated in e-learning settings. Expansion showed no significant impact of undergraduates' past experience or gender on the model fit. The model relies on the use of behavioural intention to predict anticipated future conduct of the respondents. (For more details see Appendix E, Figure 7).

Other researchers such as Ahmed Al-Azawei and Lundqvist (2015) suggested a new model that modified and extended the factors used in the Technology Acceptance Model (TAM) for checking apparent acceptance of an Arabic sample in e-learning. A total sample of 70 learners took part in the research. The questionnaire method was used in this research. The findings indicated that not every factor that was identified could provide a prediction of apparent acceptance. The limitation was the sample size, which was quite small, meaning that the result was not enough to show the effect of factors with user satisfaction. (For more details see Appendix E, Figure 8.)

A study by Alsabawy et al. (2016), recommended the adoption of a model with five factors (IT infrastructure services, system quality, information quality, service delivery quality, and usefulness). The study was done quantitatively at an institution of higher learning in Australia involving 720 student respondents. The results suggested the IT infrastructure services are the critical factors to increase the effect of e-learning. However, the author is limited to a single university, so the outcomes cannot be generalised.

On the other hand, Abdullah et al. (2016) in their the study attempted to distinguish the most ordinarily utilized outside elements among those investigations rather than recognize the qualities of the connection between the most generally utilised outside elements of e-learning frameworks. A total of 107 papers were quantitatively

analysed that covered the last decade. TAM was extended and utilised in relation to the adoption of e-learning. The results showed that TAM used the personal ability factor the most. There is likewise an imperative impediment to the utility of the distributed investigations considered in this meta-examination, where by far most of the productions do not indicate blunder estimates and just state importance levels.(For more details see Appendix E, Figure 9.)

Jabbouri et al.(2016) studied the impact the influence of IT infrastructure on e-learning as a very important challenge in Iraqi private universities. The study comprised six private universities in Iraq and included the selection of 75 academics from these universities. The results were positive and showed that IT Infrastructure and innovation performance were also statistically significant in their association.

Aparicio et al. (2016) provided a deeper understanding of how the cultural characteristics influence students to use e-learning systems. In additionally propose a model gauge the achievement of e-learning frameworks that incorporate a social structure, independence, and cooperation. The study used the survey method to study undergraduates in different institutions. Furthermore, a quantitative approach was used to measure success factors in e-learning systems. A quantitative technique, online survey to which 323 undergraduates responded. The result shows that being satisfied influences the manner in which they gauge the individual effect and such effect on the organisation. The limitation was due to the fact that the collection of the sample was from a single European country.

2.2.2 E-learning Knowledge Sharing

Al-Husseini (2015), showed the effect of e-learning knowledge sharing on developing the Iraqi public universities. The methodology used questionnaires, which were sent to eight public institutions from, which 240 responses were returned and usable for analysis. The results revealed that knowledge sharing is an important function in enhancing

product innovation within the university environment. The quantitative method was used to analyse the data in this research.

Furthermore, Yilmaz (2016) conducted a study to investigate the structural relationships among knowledge sharing behaviours. It was implemented on undergraduates who participated in an e-learning group for a Computer Science programme, which used mixed learning mode. Information was gathered from 316 undergraduates. The survey was viewed as appropriate for factor examination. The outcomes showed that the scholastic self-adequacy of the undergraduates decidedly influenced their attitudes towards sharing practices. However, there were several limitations, one of which was the fact that the knowledge sharing among all the students was confined to a solitary environment. In addition, it is limited to exploring the relationships between the behaviours of knowledge sharing, academic self-efficacy, and class fraternity.

2.2.3 E-Learning Behaviour

Lee, Yoon and Lee, (2009) showed that there is a need to comprehend the behaviour of students' e-learning adoption in a multi-country context. They examined the crucial aspects of e-learning adoption in South Korea with the aim of bridging a gap in the literature on e-learning at individual country level. The instrument was a questionnaire and their findings supported various other recent research outcomes related to the TAM domain carried out in various countries worldwide. Perceptions of e-learning being user-friendly were found to have an association with perceptions of usefulness. Despite the fact was confined to South Korea, such cross-cultural studies can provide useful insights into what is now a rapidly growing research niche.

Tanrikulu, et al. (2010) investigated the overall scenario of e-learning systems in Turkey, and also evaluated the achievements of the e-learning programmes in relation to the factors; their focus was on the on-going situation and the achievements of thee-learning systems in Turkey. Undergraduates in e-learning

programmes in Turkish universities, as the respondents also had to answer a questionnaire. The approach was a combination of a literature review and user testing to evaluate software systems. The respondents comprised 57 students studying for their associate degree. The results were to help in defining an approach to evaluate e-learning systems.

Another study by Keramati, et al. (2011), conceptualised a model to establish the function of readiness factors in the context of the relationship between e-learning factors and e-learning outcomes. A total of 96 respondents (Tehran University academic staff) completed the questionnaire. Findings would be beneficial academically and in practice. There were however some limitations which should be considered. Furthermore, it pointed out that different results have been obtained in different countries. Future studies could investigate these issues employing a larger research sample. It has been claimed by some researchers that e-learning factors can comprise more than four elements and this is something that should be considered in future work.

Another study by Lin, (2012), attempted to outline this question by integrating the information system continuance theory and task-technology fit to enhance awareness and understanding of the precedents of the desire to carry on with e-learning, using the questionnaire. There were inconsistent outcomes detected in the literature that referred to the outcomes of e-learning. It had many constraints though. Firstly, the subjective influence on achievement was assessed by apparent effects on learning. Secondly, the perception of fit factor was measured relative to the ability to collect, build or share knowledge from using the vocabulary learning strategies. Thirdly, most of the respondents had experienced a year or two of e-learning practice.

According to Al-Gahtani, (2014), there has been progress in understanding the factors that determine the acceptance and assimilation of e-learning in a developing country by testing a simple TAM3-based network on the use of structural equation modelling. It used an approach that sought the reasons why individuals accepted and assimilated e-learning in academic settings. There was a survey of 286 students using a

quantitative approach. Results showed factors of e-learning technology acceptance, while also examining some related post-implementation interventions expected to facilitate the likelihood of acceptance and assimilation of e-learning systems.

According to, B. Wu and Chen (2017), a model integrating the technology acceptance was proposed (TAM), and task fit technology (TTF) model to collect data by a survey was used to test the hypotheses. The sample was 252 employed participants in China who had already used e-learning system. The results showed that the model for the integration of the TAM for the purpose of adopting TTF model for use offered a more detailed insight into the related behaviours. The limitation was carried out in China and used a design that made it difficult to determine causal effects among the constructs.

2.2.4 Web Based e-Learning

As highlighted by Chen and Tseng (2012), their study was for the purpose of analysing the influential factors that would affect the intentions of university students towards using web-based e-learning for in-service education and for identification of the most important factors that impact the involvement of university students in web-based e-learning. The authors distributed questionnaires for 402 university students in central Taiwan employing TAM. The results indicated a positive association between self-efficacy and behaviour that suggested intentions to accept web-based e-learning. Despite some limitations, utilizing web-based to increase using e-learning for university students. Furthermore, learning material and relevant training materials for practical practice are downloadable any time, and anywhere

Tarhini et al. (2013), in another study developed the TAM model by integrating new variables to the model to explore how these variables would influence students' intention to accept and use e-learning systems. In total, 604 valid questionnaires were returned by students involved in web-based learning systems at Brunel University in England. This was theoretical and empirical proof that TAM is a beneficial theoretical framework to improve understanding of the students' acceptance of e-learning

technology and an even stronger behavioural intention to use the system. However, there are some limitations. First, the analysis fails to include any investigation of the possible effect of a set of moderators. Second, it is impractical to capture the actual use of the system using the student log-file.

2.2.5 E-Learning of Information and Communication Technology (ICT)

Bhuasiri, et al. (2012) in their study determined numerous factors from the literature that could affect the success of e-learning systems and made a comparison of the relative significance among two stakeholder groups in developing countries and ICT experts. The study gathered 76 responses employing the Delphi method and Analytic Hierarchy Process (AHP) method. The finding reveals six dimensions and 20 crucial success factors for e-learning systems in developing countries. The only limitation is the limited number of ICT experts in the Faculty.

Furthermore, Basha et al. (2013) reviewed the existing literature on the use of ICT resources in education in various developing countries. The main variables of the study comprised investigation of the readiness of ICT, instructors and learners.

As stated by Khasawneh (2015), whose study focused on developing the e-learning process through ICT, a model relevant to the environment of the study was adopted. The study was carried out in a university in Jordan and the results concurred with those of earlier studies as they all maintained that there were four indicated factors. The study found that personal ability and the facilitating condition factors had a positive relation with the behavioural intention. It was however limited to academic staff in their teaching and learning process.

2.2.6 Students' Experiences in e-Learning

Paechter, et al. (2010) made a study of students' e-learning experiences. Using regression analysis they explored this experiences that contributed to the perception of

learning performance and course satisfaction. Their goal was not to study any courses or best-practice examples in particular but to consider a large student sample to acquire an overview of e-learning as implemented in universities in Austria. The quantitative method was used and the questions were answered by 2,196 participating students from 29 Austrian universities. The outcomes of the study indicated that influencing students' motivation and goals could be achieved by adapting education according to the importance of continuing education and training for the instructors. The limitation is that staff needed a high level of educational expertise to apply the e-learning system but they were not adequately experienced and did not have the skills to properly implement e-learning.

Recently, Jen-Her et al. (2010) proposed a research model that examined the factors determining student learning satisfaction in a mixed e-learning system. The model was tested employing a questionnaire survey of 212 students. The results specified that learning environment and expected performance have considerable effect on learning satisfaction. Also, interaction has an important impact on the learning environment. It has limitations that also present future research opportunities. First, the model was endorsed with selected sample data from the target universities in Taiwan. Other samples from different countries, cultures, and contexts should be collected to verify and fine tune the study findings.

Additionally, Chow and Shi (2014) examined and clarified students' satisfaction and their wish to continue with the e-learning system by examining the relationship between confirmation and the four factors of e-learning and at the same time examined the relationship between the four factors of e-learning and satisfaction and continuing intention. The results confirmed the existence of a positive relationship with both factors and satisfaction in using e-learning. A sample of 250 university students from Hong Kong was chosen randomly, to answer the questionnaire.

2.3 CRITICAL SUCCESS FACTORS

2.3.1 IT Infrastructure

An IT infrastructure is considered the basis of information and communications technology, and a basic data system, during the technical setting to ensure the success of any e-learning system. (Jabbouri et al. 2016). However, the infrastructure constitutes one of the critical factors in ICT. It can be either hamper or enable the achievement of a competitive edge for a university as one of the competitive strategies, to attain higher levels of organisational transformation and planning (Alsabawy et al., 2016).

2.3.2 System Quality

System quality is a measure of the system based on accuracy, convenient usage and other system yardsticks (Hassanzadeh et al. 2012). This factor can be considered as a significant component in investigating the aim by stakeholders in any e-learning system. Previous studies have acknowledged that system quality is a significant factor in the evaluation of e-learning (Alsabawy et al. 2016).

2.3.3 Multimedia Instruction

Multimedia instruction helps students to acquire complex skills, including the usage of voice media or video media instruction to facilitate students understanding of the complexity of pedagogical materials and be capable of using acquired concepts to reason and infer and be competent enough in applying conceptual knowledge to use e-learning flexibly (Liaw 2008).

2.3.4 Service Quality

Service quality in e-learning refers to the overall support that e-learning system is able to deliver to learners using the system (Bhuasiri et al. 2012). On the other hand, this

factor provides considerable support to students through practice and is a positive and efficient support for system users to use and fully benefit from the system. Some researchers have argued that service quality is a subset of system quality, but changes in the role of ISs have service quality as an independent component (Hassanzadeh et al. 2012). Previous research showed that much effort has been made to assess service quality (Alsabawy et al. 2016). According to Sun et al. (2008), service quality will positively influence user satisfaction with e-learning.

2.3.5 Ease-Of-Use

This factor aims to measure how easy and convenient it is for students to use the e-learning system (Lim et al., 2007). In other words, ease-of-use or convenient usage refers to the prospective user's expectation that the use of the e-learning system will be easy and stress-free (Bhuasiri et al. 2012). According to (Sun et al. 2008) and (Ahmed Al-Azawei & Lundqvist 2015), ease-of-use significantly affects user satisfaction with e-learning.

2.3.6 Usefulness

This factor indicates the student's use of the e-learning system to enhance their work and performance which lead to future benefits. According to Sun et al. (2008), usefulness of the e-Learning system will positively impact user satisfaction with e-learning. (Chen & Tseng, 2012). According to, Alsabawy et al. (2016), there are positive effects between usefulness and user satisfaction. Sun et al. (2008), state that usefulness of the e-learning system will positively impact user satisfaction with e-learning.

2.3.7 Openness

This factor is significant for using e-learning over current time. Furthermore, open education community has stressed openness and that teaching measureable should

come from the community and be both visible and accessible with free access, better choice and flexibility (Bing Wu & Chen, 2017).

2.4.8 Self-Efficacy

This factor referred as a learners' cognitive beliefs that affect their behaviour when using a technology (J.-H. Wu et al., 2010). It is one's belief in one's ability to perform certain tasks successfully (Bhuasiri et al., 2012). The e-learning system has recently been used in Iraq, which means that this factor is important to help students in utilizing the new technology (Luaran et al., 2014). According to Sun et al. (2008), self-efficacy has a positively significant effect on user satisfaction with using e-learning

2.4.9 User Satisfaction

This variables is one of the most critical factors supporting an e-learning quality and us frequently used to evaluate success in implementing the e-learning system (Hassanzadeh et al., 2012). There are many works that have applied user satisfaction as a single construct to estimate success in e-learning based on information and communication technology (Alsabawy et al., 2016). All factors have been summarised and are shown in the table below according to these references:

Table 2.1 Related studies of factors used

No	Factor	Reference
1	IT infrastructure	(Alsabawy et al. 2016) , (Alsabawy et al. 2013), (Jabbouri et al. 2016).
2	System quality	(Hassanzadeh et al., 2012; Bhuasiri et al., 2012; Liaw, 2008)
3	Multimedia instruction	(Liaw, 2008)
4	Service quality	(Hassanzadeh et al., 2012)
5	Ease of use	(Ahmed Al-Azawei & Lundqvist, 2015; Basha et al., 2013; Aparicio et al., 2016; Abdullah et al., 2016; Chen & Tseng, 2012; B. Wu & Chen, 2017)
6	Usefulness	(Chen & Tseng, 2012; B. Wu & Chen, 2017; Alsabawy et al., 2016; Alsabawy et al., 2013; (Liaw, 2008), (Bhuasiri et al., 2012), (Aparicio et al., 2016), (Abdullah et al., 2016), (Sun et al., 2008), (Chen & Tseng, 2012), (Islam, 2013), (Al-Gahtani, 2014), (Lee et al., 2009)
7	Openness	(B. Wu & Chen, 2017).
8	Self-Efficacy	(Liaw, 2008), (Ahmed Al-Azawei & Lundqvistm 2015), (Sun et al., 2008), (Lim et al., 2007), (Chen & Tseng, 2012), (Tarhini et al., 2013), (Islam, 2013),
9	User satisfaction	(Alsabawy et al., 2013), (Hassanzadeh et al., 2012), (Liaw, 2008), (Ahmed Al-Azawei & Lundqvist, 2015), (Sun et al., 2008), (J.-H. Wu et al., 2010), (W. S. Lin, 2012), (Chow & Shi, 2014), (Paechter et al., 2010)

2.5 THEORETICAL

This section provides a comprehensive view of technology theories. Technology theories are optional individual behaviour that is explained by behavioural theories. Furthermore, this research aimed to explore the relationship between user satisfaction and independent variables in e-learning system. DeLone, W. H. and McLean, (1992), showed that variables have positive effect on success information system. Moreover, TAM was widely used to explore the factors affecting student's acceptance in previous studies on e-learning. Thus, studying previous models will assist understanding of the significant relationship between a dependent factor and an independent factor and build the theoretical model of this research. The above-mentioned theories are used to identify behaviours and organisation. In addition, these models are the best frameworks to form the theoretical basis of this study.

2.5.1 Models To Measure Success of The Information System

DeLone, W. H. and McLean, (1992) proposed a model to show which variable was important in measuring the success of the information system. Several papers have validated this information success model and it has been widely adopted for e-learning research (Pata, 2009). To succeed, any model for information systems must comprise six variables which are taken from many successful information systems studies such as system quality, user satisfaction and intention to use, System quality influences user satisfaction and user satisfaction in turn affects intention to use. Furthermore, all these factors have significant effect and impact individuals and organisations for success information system model. DeLone and Mclean, (2003) added the service quality as an important factors that impacts user satisfaction. The study has added service quality as an important factor that impacts user satisfaction. (For more details see Appendix E, Figure 10,11).

Many earlier models have sought to explain the difference in the acceptance and adoption of new information technology systems (F. D. Davis et al., 1989; Venkatesh &

Davis, 2000. and Shankar et al., 2003) developed the UTAUT model to merge previous related models such as technology acceptance model (TAM), Theory of Reasoned Action (TRA), Motivational Model (MM), Theory of Planned Behaviour (TPB), combined TAM and TPB (C-TAM-TPB). Model of Personal Computer Utilisation (MPCU), Diffusion of Innovation Theory (DOI); and Social Cognitive Theory (SCT).

2.5.2 Modern Theoretical Model (UTAUT)

UTAUT is a modern theoretical model compared to other models and can support the other models' weaknesses (Min et al., 2008, Marchewka & Kostiwa, 2007, Yueh et al., 2015). The aim of developing UTAUT was to determine the factors that affect specifically the users' perception of adoption of new technology (Shankar et al., 2003, Min et al., 2008, Dečman, 2015). Figure 2.12 shows the conceptualisation of UTAUT. Tai (2013) extended UTAUT and proposed the UTAUA2 model in a consumer context. The main difference between UTAUT and UTAUT2 is the context variables. UTAUT2 enhances three context-specific variables (hedonic motivation, price value, and habit) to apply the UTAUT in a consumer context. Lian (2015) compared UTAUT and UTAUT2 and chose to use UTAUT, based on the premise that UTAUT better explains the research context in e-learning services by adding other variables that are more related to e-learning adoption such as security.

This study employed UTAUT as the theoretical basis to build the proposed research model. UTAUT has been widely used in many areas such as utilisation of new technology. However, the modelling of e-learning studies is still limited (Nguyen et al., 2014). Thus, the factors of UTAUT will be used in this study along with other factors such as openness, (ease-of-use and usefulness among other factors because they are crucial for ensuring the successful adoption of an appropriate e-learning system. der Schyff and Krauss (2014) and other researchers have reviewed UTAUT with the exclusion of openness, ease-of-use, and usefulness (Behrend et al., 2011). (For more details see Appendix E, Figure 12).

2.5.3 Technology Acceptance Model (TAM)

F. D. Davis et al. (1989), proposed a Technology Acceptance Model (TAM), the main objective of which was to investigate how the variables affect the user acceptance and utilisation of technology. Perceived usefulness and perceived ease-of-use were variables newly-added to the TAM model. Those variables have significant effect on behaviour intention to utilisation and adopt new technology. (For more details see Appendix E, Figure 13).

The study has been developed and checked a theoretical extension of TAM that explains perceived usefulness and usage intentions in terms of social influence and cognitive instrumental processes. The extended model is known as TAM2. (Venkatesh & Davis, 2000). (For more details see Appendix E, Figure 14).

2.6 CONCEPTUAL MODEL

H1. There is a positive relationship between IT Infrastructure and user satisfaction.

According to Raouf and Naser (2012), the first hypothesis investigated the positive effect between IT infrastructure and user satisfaction. Therefore, utilising an e-learning system is positively influenced by IT infrastructure (Alsabawy et al., 2013), IT infrastructure has affects and supports user satisfaction.

H2. There is a positive relationship between system quality and user satisfaction.

The second hypothesis investigated the effect of system quality on user satisfaction. According to F. Davis (1989), it has been shown that system quality is more likely to induce a positive perception in user satisfaction. System quality has been discussed in previous studies in relation to user satisfaction. In addition, the study provided support for

system quality, which has a positive influence on user satisfaction (Chiu et al., 2007). Therefore, the following hypothesis is suggested:

H3. There is a positive relationship between Multimedia instruction and user satisfaction.

The third hypothesis investigated the effect of Multimedia instruction on user satisfaction. According to Liaw et al. (2007), multimedia instruction should be considered when implementing e-learning system. Furthermore, the study focused on environmental characteristics included in e-learning's system. Multimedia instruction is one of the important environmental characteristics and has a positive influence on user satisfaction.

H4. There is a positive relationship between ease-of-use and user satisfaction.

The fourth hypothesis investigated the effect of ease-of-use on user satisfaction. The study found that ease-of-use had a significant effect on user satisfaction and this is the most important factor in the successful use of the e-learning system (Tarhini et al., 2013). The finding suggested that ease-of-use significantly influenced user satisfaction and this factor was related to user satisfaction behaviour (Venkatesh & Davis, 2000).

H5. There is a positive relationship between openness and user satisfaction.

The fifth hypothesis investigated the positive effect between openness and user satisfaction. The study showed a major percentage of students are interested in open education because of the open nature underlying the idea. It is one of the most important key factors and improves collaboration and open access. Individual-technology consists of a lot of factors and openness is one of the most important and it has a positive effect on user satisfaction (B. Wu & Chen 2017).

H6. There is a positive relationship between usefulness and user satisfaction.

The sixth hypothesis investigated the effect of usefulness on user satisfaction. The paper highlight usefulness as a determinant of user satisfaction with e-learning systems (Calisir & Calisir, 2004) . In addition, a previous study suggested usefulness is an appropriate way of measuring user satisfaction with the use of e-learning systems (F. D. Davis et al. ,1989).

A study by Islam (2013) showed that usefulness is very important in the instrumental rate of e-learning. Furthermore, to adopt any new individual technology the paper explained that usefulness has a positive effect on user satisfaction.

H7. There is a positive relationship between service quality and user satisfaction.

The seventh hypothesis investigated the effect of service quality on user satisfaction. According to Chiu et al. (2007), service quality is achievement understanding which impacts user satisfaction and directly affects students. In addition, previous studies suggest service quality as a very significant factor to increase the level of user satisfaction in the implementation of e-learning systems.

H8. There is a positive relationship between self-efficacy and user satisfaction.

The eighth hypothesis investigated the effect of self-efficacy on user satisfaction and this study showed that self-efficacy significantly affected user satisfaction to use e-learning systems based on ICT among students in the universities (A. Al-Azawei & Lundqvist., 2015; Khasawneh 2015).

H9. There is a positive relationship between user satisfaction and utilising e-learning

The last hypothesis investigated the effect of user satisfaction on the use of e-learning. The researcher explains and supports the associations between user satisfaction, and using new technology. In addition, the study founded there are a positive impact between user

satisfaction and implementation e-learning system. Furthermore, the level of user satisfaction and the benefits of using e-learning system were very high (Gorla et al. 2010).

In conclusion, based on the literature for the e-Learning models and according to TAM and UTAUT theory, this study specified the critical factors that have high-level effect on user satisfaction to make the implementation of e-learning in Iraqi public universities very successful. In addition, these factors include eight independent factors and one moderator and one dependent.

This study focused on the eight independent factors which supported and increased the effect on user satisfaction in using the e-learning system. In addition, the moderator factor (user satisfaction) supported and increased the effect of using e-learning in Iraqi public universities. In other words, nine hypotheses in this research analysis are accepted according to correlation analysis. This result above indicate that if these functions perform well there is also a tendency for consider their level. Finally, this factor is the consideration by the student and they are sufficient to evaluate the user satisfaction in using the e-learning system.

Following previous studies, this study defined eight factors which impact user satisfaction to improve using e-learning systems. The basic hypothesis is that continuance in using e-learning system is determined by user satisfaction. Furthermore, user satisfaction is determined by eight factors: IT Infrastructure, system quality, multimedia instruction, and ease-of- use, openness, usefulness, service quality and self-efficacy.

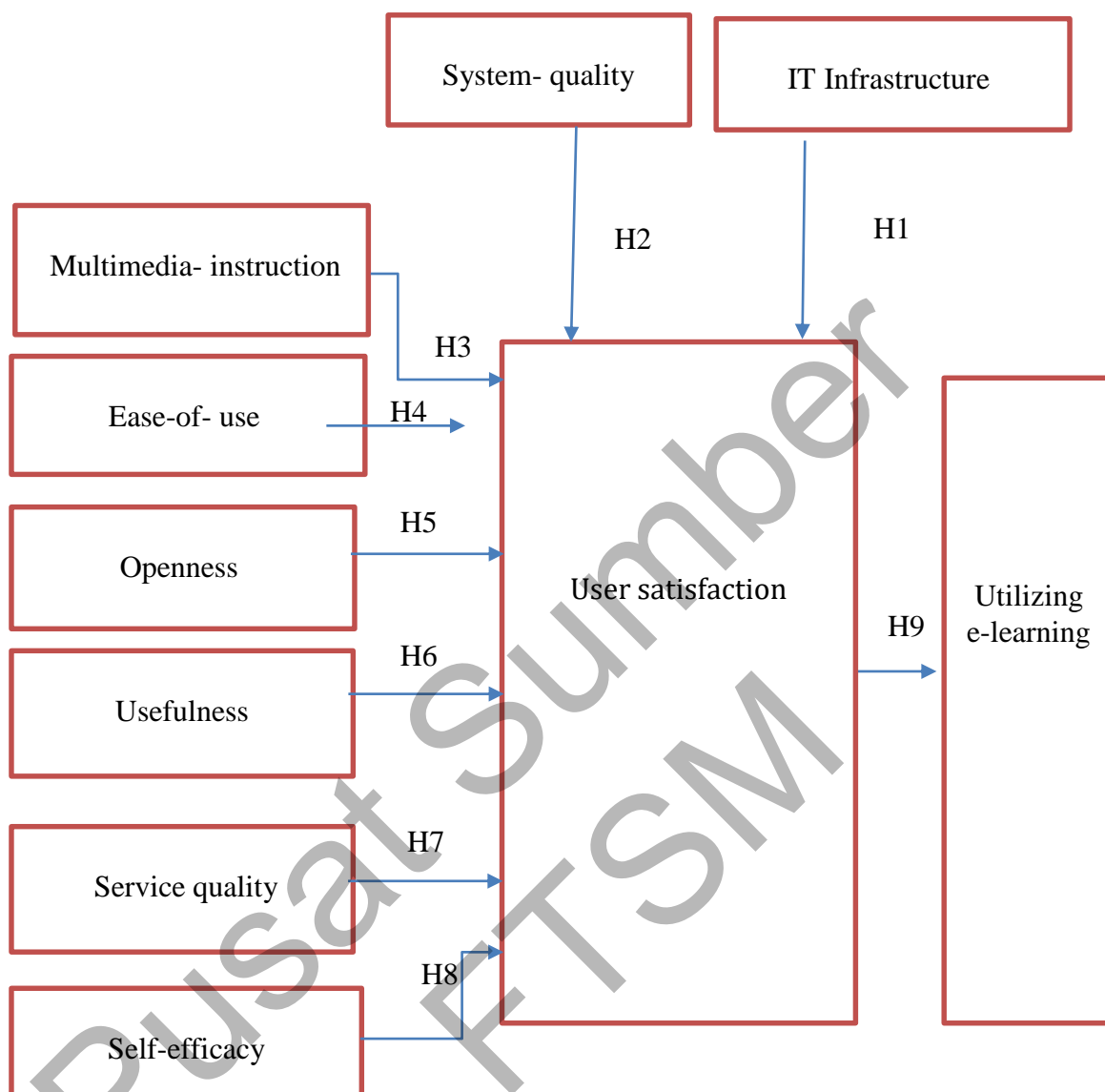


Figure 1.1 Conceptual model

2.7 CHAPTER SUMMARY

This chapter discusses all the results, limitations and research gaps of the recent models. After because the expected results in this work will depend on their limitations and gaps.

During the literature review it was shown that the IT infrastructure has a positive effect on user satisfaction to use e-learning based on ICT for public universities. Most of these models have been applied in different case studies but they are poor studies for e-learning of ICT in the context of Iraq. Based on this researcher's review; there is no model for e-learning based on ICT of Iraqi public universities. In most of these earlier studies there has not been a combination of these factors applied. The previous models were limited to use the openness factor and its effect on user satisfaction and did not include developing countries.

The conceptual model for this study has all these effect factors including the openness factor that affects user satisfaction in using e-learning based on ICT in Iraqi public universities. The openness factor has been used in an e-learning model in China (B. Wu & Chen, 2017). Besides the openness factor or other individual factors, to the best knowledge of this researcher, a combination of factors has not been applied to investigate their effect on user-satisfaction in using e-learning based in ICT. This model focuses on addressing the issue of lack of experience, slow bandwidth, and poor skill levels of students.

CHAPTER III

RESEARCH METHODOLOGY

3.1 INTRODUCTION

The current chapter presents the technique employed and processes involved in answering the study questions and attaining the objectives study in Chapter I. This chapter describes the nine stages by presenting the research design in Section 3.2.

First stage explains the literature review. The second stage identifies the problem, gaps, and collected factors. The third stage describes the instrument design, while the fourth focuses on population and sampling. The fifth stage explains the instrument validation and the sixth phase describes the Pilot Study. The seventh stage is a discussion of the data collection and the eighth stage explains the data analysis while the final stage deals with the refinement of the final model.

3.2 RESEARCH DESIGN

This study adopts a quantitative approach, with the research methodology divided into nine phases according to the stages and the scope of the research. Each phase is explained in detail based on the stages of this research. Furthermore, it also clearly discusses the achievements of the research objectives. Figure 3.1 illustrates the research framework.

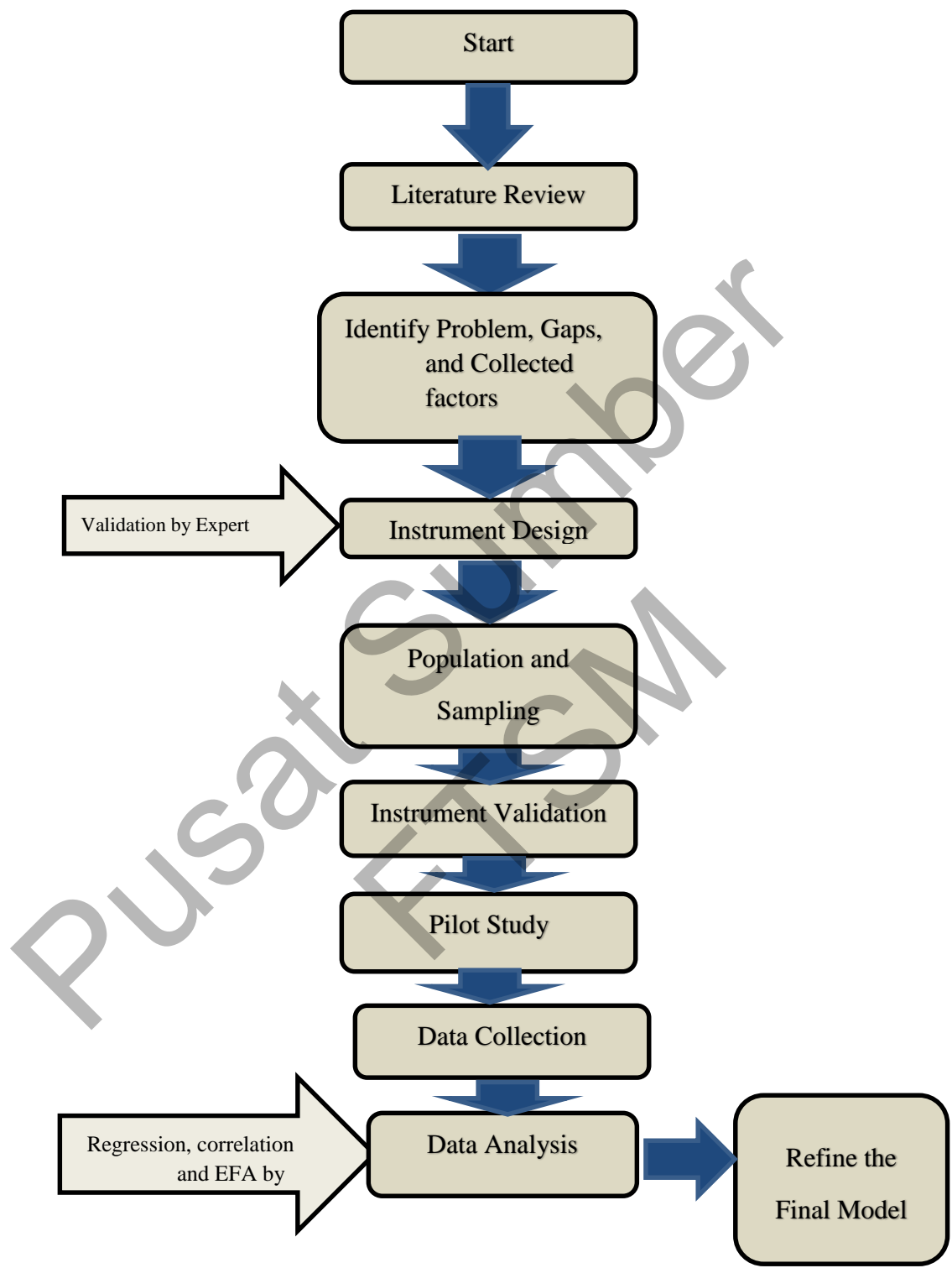


Figure 3.1 Research Methodology Framework

3.3 LITERATURE REVIEW

The literature was reviewed to identify works related to the study objective and to determine the factors employed in existing research, as well as detect important tools and their utilisation in e-learning system on the basis of ICT. The theoretical approach of this study involved a thorough review of the literature so as to determine the pertinent issues and gaps in the body of knowledge related to the topic of this current research.

The main ideas were gained from the literature by identifying the challenges in e-learning for ICT, analysing and identifying the generic features of the existing e-learning models, and identifying the factors.

3.4 PROBLEM IDENTIFICATION AND FACTORS COLLECTION

In this stage, after review the research articles, books, journal papers, and conference proceedings, related to this area, the research problem and gaps in e-learning of ICT were identified. Furthermore, the key factors that affect the use of e-learning based on ICT in public universities were also investigated.

3.5 INSTRUMENT DESIGN

The instrument was designed based on understandable language; the considered items were those related to the objectives of the study. Besides being specific to avoid ambiguity, the instrument was tested by four experts to verify the context and to ensure that it was clear and concise. As for the instrument, it was a close-ended questionnaire in which respondents needed to provide a specific answer for each item.

3.6 POPULATION AND SAMPLING

In selecting the population and sampling, it was important for the study that the sample selected was unique, with a specific feature. The method employed was random sampling from two

public universities in Iraq (Baghdad University, and University of Technology). The sample comprised 182 students from a total of 308 students in the Faculty of Computer Science in both of these universities (Krejcie & Morgan, 1970).

3.7 INSTRUMENT VALIDITY AND RELIABILITY

The instrument was validated by the four experts in the field of this study. Each validator had some comments regarding the suitability of the instrument and/or the contents. (Please refer to Appendix C for the names of the experts.) After following up on the relevant comments a new version of the questionnaire was produced to be the guide for the next data collection phase.

To ensure that the instrument was free of errors and could achieve its intended goal, a pilot study was conducted as it was considered as it is one of the best ways to verify a correct questionnaire. Gable (1994) stated that data must be pilot tested to ensure that the instrument was free of errors and the respondents could give their feedbacks correctly.

Prior to the final data collection stage, the researcher administered the questionnaire to 30 students in the Faculty of Computer Science in Baghdad University and Technology University, from each of which 15 students agreed to participate. .

After that, the researcher entered the collected data to the SPSS software package to test the reliability. A Cronbach's alpha reliability test was also applied.

The results showed that all factors produced 0.7 and above in the Cronbach's alpha test value and this was considered reliable. Based on Feldt (1969), the values of 0.6 to 0.7 were questionable, values of 0.7 to 0.8 were acceptable, values of 0.8 to 0.9 were good and values above 0.9 were considered excellent. It is important to mention that the Cronbach's value must be between 0 and 1. (Please refer to Appendix D for full Pilot Study reliability results.)

3.8 DATA COLLECTION

The collection of the data for this study was based on a survey of a sample comprising students from two public universities (Baghdad University, University of Technology). In the process of gathering data, there was typical close contact between the researcher and the participants. The instruments were administered to the students in the class in both of these universities face-to-face and the response rate was higher. The questionnaire used contained four sections. The first part had the respondents' background information. The second focused on the factors affecting user satisfaction, while the third was to show how user satisfaction affected the utilisation of e-learning. The fourth was to explain the outcomes of using e-learning. The questionnaire was sent to the coordinators of the two selected universities and distributed for the students from the Faculty of Computer Science. After a week; the coordinators collected the questionnaire from 182 student respondents.

3.9 DATA ANALYSIS

This research analysed the data collected using statistical software and methodologies to analyse the data. This study employed the Statistical Package for the Social Sciences (SPSS) Software to test the hypotheses and validate conceptual model by measuring regression, correlation and factor analysis. Furthermore, the final model was obtained by analysing the questionnaire for students, who study in the Faculty of Computer Science in two public universities.

The frequencies and percentage explained provide the details of the problem addressed by the dataset in the questionnaire. To determine the reliability and factor analysis of the model, this study tested the maximum and minimum values of each factor. In addition, the datasets were checked for normality and outliers. This was followed by the researcher checking the reliability (Cronbach's alpha) coefficient, which was computed in order to check the accuracy. To determine the relationship between the independent factors (IT infrastructure, system quality, multimedia instruction, openness, service quality, usefulness, ease-of-use and self-efficacy) with the moderator factor of user satisfaction. Furthermore, the study measured the correlation and regression relationship between independent factors and user satisfaction from

one side and user satisfaction with utilising of e-learning system from another side. In addition, datasets decrease was done by using validation (factor analysis), the factor analysis assisting in establishing the dimensions suitability to model the use of e-learning system. (for more details see Appendix B).

3.10 CHAPTER SUMMARY

This chapter presented the research design and methodology used in the research. Also presented were the suitable general instrument design, population and sampling design, instrument validity and reliability, data collection, and data analysis. The quantitative method was adopted to analyse the questionnaire. SPSS was used to analyse the data and to check the relationship between factors and hypotheses.

CHAPTER IV

RESEARCH FINDINGS

4.1 INTRODUCTION

This chapter focuses on the analyses of the collected data using SPSS 24 to assess the relationships between independent factors and using e-learning systems. The data have been collected from respondents. The statistical models are executed in order to produce the findings and express the opinions.

The questionnaire comprises four sections, background information, factors affecting user satisfaction, user satisfaction, and the effect of using the e-learning system. A total of 308 sets of questionnaires were distributed to the students who were the respondents of this study in two Iraqi Public Universities (University of Baghdad and Technology University). A total of 182 sets of questionnaire were collected from the respondents (Krejcie & Morgan 1970). This chapter includes a brief description of the missing values, respondent profiles, normality, outlier, and finally, specifications of the electronic information sharing that included reliability by using Cronbach's Alpha tool, validity by applying factor analysis technique, correlation and regression to show the relationship between dependent and independent variables.

4.2 MISSING VALUES

During the research, especially with humans, it is unusual that complete data are obtained from every case. Therefore, the data was checked in order to determine if there were any missing values during insertion of the data in SPSS. The researcher used the manual way

by scanning and skimming and also used the systematic method of choosing the Frequencies tool in SPSS (Pallan, t 2013).

Nevertheless, missing data has tested by SPSS to ensure all data correct and do not have any error when entered the data. So, to specified missing data there are two test first by the user and the second by system (Allison 2003) (see Appendix B ,Table 1-6).

4.3 RESPONDENT PROFILES

This section illustrates the profile of the respondents in order to implement this study. A total of 308 copies of the list of questions were administered. The samples included different levels of student degrees, such as higher diploma and master's students who studied at Baghdad University and Technology University in Iraq. In this research complete responses of the questionnaire were received from 182 students with different demographic backgrounds.

4.3.1 Gender Distribution

Getting responses from different gender is significant because they may have different in their opinions and point of view. This research includes both male and female respondents to ensure the research results are generated from all gender. According to the Table 4:1, it shows percentages of respondents in two gender sets. Male respondents in this research were 50.55% and the female respondents 49.45%. However, the number of the male respondents is a little more than female respondents, which shows that both genders are willing to answer the questionnaires. For more details show (Appendix B Figure 1).

Table 0.1 Percentage distribution gender

Gender	Frequency	Percent (%)
Male	92	50.5
Female	90	49.5

4.3.2 Age Distribution

Age is a requisite personal and demographic information for the respondent as it affects the reliability of the data contributed by respondents. Furthermore, it is prepared based on the research area and the respondents' goals. In the research, since the respondents are students two Iraqi Public Universities (Baghdad University and University of Technology) the age factor is significant as it will allow a matching of the respondents with the corresponding education stage to ensure that they are representative of students over a wide age range and education stages. Table 4.2 below indicates the percentages of different age groups. There are three sections of age groups. First, the students who are between 18 and 22 years, who make up 94.0%; second, the students older than 29 years with a percentage of 3.8% and lastly, 2.2% of students and from 23 to 28 years. As all age groups were represented it can be concluded that this study could represent all the students in the universities (See Appendix B, Figure 2).

Table 0.2 Percentage of Age Distribution

Age	Frequency	Percent (%)
18 to 22	171	94.0
23 to 28	4	2.2
more than 29	7	3.8

4.3.3 Education Level Distribution

The respondents selected in this research are students, thus, education level information is an important consideration in this research. The education level of a respondent will help to attain the research objectives. From Table 4.3 the Bachelor degree students show the highest percentage of 94%, followed but, respondents who are studying at master's level who made up 3.8% while higher diploma students made up 2.2%. In general, all education level are covered which means that all the major higher education stages are covered in this study. (See Appendix B, Figure 3).

Table 0.3 Percentage of education levels

Education level	Frequency	Percent (%)
Bachelor	171	94.0
high diploma	4	2.2
Master	7	3.8

4.3.4 Background of Participants

Respondents have experience of using computers and the Internet which would ensure the success the aim of this research. Table 4.4, illustrates that most respondents are from the Faculty of Computer Science because they have good computer skills. However, majoring is divided into seven groups. This result shows that networking is the highest among the respondents at 26.4% followed by Information Technology (23.6%) , Computer Science (21.4%), Software (16.5%), Information Science (6.6%), Security (3.30%) and AI (2.20%). (See Appendix B, Figure 4).

Table 0.4 Percent of participants

Participants background	Frequency	Percent (%)
Information Technology	43	23.6
Computer Science	39	21.4
Networking	48	26.4
Software	30	16.5
AI	4	2.2
Information Science	12	6.6
Security	6	3.3

4.3.5 Internet Usage

Analysis as made of Internet usage among the respondents based on hours of usage per day to help contribute towards attaining the aims of this research. Table 4.4, shows 62.1% of the respondents used the Internet more than six hours a day. And 23.1% of respondents who using Internet between 4 to 6 hours during day. 13.2% of respondents who use the Internet from 1 to 3 hours. Finally, just 1.6% of responses who use the Internet less than

an hour. The results show that the Internet usage in these universities is high according to number of responders used. (See Appendix B figure 5).

Table 0.5 Percentage using internet

Using Internet	Frequency	Percent
Less than an hour	3	1.6
From 1 to 3 hours	24	13.2
From 4 to 6 hours	42	23.1
More than 6 hours	113	62.1

4.4 NORMALITY

The normality checking was conducted in this research to ensure that the data were normal for analysis. This data should have no value beyond the acceptable range of skewness as proposed by Wong *2013) which is: between -2.58 and + 2.58 at the 0.01 important level or between -1.96 and +1.96 at 0.05 value level. (For more details see Appendix B, Tables 7-13 and Figure 6.)

Table 0.6 Percentages of Normality

Factor	Item1	Item 2	Item 3	Item 4
IT Infrastructure	.023	-.212	-.495	-.337
System quality	-.467	-.449	-.350	-.515
Multimedia instruction	.542	-.222	-1.136	
Service quality	-.521	-.466	-.032	-.271
Ease-of-use	-.640	-.494	-.172	-.388
Usefulness	.125	-.180	-.466	-.369
Openness	-.088	-.287	-.494	-.382
Self-efficacy	-.585	-.422	-.458	-.585
User satisfaction	.041	-.212	-.465	-.353
Utilising e-learning	-.461	-.465	-.353	-.537

4.5 OUTLIER

The outlier refers to the data with outlier value with the normal acceptance range of dataset (Richards & Jones 2008). Pallant (2013) identified the Outliers as “extreme cases which have a considerable impact on the regression solution.” Therefore, the method used to test the outliers of the data in each variable was the Z-score. The data are outliers when the Z-score value exceeds +3 or is below -3. After checking all items in this study it was concluded there were no outliers. (For more details see Appendix B, Figure 6.)

4.6 RELIABILITY (CRONBACH'S ALPHA)

Cronbach's alpha is the best reliability checking approach to check the quality tools to use in data collection. Cronbach's Alpha values between 0 and 1 are acceptable. The larger level of range means a higher value of reliability. Values that are 0.9 and above are excellent; values of 0.8 and above are good; values of 0.7 and above are acceptable; values of 0.6 and above are questionable; and values less than 0.6 are poor (Pallant, 2013). Table 4.7 shows the Cronbach's Alpha is excellent for two variables, and six variables above 0.8 value which are good, while two variables above 0.7 are acceptable according to the standard range. The data obtained from respondents showed good reliability level and could be included as reliable information in this study. (For more Information see Appendix B, tables 13- 22.).

Table 0.7 Percentage of Cronbach's Alpha reliability

Factor	Cronbach's Alpha	No.of Items
IT Infrastructure	.894	4
System quality	.846	3
Multimedia instruction	.846	2
Openness	.907	4
Ease-of-use	.789	4
... to be continued		

... continuation		
Usefulness	.894	4
System quality	.757	4
Self-efficacy	0.900	4
User satisfaction	.896	4
Utilising e-learning	.842	3

4.7 VALIDITY (FACTOR ANALYSIS)

Validity refers to data that have been used and are valid in order to use for the next step. Factor analysis is chosen to detect factors among the observed variables. This means that, if the data comprise multiple variables, factor analysis can be used to lower the number of variables. It is also possible to create a reduced number of factors through a sizeable number of variables which can describe the observed difference in the bigger number of variables. Factor analysis can be accomplished by three kinds for approaches first the exploratory factor analysis approach second, the confirmatory factor analysis approach final, the hybrid approach (Ahire & Devaraj 2001) Table 4.8 shows the factor analysis for this study. (For more information see Appendix B Table 23).

Table 0.8: Validating factors using SPSS

Factors	Items 1	Items 2	Items 3	Items 4
IT infrastructure	0.682	0.724	0.838	0.812
System quality	0.643	0.809	0.781	0.466
Multimedia instruction	0.461	0.445	0.436	
Service quality	0.604	0.811	0.667	0.732
Ease of use	0.516	0.693	0.582	0.660
Usefulness	0.705	0.718	0.811	0.781
Openness	0.670	0.711	0.825	0.798
Self- efficacy	0.814	0.788	0.596	0.814
User satisfaction	0.688	0.721	0.836	0.809
Utilisation e-learning systems	0.640	0.836	0.809	0.457

4.8 CORRELATION

A correlation analysis was conducted by checking the relevance impact Of the independent variables with the dependent variable utilising e-learning through user satisfaction. Furthermore, the correlation was to check the hypothesis as indicated in Chapter Two. The correlation degree evaluates the linear association between two variables. Values of the correlation coefficient are at all times between -1 and +1. A correlation coefficient of +1 shows that two variables are complete relationship in a positive linear sense; a correlation coefficient of -1 shows that two variables have complete relationship in a negative linear sense, and a correlation coefficient of 0 shows that there is no linear relationship between the two variables(Hair et al., n.d.). Figure 4.1 shows the correlations between the independent variables and the dependent variable. (For more information see Appendix B, Table 24).

4.9 REGRESSION

Regression analysis measures the relation between an independent variable and a dependent variable. Regression is used to test the hypothesis of each factor in order to determine the effect. It shows also the summary model of each factor. Also it is used to find the final model of the research. The nine factors were found to be significant factors and they could affect effect the e-learning factors. (For more details see Appendix B, Table 25-33.).

Table 4.9 Model Summary of Multiple Regression Analysis

Factors	R	R Square	Adjusted R Square	Std. Error of the Estimate
IT infrastructure	.758 ^a	.574	.572	.35028
system quality	.701 ^a	.492	.489	.38288
Multimedia instruction	.355 ^a	.126	.121	.50208
Ease-of-use	.578 ^a	.334	.330	.43819
Openness	.721 ^a	.521	.518	.37181
Usefulness	.686 ^a	.471	.468	.39058
Service quality	.718 ^a	.515	.512	.37400
Self-efficacy	.624 ^a	.390	.386	.41943
User satisfaction	.890 ^a	.792	.791	.28656

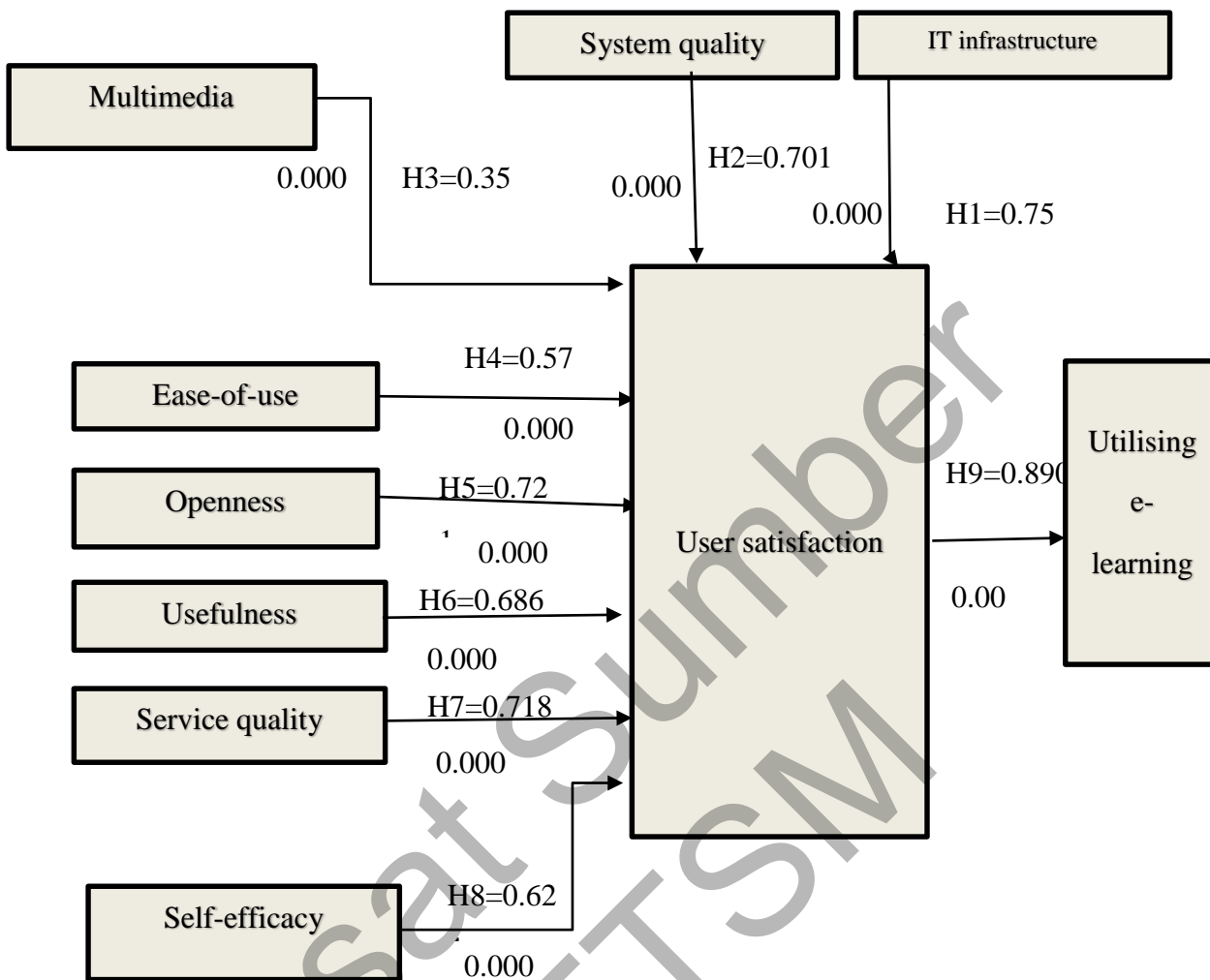


Figure 0.1 Final Model

4.10 HYPOTHESIS TEST

H1. There is a positive relationship between IT Infrastructure and user satisfaction.

The first hypothesis investigated the effect of IT infrastructure on user satisfaction. The Pearson correlation value gained in this hypothesis was 0.758 and this result suggested a positive relationship between IT infrastructure and user satisfaction. The significant result in this hypothesis p-value =0.000 meant this hypothesis was proven to support IT infrastructure.

H2. There is a positive relationship between system quality and user satisfaction.

The second hypothesis investigated the effect of system quality on user satisfaction. The Pearson correlation value gained in this hypothesis was 0.701 and this result suggested there was a positive relationship between system quality and user satisfaction. The significant result in this hypothesis p-value =0.000 meant this hypothesis was proven to support system quality.

H3. There is a positive relationship between Multimedia instruction and user satisfaction.

The third hypothesis investigated the effect of Multimedia instruction on user satisfaction. The Pearson correlation value gained in this hypothesis was 0.355 and this result suggested there was a positive relationship between Multimedia instruction and user satisfaction. The significant result in this hypothesis p-value =0.000 meant this hypothesis was proven to support Multimedia instruction.

H4. There is a positive relationship between ease-of-use and user satisfaction.

The fourth hypothesis investigated the effect of ease-of-use on user satisfaction. The Pearson correlation value gained in this hypothesis was 0.578 and this result suggested there

was a positive relationship between ease-of-use and user satisfaction. The significant result in this hypothesis $p\text{-value} = 0.000$ meant this hypothesis was proven to support ease-of-use.

H5. There is a positive relationship between Openness and user satisfaction.

The fifth hypothesis investigated the effect of Openness on user satisfaction. The Pearson correlation value gained in this hypothesis was 0.721 and this result suggested there was a positive relationship between Openness and user Satisfaction. The significant result in this hypothesis $p\text{-value} = 0.000$ meant this hypothesis was proven to support Openness.

H6. There is a positive relationship between usefulness and user satisfaction.

The sixth hypothesis investigated the effect of usefulness on user satisfaction. The Pearson correlation value gained in this hypothesis was 0.686 and this result suggested there was a positive relationship between usefulness and user satisfaction. The significant result in this hypothesis $p\text{-value} = 0.000$ meant this hypothesis was proven to support usefulness.

H7. There is a positive relationship between service quality and user satisfaction.

The seventh hypothesis investigated the effect of service quality on user satisfaction. The Pearson correlation value gained in this hypothesis was 0.718 and this result suggested there was a positive relationship between service quality and user satisfaction. The significant result in this hypothesis $p\text{-value} = 0.000$ meant this hypothesis was proven to support service quality.

H8. There is a positive relationship self-efficacy and user satisfaction.

The eighth hypothesis investigated the effect of self-efficacy on user satisfaction. The Pearson correlation value gained in this hypothesis was 0.624 and this result suggested there was a positive relationship between self-efficacy and user satisfaction. The significant result in this hypothesis $p\text{-value} = 0.000$ meant this hypothesis was proven to support self-efficacy.

.H9. There is a positive relationship user satisfaction and utilising e-learning

The last hypothesis investigated the effect of user satisfaction on the use of e-learning. The Pearson correlation value gained in this hypothesis was 0.890 and this result suggested there was a positive relationship between user satisfaction and utilising e-learning. The significant result in this hypothesis $p\text{-value} = 0.000$ meant this hypothesis was proven to support user satisfaction.

In conclusion, the results of the analysis of the questionnaire showed the eight independent factors supported and increased the effect of user satisfaction on e-learning. In addition, the moderator factor (user satisfaction) supported and increased the effect of using e-learning in Iraqi public universities. In other words, nine hypotheses in this research analysis were accepted according to correlation analysis. The results shown above indicated that all those factors have a significant effect on achievement and develop from user satisfaction, in the end, conclude user satisfaction is the important factor to performance e-learning system.

Table 0.9 Hypotheses testing

Hypothesis	Status
H1. There is a positive relationship between IT Infrastructure and user satisfaction.	Supported
H2. There is a positive relationship between system quality and user satisfaction.	Supported
H3. There is a positive relationship between Multimedia instruction and user satisfaction.	Supported
H4. There is a positive relationship between ease-of-use and user satisfaction.	Supported
H5. There is a positive relationship between Openness and user satisfaction.	Supported
H6. There is a positive relationship between usefulness and user satisfaction.	Supported
H7. There is a positive relationship between service quality and user satisfaction.	Supported
H8. There is a positive relationship between self-efficacy and user satisfaction.	Supported
H9. There is a positive relationship between user satisfaction and use e-learning	Supported

4.11 CHAPTER SUMMARY

This chapter focused on discussing and describing the result of the current study analysis data by using SPSS analysis tools and the results were obtained in order to evaluate the model. The data were collected from students. The hypotheses developed in the previous chapter were successfully checked and investigated. . Several techniques were used in this chapter such as, missing value, respondent profile, normality, outlier, and finally specifications of the electronic information sharing that included reliability (Crobach's Alpha), Validity (factor analysis), Correlation between dependent and independent variables, and Regression that were presented. In summary, these results founded that the nine factors supported, and positively affected the use of e-learning in public Iraqi universities. Finally, the nine factors can be used to develop e-learning in Iraqi public universities.

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CHAPTER V

DISCUSSION AND CONCLUSION

5.1 INTRODUCTION

In the previous chapters of this study, the following have been discussed the Introduction , Background of the research, the Significance of using e-learning in Iraqi public universities, Problem Statement, Research Questions, Research Objective, and the Scope of the Study. The literature was also reviewed and 29 papers related to the adoption of a model for e-learning system were discussed. In addition, the theoretical model was developed and the research hypotheses were formulated, followed by the proposed process of the research, the selection of the research methodology, the questionnaire design and development and its validation by experts,. The method of data collection was also explained followed by the data analysis and the presentation and discussion of the results.

This chapter focuses on the results which were obtained in chapter IV and the reliability of which were tested. In addition, all the selected factors for the current study are able to influence user satisfaction with using the e- learning system. Eight factors have positive effect and support to user satisfaction. Finally, the conclusion of the study will be presented and the limitations explained while suggestions for future research will be provided.

5.2 DISCUSSION RESULTS

The current research achieved three objectives: firstly, determined the critical success factors related to the utilisation of ICT e-learning systems in Iraqi public universities. This objective was achieved .by collecting all factors that were related to e-learning. The collection was then

edited and reformed by removing some parallel factors. This was followed by the collection of the factors related to user-satisfaction to utilise e-learning systems based on ICT in Iraqi public universities.

Second objective was investigated the effects factors on utilise e-learning systems through user satisfaction base on ICT in Iraqi public universities. This objective was successfully achieved through the results in Chapter IV that were found to affect increased user-satisfaction to utilise e-learning systems based on ICT in Iraqi public universities and among Iraqi students in e-learning. The results showed that the nine hypothesis positively affected and supported the use of e-learning systems based on ICT in Iraqi public universities. The final objective was to model an e-learning system by using ICT for Iraqi public universities. It was confirmed that the success of this model depended on the collected data and results in SPSS that showed all factors had positive effects on user satisfaction to use e-learning systems based on ICT in Iraqi public universities.

5.2.1 IT Infrastructure

The current study concludes that IT infrastructure is the most crucial factor in using e-learning to increase user-satisfaction to use e-learning systems based on ICT in Iraqi public universities. The results showed the correlation value (0.758) and integration value ($p=0.000$) which meant that IT infrastructure had a positive effect and supported user-satisfaction to utilise e-learning systems based on ICT in Iraqi public universities and this suggested the need to attend to all departments of IT infrastructure including experience of staff, software, hardware and IT skill, in other words, all universities in Iraq lack IT infrastructure and the staff have issues in using e-learning.

5.2.2 System Quality

The results in this research show that although the value of correlation (0.701) and the value of integration ($P=0.000$) suggest that this factor positively affects and supports user satisfaction to utilise e-learning systems based on ICT in Iraqi public universities but it is not as important

as IT infrastructure, openness, and service quality. According to H.F. Lin (2007), system quality has positive effect on e-learning through user satisfaction. In addition, the success in the use of any technology is measured by “The degree to which the system has the distinctive characteristics of the information system itself measured by response time, system accessibility, system reliability, system flexibility, system usefulness, ease-of-use, ease of learning, etc.” (Gorla et al., 2010).

5.2.3 Multimedia Instruction

According to the results in Chapter IV that showed the value of correlation ($p=.355$) and integration variable ($p=0.000$), Multimedia instruction has a positive effect on user satisfaction to utilise e-learning systems based on ICT in Iraqi public universities .thus, the correlation for this factor very low that mean this factors not so important to implementation e-learning systems . According to Liaw (2008), using e-learning has a positive effect on user satisfaction multimedia instruction through user satisfaction.

5.2.4 Service Quality

The findings of this research show service quality positively affects and supports user satisfaction to utilise e-learning systems based on ICT in Iraqi public universities according to the correlation and integration results of (0.718) and ($p=0.000$) respectively which means increased service quality. According to H.F. Lin (2007), service quality has a positive effect on e-learning through user satisfaction.

5.2.5 Ease-Of-Use

According to the results in Chapter IV that showed the value of correlation ($p=.578$) and integration variable ($p=0.000$), ease-of-use positively affects user satisfaction to use e-learning systems based on ICT in Iraqi public universities. TAM found that technology

adoption is due to ease-of-use of a certain technology (F. Davis 1989). Furthermore, the success of any technology depends on how students deal with e-learning resources in an easy way. This research supported and showed a positive effect on this variable.

5.2.6 Usefulness

The results in this research show that the value of correlation (0.686) and integration ($P=0.000$) suggested that this factor positively affected and supported user satisfaction to use e-learning systems based on ICT in Iraqi public. In addition, success in the use of any technology is measured by “The degree to which the system has the distinctive characteristics of the information system itself measured by response time, system accessibility, system reliability, system flexibility, system usefulness, ease-of-use, ease of learning, etc.” (Gorla et al. 2010)

5.2.7 Openness

The findings of this research show openness has a positive effect on and supported user satisfaction to use e-learning systems based on ICT in Iraqi public universities according to the results of correlation and integration, which were (0.721) and ($p=0.000$) respectively. Based on the results this factor was important to increase the effect of e-learning in Iraqi public universities and this factor enables visible, accessible and free education resources to be developed from the community.

5.2.8 Self-Efficacy

According to the results in Chapter IV that showed the value of correlation ($p=.624$) and integration variable ($p=0.000$), Self-efficacy positively affects in user satisfaction to use e-learning systems based on ICT in Iraqi public universities.

5.2.9 User Satisfaction

The main aim of this study is to determine how user satisfaction affects utilisation of e-learning systems based on ICT in Iraqi public universities. In this study, the results showed that all factors had positive effects on user satisfaction as the results of correlation and integration with user satisfaction were (0.890) and ($p=0.000$) respectively, thus showing the positive effect on and support for utilising e-learning systems

In conclusion, these nine factors were measured by the students studying in Iraqi public universities. There are positive relationships between user satisfaction to utilise e-learning systems based on ICT in Iraqi public universities and these nine factors are the variables for the evaluation of user satisfaction.

5.3 CONCLUSION OF STUDY

This research aimed to highlight the main challenges that impeded the utilisation of e-learning in developing countries and specifically in Iraqi public universities. As e-learning has been newly implemented in Iraqi public universities so this study has been focused on Iraq. Furthermore, it appears that many public universities have begun trying to use e-learning, but most of the students do not have the experience to use technology and lack the necessary skills. The solution therefore was to fill the gap in knowledge and skills in order to increase the use of new technology such as e-learning in Iraqi public universities. Thus, this research suggests a new proposed model to encourage using e-learning in Iraqi public universities and defined the challenges that hinder such use of new technology.

The most important challenge to the adoption and use of e-learning in Iraq is the lack of IT infrastructure as proven by the results of the quantitative analysis. Firstly, IT infrastructure has a lot of problems such as low Internet bandwidth and lack of technical support. These results

facilitate the development and improvement of performance by maximising the benefits of IT Infrastructure.

The second challenge is to use e-learning ease-of-use to measure success of any technology, which depends on how easy it is for students to access the e-learning resources. This research supported and showed a positive effect on this variable

Numerous researchers have attempted to evaluate the factors which affect the use of e-learning in university. The literature review showed that no before–after study has been done to cover all these factors in this area, particularly in the context of Iraqi public universities. Thus, this research suggests the proposed model is to encourage using e-learning in these universities and defines the challenges that hinder using this new technology. This research seeks to get a deeper understanding of how these factors affect user satisfaction, and therefore, how all factors affect user satisfaction to utilise e-learning based on ICT. The survey results confirm the nine hypotheses. thus indicating that the factors, namely IT infrastructure, ease-of-use multimedia instruction, openness, usefulness, service quality, system quality, and self-efficacy all have significant effects on utilising e-learning system through user satisfaction.

Based on the result in Chapter IV, all these factors have significant effect on user satisfaction is the utilisation if e-learning based on ICT. Of all the factors, there are four that are most important in affecting and supporting the use of e-learning through user satisfaction. IT infrastructure is the most significant challenge to the use of e-learning in Iraq, and the lack of IT infrastructure has been demonstrated as a result of the quantitative analysis. The current IT infrastructure faces many problems such as low Internet bandwidth and lack of technical support. These results therefore suggest a need to focus on developing and improving performance, by exploiting the benefits of IT Infrastructure and paying more attention to IT infrastructure to support students in various ways. Attention should be paid to improving and maintaining these infrastructures. Furthermore, consideration should be given to raise the investment budget in IT infrastructure to increase the number and scope of these services.

Openness provides access to e-learning and can affect new forms of e-learning (Alraimi et al., 2015). It is connected with the freedom of access to resources, and collaboration between universities because some universities lack the ability to use e-learning in every field. So it is important to help students to practise openness to all universities and develop this function

The third factor, service quality in e-learning systems is a major issue because it is a necessary function in the application of any new technology. In addition, this variable is critical to ensure universities gain a competitive preference. In other words, it is a critical factor in successful use of the e-learning system. So, the universities should pay attention to this function by providing speed and understanding of the e-learning system.

Finally, usefulness has been found to be an important factor for students to feel the difference between traditional learning and e-learning from the ease of using the accomplishing assignments system. In addition, it has a direct effect on user satisfaction because time saving is one of the most significant functions for students utilising e-learning.

This study has proposed a model of the significant variables in the measuring of success using an e-learning systems' for the Iraqi public universities. Furthermore, eight factors were found for implementing e-learning systems in developing countries. These eight factors should be considered by the universities when using e-learning through user satisfaction. There are positive relationships among the eight factors and using e-learning through user satisfaction based on ICT.

5.4 RECOMMENDATIONS

This study focused on the investigation of the possible factors that could impact the usage of e-learning in Iraq, especially the factors related to the individual level environmental and cultural dimensions. In addition, this study may assist researchers to understand the background of this study and suggest the approaches for researchers, such as the approach of data collection, sampling, and questionnaire design, development and administration. Furthermore, this study provides the literature review and research approaches to other researchers for the researcher

who wants to investigate this area. Also, it helps the universities to develop e-learning system that students are comfortable with.

5.5 LIMITATIONS AND FUTURE WORK

5.5.1 Geographical Extension

In this research, the sampling frame was limited to two Iraqi public universities and so future studies should consider a wider geographical coverage to include respondents from different universities, countries, and cities, which might provide a different perspective on user satisfaction with regard to using e-learning. The data should be collected from different universities in the country or from outside the country, to ensure the findings are more widely representative on user satisfaction for e-learning.

5.5.2 Extension in Method

This research used the quantitative method to analyse survey data. So for the future improvement of this research consideration could be given to adopting a mixed-mode method using both quantitative and qualitative approaches. Although the quantitative method saves time the addition of another method, that is the qualitative method, could provide more detailed evidences on how and why these factors affect user satisfaction on utilisation of e-learning and designers gain useful tips for the system design and discover other new factors that might affect user satisfaction in using e-learning. Then, the findings would be more generalizable and reliable

5.5.3 Expansion in The Field of Study

First, although it was impossible to use triangulation method (both survey and interviews) because of constraints of time and resources, the questionnaire findings could have been enhanced if they had been supported by the observations and interviews with the participants in an effort to gather more reliable data. Triangulation method would offer the researcher an in-

depth understanding about the students' opinions on the e-learning systems and why they use or do not use these tools in their university studies.

Second, the present study is limited to only e-learning systems. As such, future research may replicate the study but using different e-learning tools or platforms (e.g. mobile learning, IPAD and web-based e-learning, cloud) with a different pedagogical perspective and level to determine how the results might differ from the of the present study.

Lastly, this study highlights the significance of every individual character where the individual's character may override e-learning systems environments. Here, further study is required to investigate the interaction between integration of various dimensions to determine their relative importance of e-learning environments.

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APPENDIX A
QUESTIONNAIRE

Questionnaire of e-learning in Iraqi public Universities

Dear Respondents

The purpose of this questionnaire is to find the factors that affect the adoption of e-learning at Iraq public universities. Mainly, the study aims to collect data from students at Iraqi universities. Since you are students at this university and you have the required knowledge, you are invited to participate in this study.

Please answer the following questions:

Section A: Background Information

Please specify your age?

What is your gender?

- Male
- Female

What is your current majoring?

- Information Technology
- Computer Science
- Networking
- Software
- AI
- Information Science
- Security

What is your level of education?

- High diploma
- Bachelor
- Master

How many hours do you use the Internet in a day?

- Less than one hour
- 1-3 hours
- 4-6 hours
- More than 6

1- Strongly disagree 2- disagree 3- neither disagree 4- agree 5- strongly agree

1- Section B: The factors affection for user satisfaction

IT infrastructure		1	2	3	4	5
1-	The ICT division provides me with a wide range of electronic channels such as email, website, and call centres to connect with lecturers, students, and different divisions of the university.	0	0	0	0	0
2-	The ICT division enables me to exchange information with lecturers and other students by using electronic channels.	0	0	0	0	0
3-	The ICT division provides me with a wide range of facilities to perform e-learning activities, such as access to library.	0	0	0	0	0
4-	The ICT division provides me with support services related to the e-learning system.	0	0	0	0	0

System quality		1	2	3	4	5					
1-	The e-learning system is easy to use.	0	0	0	0	0					
2-	The e-learning system includes necessary functions for my study.	0	0	0	0	0					
3-	I feel the communication quality of the Internet is not good.	0	0	0	0	0					
4-	The e-learning system includes necessary features for my study.	0	0	0	0	0					
Multimedia instruction		1	2	3	4	5					
1-	I like to use multimedia instruction.	0	0	0	0	0					
2-	I like to use voice media instruction.	1	0	2	0	3	0	4	0	5	0
3-	I like to use video media instruction.	0	0	0	0	0	0	0	0	0	
Service quality		1	2	3	4	5					
1-	E-learning system is always available to perform e-learning activities.	0	0	0	0	0					
2-	E-learning system does not crash frequently.	0	0	0	0	0					
3-	E-Learning systems make learning materials within a suitable time frame.	0	0	0	0	0					
4-	E-Learning system quickly delivers answers about my queries.	0	0	0	0	0					

Ease of use		1	2	3	4	5
1-	All functions can be used easily even with less experience in e-learning.	0	0	0	0	0
2-	The e-learning system can be used easily.	0	0	0	0	0
3-	I find the e-learning to be flexible to interact with.	0	0	0	0	0
4-	Be easy for me to become skilful at using the e-learning.	0	0	0	0	0
Usefulness		1	2	3	4	5
1-	E-learning system is a useful learning tool.	0	0	0	0	0
2-	Using the e-learning would improve my learning performance.	0	0	0	0	0
3-	E-learning improves learning outcomes.	0	0	0	0	0
4-	Using the e-learning would enhance my effectiveness in learning.	0	0	0	0	0

Openness		1	2	3	4	5
1-	I have the freedom to join any course without prerequisites.	0	0	0	0	0
2-	I have the freedom to access and use the course resources and materials for free.	0	0	0	0	0
3-	I feel free to combine the course materials with other to produce new one.	0	0	0	0	0
4-	I can reuse the course resources in my work.	0	0	0	0	0

Self-efficacy		1	2	3	4	5
1-	I am confident of using the e-learning even if there is no one around to show me how to do it.	0	0	0	0	0
2-	I am confident of using the e-learning even if I have never used such a system before.	0	0	0	0	0
3-	I feel confident using e-learning environments.	0	0	0	0	0
4-	I feel confident using e-learning.	0	0	0	0	0

2- Section C: User Satisfaction

User satisfaction		1	2	3	4	5
1-	I am satisfied with using e-learning as a learning assisted tool.	0	0	0	0	0
2-	I am satisfied with using e- learning functions.	0	0	0	0	0
3-	I feel that e-learning served my needs well.	0	0	0	0	0
4-	I am satisfied with using e-learning environments.	0	0	0	0	0

3- Section D: The effect for utilisation of e-learning system

Utilisation of e-learning system		1	2	3	4	5
1-	I would recommend others to use e-learning system.	0	0	0	0	0
2-	I use e- learning to publish information.	0	0	0	0	0
3-	I use e-learning to communicate with teachers.	0	0	0	0	0
4-	I use e-learning to store and share document.	0	0	0	0	0

استبيان للتعليم الالكتروني في الجامعات العراقية الحكومية

عزيزي المستجيب للاستبيان

الغرض من هذا الاستبيان هو ايجاد العوامل التي تؤثر على تبني التعليم الالكتروني في الجامعات الحكومية العراقية. تهدف الدراسة الى جمع البيانات من طلبة الجامعات وبما انك طالب في تلك الجامعات ولديك المعرفة المطلوبة. أنت مدعوا للمشاركة في هذه الدراسة :

الرجاء الاجابة على الاسئلة التالية :

1- فرع أ: معلومات اساسية:
رجاءاً حدد عمرك؟

ما هو جنسك ؟

ذكر

انثى

ما هو تخصصك الحالي

تكنولوجيا المعلومات

علوم حاسبات

شبكات

برمجيات

ذكاء صناعي

علم المعلومات

الامن

ما هو مستواك العلمي ؟

دبلوم عالي

بكالوريوس

ماجستير

كم ساعة تستخدم فيها الانترنت خلال اليوم ؟

أقل من ساعة

من 1-3 ساعات

4-6 ساعات

اكثر من 6 ساعات

فرع ب : تأثير العوامل على رضا المستخدمين

5	4	3	2	1	البنية التحتية لتكنولوجيا المعلومات
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	1- قسم تكنولوجيا المعلومات والاتصالات يزودني بمجموعة واسعة من القنوات الإلكترونية كالايميل، المواقع الإلكترونية ومراكز الاتصال للاتصال بالاستاذة والطلاب وباقسام مختلفة في الجامعة.
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	2- قسم تكنولوجيا المعلومات والاتصالات يمكنني لتبادل المعلومات مع الاساتذة والطلبة الاخرين بواسطة استخدام القنوات الإلكترونية
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	3- قسم تكنولوجيا المعلومات والاتصالات يزودني بمجموعة واسعة من الوسائل لتأدية فعاليات التعليم الإلكتروني مثل الوصول الى المكتبة
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	4- قسم تكنولوجيا المعلومات والاتصالات يزودني بخدمات داعمة ترتبط بنظام التعليم الإلكتروني

5	4	3	2	1	جودة النظام
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	1- نظام التعليم الإلكتروني سهل الاستخدام
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	2- نظام التعليم الإلكتروني يتضمن وظائف ضرورية لدراستي

3- أشعر بان نوعية الاتصال للانترنت ليس جيداً

4- التعليم الالكتروني يتضمن مميزات ضرورية لدراستي

5 4 3 2 1

تعليم الوسائط المتعددة

1- أحب استخدام تعلم الوسائط المتعددة

2- أحب ان استخدم تعليمات وسائل الاعلام الصوتية

3- أحب ان استخدم تعليمات وسائل الاعلام الفيديو

5 4 3 2 1

جودة الخدمة

1- نظام التعليم الالكتروني دائماً متوفر ليمثل نشاطات التعليم

الالكتروني

2- نظام التعليم الالكتروني لا تتعطل كثيراً

3- أنظمة التعليم الالكتروني تجعل مواد التعلم في اطار زمني

مناسب

4- نظام التعليم الالكتروني يقدم اجابات عن استفساراتي سريعاً

سهولة الاستخدام

5 4 3 2 1

1- كل الوظائف يمكن ان تستخدم بسهولة حتى مع خبرات قليلة من التعليم الالكتروني

2- نظام التعليم الالكتروني يمكن ان يستخدم بسهولة

3- أجد بأن التعليم الالكتروني مرن للتعامل معه

4- سهل بالنسبة لي لكي أصبح ماهر باستخدام التعليم الالكتروني

الأستفادة

5 4 3 2 1

1- التعليم الالكتروني أداة تعليمية مفيدة

2- أستخدام التعليم الالكتروني يحسن من أدائي التعليم

3- التعليم الالكتروني يحسن من النتائج النهائية للتعليم

5- استخدام التعليم الالكتروني يحسن فعليتي في التعليم

5 4 3 2 1

الأنفتاح

1- لدي الحرية للانضمام بأي دورة بدون شروط

2- لدي الحرية للوصول واستخدام موارد الدورة وموادها مجاناً

3- أشعر بالحرية لجمع موارد الدورة بالآخرى لانتاج واحدة

جديدة

4- أستطيع إعادة استخدام موارد الدورة في عملي

5 4 3 2 1

الكفاءة الذاتية

1- أنا واثق من استخدام التعليم الالكتروني حتى لو لم يكن هنالك

من يبين لي كيفية استخدامه

2- أنا واثق من استخدام التعليم الالكتروني حتى لو اني لم أستخدم النظام من قبل

3- أشعر بالثقة لبيئة التعليم الالكتروني

4- أشعر بالثقة باستخدام التعليم الالكتروني

فرع ج : رضا المستخدم

5 4 3 2 1

رضا المستخدم

1- أنا راض باستخدام التعليم الالكتروني كأداة تعليمية مساعدة

2- أنا راض باستخدام التعليم الالكتروني بوظائف التعليم الالكتروني

3- أشعر بأن التعليم الالكتروني يخدم أحتياجاتي جيداً

4- أنا راض بأستخدام بيئة التعليم الالكتروني

د : تأثير استخدام نظام التعليم الالكتروني

أستخدام نظام التعليم الالكتروني

5 4 3 2 1

1 أود أن أوصي الآخرين باستخدام التعليم الالكتروني

2- أستخدم التعليم الالكتروني لنشر المعلومات

3- أستخدم التعليم الالكتروني للتواصل مع الاساتذة

4- أستخدم التعليم الالكتروني لخرن ومشاركة الوثائق

Pusat Sumber
FTSM

APPENDIX B

ANALYSIS DATA

		Statistics				
		Age	Gender	Education	Majorin g	Use
N	Valid	182	182	182	182	182
	Missing	0	0	0	0	0

Table 1 Missing data for Age, Gender, education and use internet

		Statistics							
		IT inf1	IT inf2	IT inf3	IT inf4	sys qu1	Sys qu2	Sys qu3	Sys qu4
N	Valid	182	182	182	182	182	182	182	182
	Missing	0	0	0	0	0	0	0	0

Table 2 missing data for IT infrastructure and system quality

		Statistics							
		Mu INS 1	Mu INS 2	Mu INS 3	open1	open2	open3	open4	
N	Valid	182	182	182	182	182	182	182	
	Missing	0	0	0	0	0	0	0	

Table 3 missing data for multimedia instruction and Openness

		Statistics							
		Eas e1	Ease 2	Easy3	Ease4	useful 1	useful 2	useful 3	useful 4
N	Valid	182	182	182	182	182	182	182	182
	Missing	0	0	0	0	0	0	0	0

Table 4 missing data for Ease of use and usefulness

		Statistics							
		serv ice1	servi ce2	servic e3	servic e4	Sel- eff1	Sel- eff2	Sel- eff3	Sel- eff4
N	Valid	182	182	182	182	182	182	182	182
	Missing	0	0	0	0	0	0	0	0

Table 5 missing data for service quality and self-efficacy

		Statistics							
		use 1	user 2	user 3	user 4	e- len1	e- len2	e- len3	e- len4
N	Valid	182	182	182	182	182	182	182	182
	Missing	0	0	0	0	0	0	0	0

Table 6 missing user satisfaction and utilisation e-learning

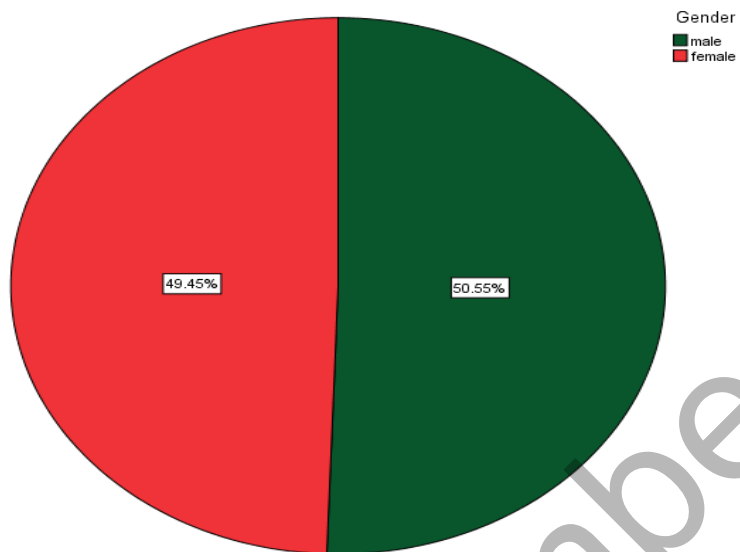


Figure 1 Gender Distribution

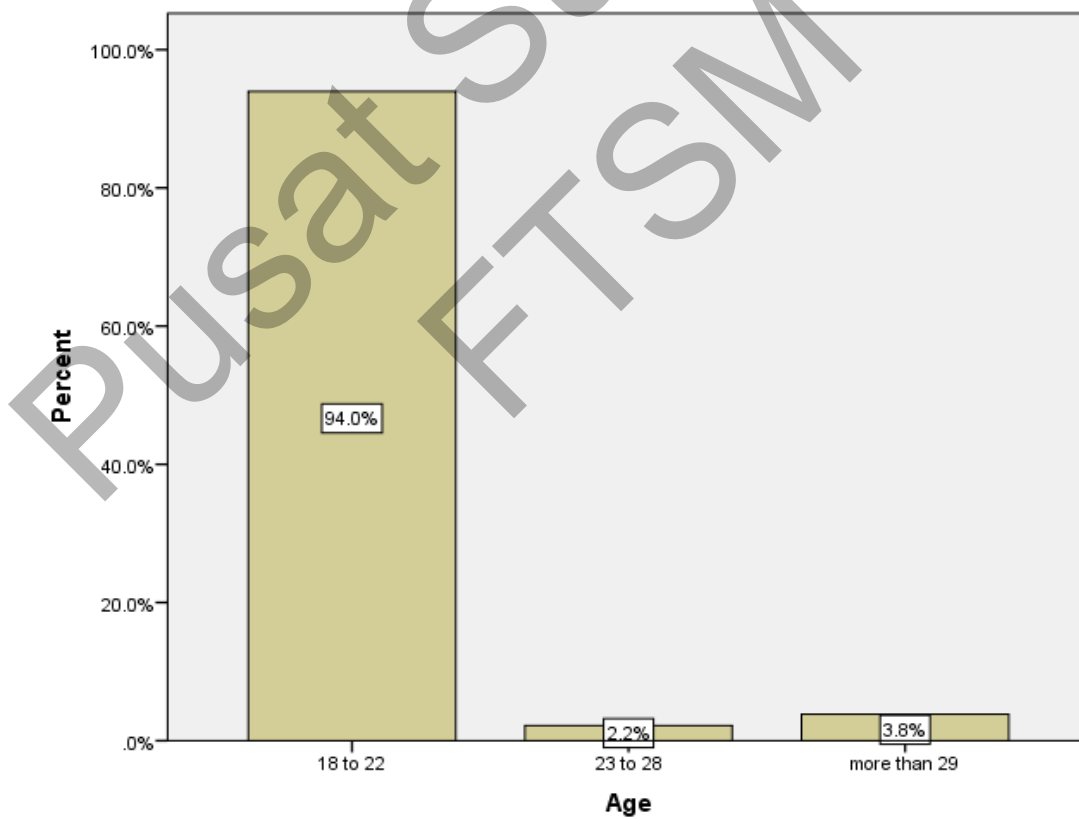


Figure.2: Age

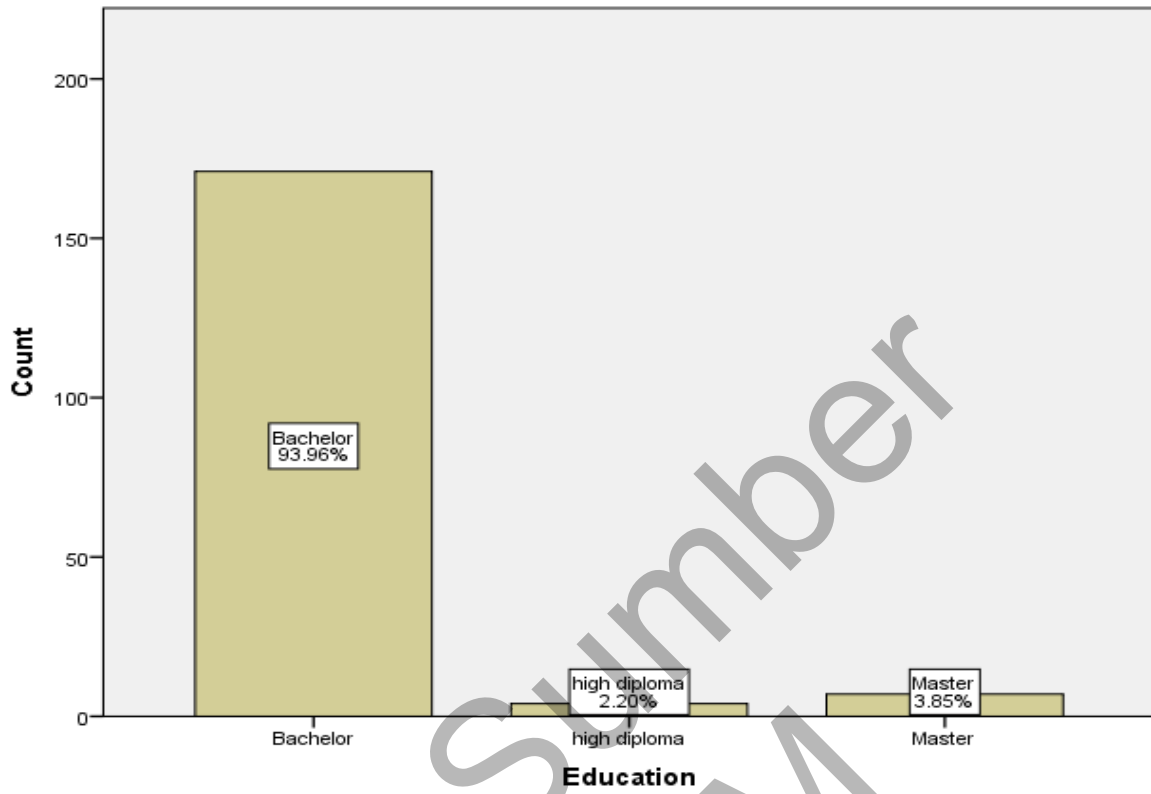


Figure.3: Education Distribution

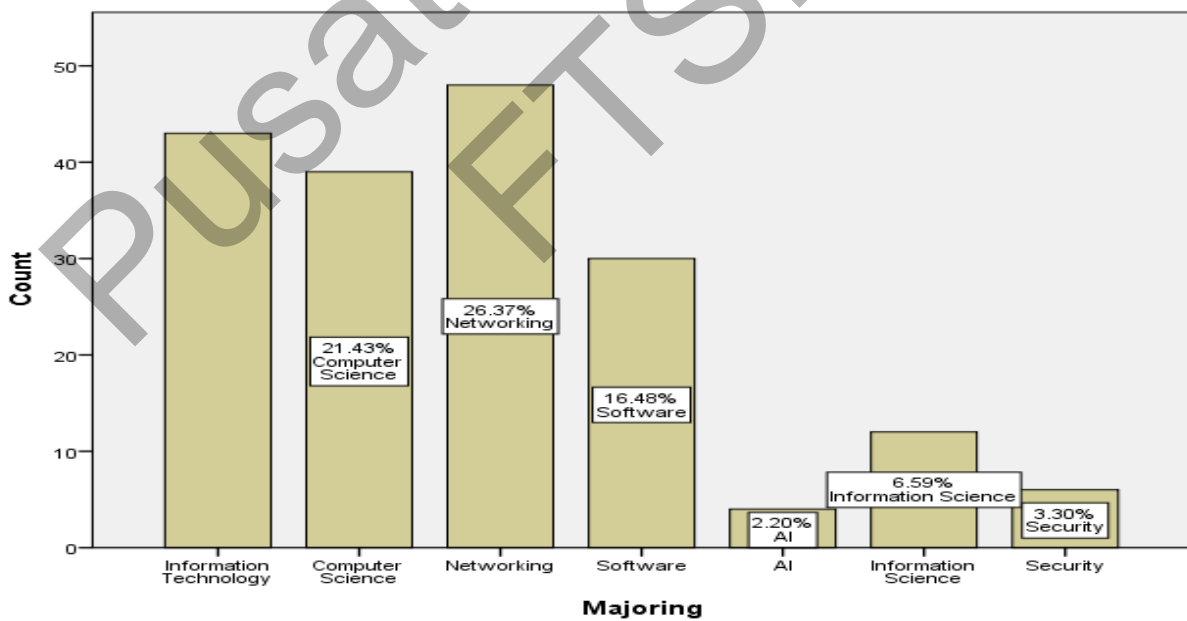


Figure 4 show Participants Background

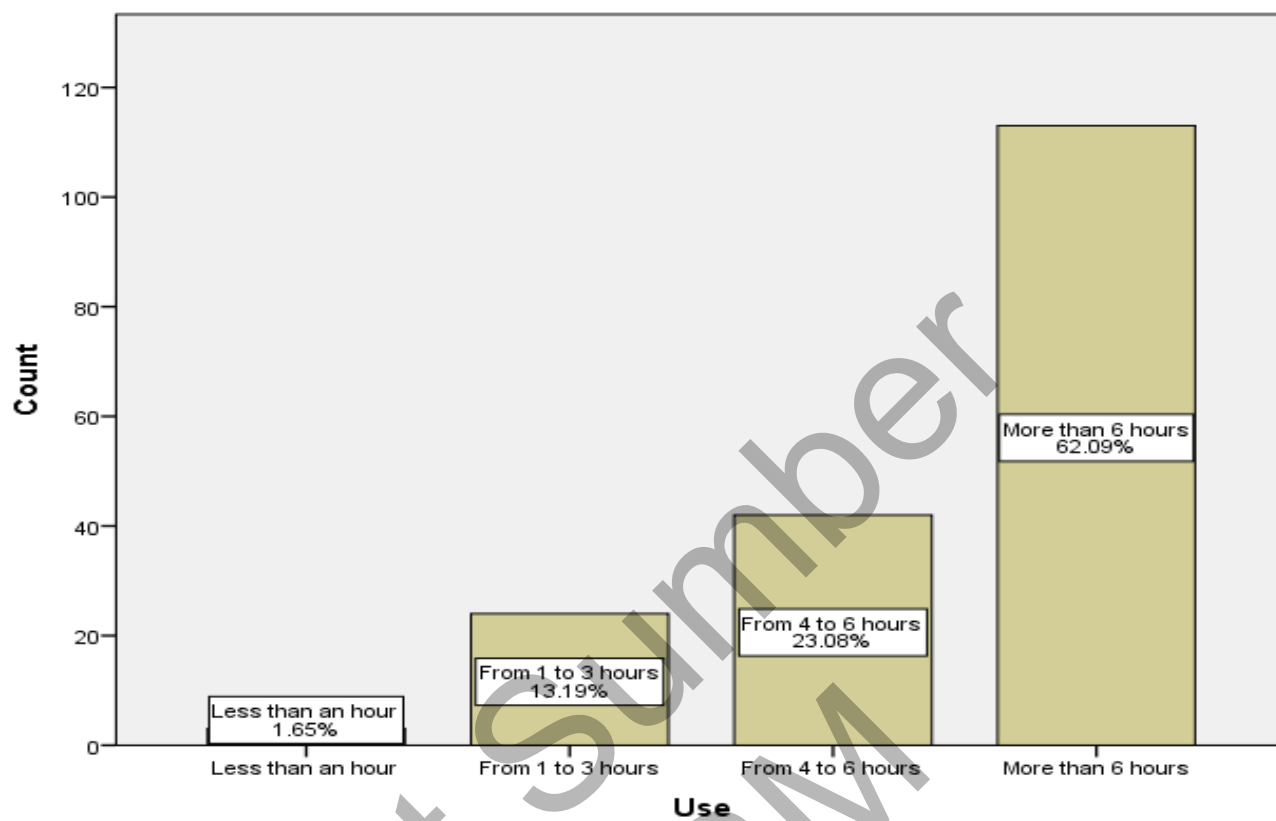


Figure 5 show the Internet Usage

		IT inf1	IT inf2	IT inf3	IT inf4
N	Valid	182	182	182	182
	Missing	0	0	0	0
Skewness		.023	-.212	-.495	-.337
Std. Error of Skewness		.180	.180	.180	.180
Kurtosis		-.591	-.665	-.806	-.648
Std. Error of Kurtosis		.358	.358	.358	.358

Table 7 Normality IT infrastructure

Statistics

		sys qu1	Sys qu2	Sys qu3	Sys qu4
N	Valid	182	182	182	182
	Missing	0	0	0	0
Skewness		-.467	-.449	-.350	-.515
Std. Error of Skewness		.180	.180	.180	.180
Kurtosis		-.244	-.887	-.658	-.622
Std. Error of Kurtosis		.358	.358	.358	.358

Table 8 Normality system Quality

Statistics

		Mu INS 1	Mu INS 2	Mu INS 3
N	Valid	182	182	182
	Missing	0	0	0
Skewness		.542	-.222	-1.136
Std. Error of Skewness		.180	.180	.180
Kurtosis		-.537	-.630	1.531
Std. Error of Kurtosis		.358	.358	.358

Table 9 Normality multimedia instruction

Statistics

		open1	open2	open3	open4
N	Valid	182	182	182	182
	Missing	0	0	0	0
Skewness		-.088	-.287	-.494	-.382
Std. Error of Skewness		.180	.180	.180	.180
Kurtosis		-.527	-.633	-.859	-.666
Std. Error of Kurtosis		.358	.358	.358	.358

Statistics

		Ease1	Ease 2	Easy3	Ease4
N	Valid	182	182	182	182
	Missing	0	0	0	0
Skewness		-.640	-.494	-.172	-.388
Std. Error of Skewness		.180	.180	.180	.180
Kurtosis		.334	-.781	-.607	-.652
Std. Error of Kurtosis		.358	.358	.358	.358

Table 10 Normality Openness and Ease of use

		useful1	useful2	useful3	useful4
N	Valid	182	182	182	182
	Missing	0	0	0	0
Skewness		.125	-.180	-.466	-.369
Std. Error of Skewness		.180	.180	.180	.180
Kurtosis		-.694	-.692	-.834	-.655
Std. Error of Kurtosis		.358	.358	.358	.358

Table 11 Normality usefulness