

**THE UNIVERSITY OF TURKISH AERONAUTICAL ASSOCIATION
INSTITUTE OF SCIENCE AND TECHNOLOGY**

**PROBLEMS OF BUILDING AN ONLINE EDUCATIONAL PORTAL IN
IRAQ**

MASTER THESIS

Wafaa Waheeb Abdullah ABDULLAH

**INSTITUTE OF SCIENCE AND TECHNOLOGY
THE PROGRAM OF INFORMATION TECHNOLOGY**

MARCH 2017

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Türk Hava Kurumu Üniversitesi Fen Bilimleri, Enstitüsü'nün 1304660003 numaralı Yüksek Lisans öğrencisi, “ Wafaa Waheeb ABDULLAH ”, ilgili yönetmeliklerin belirlediği gerekli tüm şartları yerine getirdikten sonra hazırladığı “PROPLEMS OF BUILDING AN ONLINE EDUCATIONAL PORTAL IN IRAQ” başlıklı tezini, aşağıda imzaları olan jüri önünde başarı ile sunmuştur.

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A handwritten signature in blue ink, appearing to read 'Wafaa Abdullah', with a large, stylized flourish above the name.

Wafaa ABDULLAH

31.03.2017

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LIST OF ABBRIVIATION

ATU	Attitude towards Usage
BIU	Behavioural Intention to Use
CLE	Collaboration and Learning Environment
CWAM	Course Website Acceptance Model
ICT	Information and Communication Technology
LMS	Learning Management System
LCMS	Learning Content Management System
PEOU	Perceived Ease of Use
PEU	Perceived Ease of Use
PU	Perceived Usefulness
TAM	Technology Acceptance Model
TRA	Theory of Reasoned Action
SEM	Structural Equation Modelling

ABSTRACT

PROBLEMS OF BUILDING AN ONLINE EDUCATIONAL PORTAL IN IRAQ

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Thesis Supervisor: Assist. Prof. Dr. Yuriy ALYEKSYEYENKOV

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The research is aimed at analysing the barriers that could be faced during the development and building of an online educational portal of the general directorate of education in Iraq. It has been established that the current situations in Iraq are restricting the students to get optimal opportunities of learning. Both, teachers and students are unable to access the educational institutions, due to the unstable situation in the country. Therefore, there is an intense need of online portal or e-learning platforms in Iraqi Schools so as to fulfil the learning needs of the students. In this study, the researcher analyses the potential hurdles that could influence the implementation of e-learning platform (LMS: Learning Management System) in the Schools of Iraq. In particular, certain objectives are developed, including the analysis

of the impacts of PEU and PU on BIU of LMS; the assessment of the impacts of PEU and PU on ATU of LMS system; examination of the relationship between ATU and BIU; and recognising the challenges in developing and building an online educational portal of the General Directorate of Education' in Iraq. In this regard, mixed research method is used in which secondary data is collected from already published researches, articles, and text books. Moreover, the primary data is collected by conducting survey questionnaire with the 210 participants, working on different levels at Iraqi Schools. The data is analysed through different statistical techniques that include: regression analysis, correlation analysis, and descriptive statistics. The findings show positive correlation between PEU and PU and BIU and ATU. Therefore, the concerned authorities are needed to spread awareness regarding LMS so as to alter BIU and ATU that ultimately impacts PEU and PU.

Keywords: Learning Management System (LMS), E-learning, Higher education, Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM)

ÖZET

**ONLINE BİR EĞİTİM PORTALI OLARAK IRAK'TA İNŞAAT
SORUNLARI**

ABDULLAH, Wafaa

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Tez Danışmanı: Doç. Dr. Yuriy ALYEKSYEYENKOV

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Araştırma, Diyala'daki Eğitim Genel Müdürlüğünün bir online eğitim portalının geliştirilmesi ve oluşturulması sırasında karşılaşılabilecek engellerin analiz edilmesini amaçlamaktadır. Irak'taki mevcut durumların öğrencilerin öğrenme imkânlarını elde etmelerini kısıtladığı tespit edilmiştir. Ülkedeki belirsiz durum nedeniyle hem öğretmenler hem de öğrenciler eğitim kurumlarına erişemiyorlar. Bu nedenle, öğrencilerin öğrenme ihtiyaçlarını karşılamak amacıyla Irak Okullarında online portal veya e-öğrenme platformlarına yoğun şekilde ihtiyaç duyulmaktadır. Bu çalışmada, araştırmacı Irak Okullarında e-öğrenme platformunun (LMS: Öğrenme Yönetim Sistemi) uygulanmasını etkileyebilecek potansiyel engelleri analiz etmektedir. Özellikle, Algılanan Kullanım Kolaylığı (PEU) ile Algılanan Kullanışlılığın (PU) Öğrenme Yönetim Sisteminin Davranışsal Kullanma Niyeti (BIU) üzerindeki etkilerinin analizi; Algılanan Kullanım Kolaylığı ile Algılanan Kullanışlılığın Öğrenme Yönetim Sisteminin Kullanıma Yönelik Tutumu (ATU) üzerindeki etkilerinin değerlendirilmesi; Kullanıma Yönelik Tutum ile Davranışsal Kullanma Niyeti arasındaki ilişkinin incelenmesi; ve Irak'daki Eğitim Genel Müdürlüğünün bir online eğitim portalının geliştirilmesi ve oluşturulmasında

karşılaşılan zorlukların farkına varması da dahil olmak üzere bazı hedefler geliştirilmiştir. Bu bağlamda, daha önce yayınlanmış olan araştırmalar, makaleler ve ders kitaplarından ikincil verilerin toplandığı karışık araştırma yöntemi kullanılmıştır. Ayrıca, birincil veriler Irak Okullarında farklı düzeylerde çalışan 210 katılımcı ile anket yapılarak toplanmıştır. Veriler, regresyon analizi, korelasyon analizi ve betimsel istatistikleri içeren farklı istatistiksel teknikler kullanılarak analiz edilmiştir. Bulgular PEU, PU, BIU ve ATU arasında pozitif bir korelasyonun olduğunu göstermektedir. Bu nedenle, ilgili makamların nihayetinde Algılanan Kullanım Kolaylığı ile Algılanan Kullanışlılığı etkileyen Davranışsal Kullanma Niyeti ile Kullanıma Yönelik Tutumu değiştirmek için Öğrenme Yönetim Sistemi ile ilgili farkındalığı artırmaları gerekmektedir.

Anahtar Kelimeler: Öğrenme Yönetim Sistemi, Online Öğrenme, Yükseköğretim, Akla Dayalı Davranış Teorisi, Teknoloji Kabul Modeli.

CHAPTER 1

INTRODUCTION

1. 1. Introduction

This section presents the background context of the research that is based on the significance of e-learning with respect to the rapidly increasing trend of integrating technology in all the industries, businesses, and educational areas. Additionally, the theoretical framework is also described in this section based on the context of the research. The section also contains the problem statement, the purpose of the research and the related aims and objectives along with the adopted methodology for attaining those objectives. Lastly, the chapter also presents the structure of the overall thesis that reflects the directional flow of the research.

1.2. Background

The advancement and developments in the field of Information and Communication Technology (ICT) have witnessed the enormous level of growth in diverse nature of practices and fields in the last decades. The development of ICT has revolutionized multiple areas of knowledge and information through a range of applications and services [1]. As a result, it has modernized the human life in terms of multiple aspects yielding incredible advantages, particularly in the developing regions of the world. Irrespective of all the advantages and benefits of ICT in the field of education, there are numerous barriers and challenges to its implementation in such countries. The gratuity of ICT has not been fully utilized in the developing regions of the world, like Iraq in the Middle East for certain challenges and barriers posed by the government, political conditions and the society individuals as well [2].

It is noted that the adverse political conditions of this region have delayed the development phase with respect to ICT in the educational sector. It included the focus on the massive development of destructive weapons for wars and the associated revolutions. Thus, the regional politics could not focus on the economic and social development of the society, which in turn resulted in increasing rate of illiteracy, poverty, and weakening infrastructure due to poor provision of educational services.

Despite the aforementioned facts, the prominence of ICT in the field of education has been recognised by the educational system of Iraq in terms of introducing the applications of e-learning (electronic learning). It has received considerations based on the recognition of attaining the best practices of education to cope with the international standards of learning by promoting relevant educational programs. The advent of e-learning and its relevant applications, including "Learning Management System (LMS)" and "Learning Content Management System (LCMS)" have widened the doors of the improved and successful acquisition of advanced educational systems. As a result, the learners have been facilitated to acquire the information and knowledge living in the developing countries that are similar to the education quality of their counterparts residing in the developed countries [3].

However, as mentioned above, certain constraints or barriers are still there in some regions that affect the technology based process of knowledge acquisition. With respect to these barriers and their impacts on the technology acceptance and prevalence in the educational sectors of the developing and certain Arab regions, it is observed that the deployment of ICT infrastructure in the educational sector has resulted in progressive outcomes [4]. Nonetheless, it is also observed that the inadequate and inconsistent utilization of ICT has been resulting varying outcomes for different regions, for instance, Iraq province of Iraq has not received considerate access to the perks of electronic learning. However, it is intended to develop an established learning platform for the learners in Iraq to compete with their counterparts in the developed countries of the world.

E-learning reflects the learning environment that utilizes the platform of ICT infrastructure for learning and teaching activities. This approach of enhancing the educational environment's credibility is regarded as a technologically empowered pedagogy. Computers, notebooks, laptops, and even mobile devices including tablets and smartphones are compatible with the technology of e-learning that turns out to be

the most significant aspect of this educational platform. The learners are capable of attaining their desired knowledge and information in a flexible manner [5]. They can plan their learning schedule in accordance with their lifestyles and routines in a real-time learning environment, having no need to attend the typical classroom sessions. Thus, the learners can even pursue their career ahead by taking further online courses. Moreover, the nature of sharing information and knowledge is aligned with the preferences of the learners, including either webinars, materials in the form of slideshows, videos, PDFs, word files, and interactive forms of animations, flash games, and simulations, along with the communication modes of forums, e-mails and even live chat with the professors [5]. Thus, the element of learning is facilitated at all the levels without causing any sort of constraint for the learners.

The educational system in the Schools of Iraq has to encounter challenging situations in the management of the learning efforts, like services, activities, and the infrastructure. Besides the environmental concerns, the inadequate conditions of the country's economy have resulted in restricting the budgets for the Schools that have made the efficient delivery of learning services difficult. Therefore, the minimization of costs of the learning resources is the foremost requirement of the Schools to attain competence in the educational sector [6].

In this regard, the Iraqi Schools are proposed to develop e-learning system for providing quality education at reduced costs of the learning processes. The platform of e-learning makes it possible for the learners to have enhanced accessibility to the information content and learning material. Once the individuals are motivated towards accepting the technological innovation of e-learning, the usefulness of the model gets ensured with respect to the usability of the model that demands assured service quality.

Although, e-learning has numerous advantages with respect to the learning needs of the individuals and the development needs of the economies at the global level, yet certain barriers impact its effectiveness adversely. Similar is the case with the educational setting of Iraq, a province of Iraq as it lacks in the integration of e-learning to facilitate the learning needs of the people. There is no such platform that could serve as a mode of learning for those who could not access the educational institutions. As a result, the educational status of the region has declined, yielding increased poverty rate and worsened economic conditions. Therefore, there is a need

of establishing a well-suited platform for electronic learning based on the implementation of TAM [7].

The effectiveness and proficiency of e-learning is evident from the aspect that the learners are capable of gaining individual level consideration of the teachers at all the levels; thus, the process of learning is facilitated.

Based on multiple sources of knowledge and information, the learners have enhanced command over the subject matter as a result of high level of motivation towards learning. The incessant growth in ICT has made its use imperative, yielding significant contributions to modifying and improving the learning and teaching practices [8].

The educational institutions across the world have enhanced the accessibility to the electronic learning approach by the integration of ICT. In this regard, the technology acceptance is required at all the levels along with the upgraded technicalities of the professionals and the administrative department. Among the applications of ICT, LMS “Learning Management System” is the most significant. The attributes related to the educational needs are best served by the deployment of LMS across the educational institutions [9].

LMS is capable of deploying, managing, tracking and reporting on the interactivities among the learners and the instructors along with the content management. LMS yields productive and effective outcomes for all the educational settings, including Blackboard (commercial) or Moodle (open-source). Thus, LMS serves as the critical element in the success of electronic learning [8]. However, its significance needs to be properly recognised by the educational administration of the Iraqi Schools for the purpose of facilitating the educational needs of the learners. More specifically, the economic conditions of the country are in need of improved and sustained educational status that is based on the ensured availability and accessibility of the educational content.

1.3. Theoretical Framework

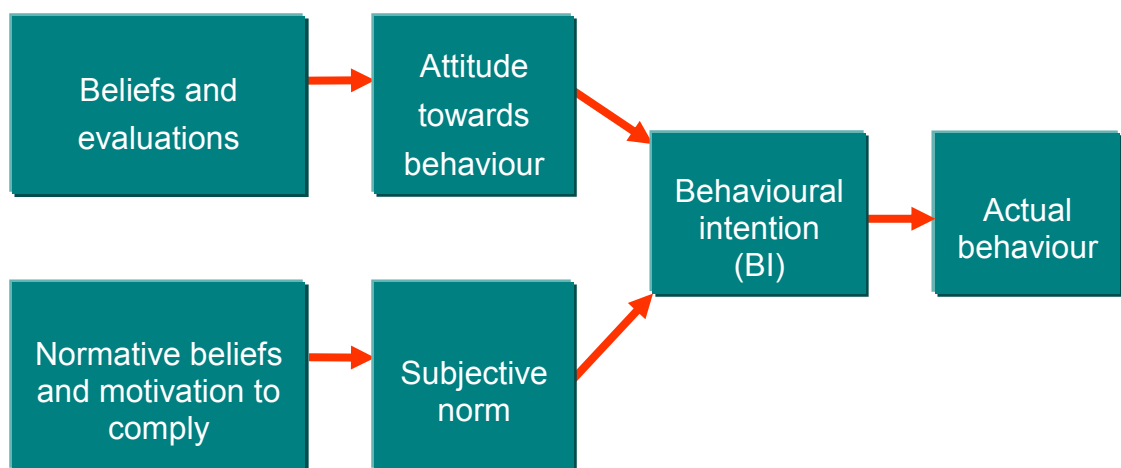
The adaptability to the perks of Technology Acceptance Model (TAM) demands its diffused adoption both at the individual and organisational levels. It is based on the increasing demands of acquiring the benefits of technology in all the industry and business sectors [10]. More specifically, it addresses the aspects of the attitudes of the users towards technology use that makes it a model based on users' intentions. Its significance lies in predicting the acceptance of technology among the users that is required to successfully deploy LMS. It is a fact that different technology models have different benefits with respect to different premises. In this regard, among the significant components TAM, Perceived Usefulness (PU) represents the aspects of enhancing the performance of the users. In this case, the impacts of e-learning are productive on the performance of the learners as the use of technology enhances the accessibility of the learning material and the teaching practices as well. Besides, the element of "Perceived Ease of Use-PEOU" also entails a positive impact on the behavioural intention of the users as the recent trends in technology have positive effects on the students' attitude towards the approach of electronic learning [11]. These aspects collectively depict the users' attitudes and the corresponding behavioural intention towards using the implemented technological element.

Accordingly, the Theory of Reasoned Action (TRA) is applicable in this regard to determine the acceptance of e-learning among the individuals of Iraq. It is noted that the individuals' beliefs impact their attitudes and the associated social norms. TRA shapes the intentional behaviours of the users by means of dictating or guiding the behaviours of individuals [4].

The theory is based on the prospect that the individuals involved in the process make decisions rationally along with continuously evaluating the beliefs while carrying out the formation of their attitudes towards their behaviour. According to [12], the actual behaviour of the users of the technology is determined by their behaviour intentions. These behaviour intentions, in turn, result in determining the attitudes of the individuals towards the respective behaviours along with the subjective norms with respect to the associated performance of their behaviours. In this regard, an "expectancy-value model" is used to evaluate the beliefs of the individuals from their "attitudes towards behaviour". For each value of

"attitude towards behaviour", the evaluated outcome is multiplied by the belief strength of the individuals. Subsequently, the entire set of outcomes is added to yield the overall attitude.

With respect to another significant construct of TRA, Li, (2010) has regarded subjective norm as the individuals' perceptions that make them react or respond. The strength of the corresponding motivation and the normative beliefs of the individuals are multiplied, and the outcome yields the behavioural intention when added to the subjective norms. Thus, the actual behaviour of the individuals is determined towards the technological innovation.



1.4. Statement

It is evident that the conditions of Iraq are not appropriate for facilitating the learning needs of the common people through traditional mode of learning as neither the learners nor the teachers or practitioners can access the learning institutions in the challenging situations of war. It does not mean that the traditional modes of learning have lost their existence in Iraq, but the difficulties in reaching the institutions and the inappropriate environment of the educational settings demand the alternatives to meet the educational needs in order to increase the literacy rate and enhance the education quality to meet the international standards. Therefore, e-learning turns out to be the most suitable alternative to the traditional learning settings, and its significance needs to be recognised for the educational needs of Iraq. Besides serving

the needs of the learners, the ICT based infrastructure of e-learning also applies to enhance the skills and knowledge of the information professionals.

The lost competence of the country needs to be rebuilt by intellectually re-establishing its position in the global economy. In this regard, the development of an e-learning platform is required in terms of the implementation of "Technology Acceptance Model-TAM" for making the people of Diyala, Iraq competent with their counterparts in other regions of the world. Thus, the readiness towards the adoption of e-learning practices needs to be evaluated along with identifying the barriers to its successful deployment as well.

1.5. Purpose of the Research

With respect to the subject matter of the research, the study focuses on the identification and analysis of the barriers in implementing the ICT infrastructure in the educational settings along with their influences. Accordingly, the significance of e-learning needs to be recognised over the traditional modes of learning that demand the physical presence of the learners and the teachers as well. Thus, the research would facilitate all the stakeholders' needs associated with the educational settings, aiming at the development of the economic condition of the country at the global level.

1.6. Aims and Objectives

The study is intended to attain the following aims and objectives regarding the deployment of an ICT infrastructure (LMS system) in Iraq, through e-learning.

Aims

- To resolve the challenging situation of the Iraqi educational system.
- To adopt a professional approach to developing an electronic learning environment.
- To review the deployment of a professional LMS system, complementing the relevant standards of e-learning.

Objectives

- To analyse the impacts of PEU and PU on behavioural intention to use (BIU) of LMS.
- To assess the impacts of PEU and PU on attitude towards usage (ATU) of LMS system.
- To examine the relationship between ATU and BIU;
- To recognise the challenges in developing and building an online educational portal of the General Directorate of Education' in Diyala.

1.7. Research Methodology

In order to conduct the research to attain the designed objective, the study has adopted mixed method approach for successfully comprehending the significance of the model of TAM in Iraqi educational settings with respect to the needs of e-learning. The use of the combined approach of qualitative and quantitative methods has served as a catalyst in the attainment of coherent, reliable and comprehensible results. The prospect of mixed approach entails the use of a questionnaire and the use of secondary resources. The relevant data and information has been gathered from the credible secondary sources that are accessible over the internet. These resources include the publications, reports, and the peer-reviewed journals. Accordingly, the researcher has accessed the online databases of ProQuest, EBSCOhost, Science Direct, JSTOR, and others for gaining relevant data and information.

As a result, ample amount of credible and authentic information has been collected in a timely and cost-effective manner that is the significant aspect of the qualitative approach.

Besides, the research also includes the component of a qualitative questionnaire that comprised of around (22) questions based on the demographic information of the learners , see in appendix A1, and the significant aspects of TAM for e-learning implementation. These aspects of TAM included the "Perceived Ease of Use-PEU", "Perceived Usefulness-PU", "Attitude towards Usage-ATU", and the "Behavioural Intention to Use-BIU" of the learners. Moreover, certain external variables were also inquired with respect to the research objectives, including the institutional issues, management issues, technological issues, pedagogical issues, and

resource support issues as well. The questionnaire, see appendix A1, was conducted within the sample size of 210 from different practical position and age groups like students, teachers, and education administrative.

Consequently, the adopted methodology of the mixed method has facilitated the collection of data in a flexible manner along with enhancing the credibility of the explored areas of the research based on its objectives. It is noted that the researcher has the flexibility of identifying and reviewing multiple aspects of the subject matter as the learners' perspectives and the scholarly opinions and results both are accessible [13, 14, 15, 16].

Even though the analysis of the responses of the questionnaire has been time-taken in collaboration with the reviewed literature, yet the accuracy of the attained outcomes has eradicated its impact. With respect to the analysis of the questionnaire responses, Likert scale has been used, comprising of the responses of "Disagree, Strongly Disagree, Neutral, Strongly Agree, and Agree", with respect to the intended objectives of the research. Moreover, the responses to the questions based on the external variables were evaluated in a descriptive manner by calculating the frequency of the responses. Thus, the outcomes of the questionnaire were integrated with the data gathered from the scholarly articles and peer-reviewed journals for comprehending the final words related to the research scope. The outcomes of the research have assisted in providing the necessary recommendation for the future work.

1.8. Structure of the Research

The thesis incorporates the following sections in its structural execution,

Chapter 1: This section includes the background context of the focus of the research, the relevant theoretical framework, problem statement, purpose of the research, aims, and objectives, and the adopted methodology for attaining those objectives as well.

Chapter 2: In this section, the literature of the research subject in terms of the background and theoretical aspects is presented. This chapter serves as the significant section of the study as it encompasses the description of the most important elements of the study.

Chapter 3: With respect to the nature of the research and its subject area, the adopted methodology is discussed in this section of the thesis. Moreover, the methodology section entails the adopted approach of data collection and the analysis of the collected data as well.

Chapter 4: This section represents the analysis part of the collected data along with the acquired discussions, related to the Technology Acceptance Model for e-learning.

Chapter 5: Finally, in this section of the research, the overall study outcomes are concluded. Moreover, certain recommendations and suggestions related to the future work are also present in this section.

CHAPTER 2

LITERATURE REVIEW

2. 1. E-learning

According to among the domains based on the use of the internet and the associated technology, the domain of education seems the main domain with respect to the usage of internet-based electronic applications [6]. The corresponding electronic applications are aimed at enhancing the management of the outcomes performance of learners and the instructors. It reflects that the use of electronic applications or e-learning system in the educational institution is intended to manage the learning activities and the associated resources in an efficient and proficient manner to reduce the cost utilization [17, 18]. According to the adoption of e-learning is based on the objectives of evading the problem creating elements in the educational organisations [19]. Through the technology-based pedagogy of e-learning, the required learning material, and the associated resources have the benefits of accessibility, availability and minimized expenses [20].

2.2. Relevant Terminologies

The prospect of delivering education through electronic applications entails a variety of learning modes having a different level of effectiveness with respect to the intended objectives, respectively. Following are the types of e-learning as discussed by different studies [18, 19, 21].

"Blended Learning": It incorporates the combined impacts of offline and online learning modes. In this mode of learning, the students have to attend classes as well along with certain online sessions.

"Web-based Learning": This form of e-learning system incorporates the availability and accessibility of the learning material through the use of web browsers.

"Social and Collaborative Learning": In this mode of learning platform, the learners acquire knowledge in an interactive environment where they can socialize with other learners as well.

"Online Learning": It means that the learning material is readily available on the computer that is accessible to the learners. It entails the availability of the content through, the internet, the web, or installed on a disk (hard disk), or on external storage, like a CD-ROM.

"Distance Learning": although it sounds similar to the advantageous e-learning system, yet the learners have to interact with their instructors in a timely manner while interacting at a distance.

"Synchronous learning": Synchronous means the execution of learning process at the same time even the individuals involved (learners and instructors) are physically separated.

"Asynchronous learning": Asynchronous learning means the development of the course content prior to the execution of the entire course plan. In this regard, the role of the practitioner is significant to make the relevant course material readily available over the internet. It depends on the learners to select the most appropriate time for taking the course.

E-learning has the direct impacts of the learners' needs of knowledge that is represented by their involvement in the process of education [22]. In this regard, the timing of interactions in between the learners and the instructors is considered significantly. Consequently, the system of e-learning is categorized as “internet-based” and “computer-based” e-learning [23, 24]. The platform of computer-assisted or computer-based learning incorporates both the hardware and software elements as these are the significant components of ICT [25, 26, 27]. Accordingly, the computers being used for the purpose of e-learning are integrated with the pertinent software tools for facilitating the process of learning even outside the classroom environment. It is noted that the involvement of technology in the process of learning makes it possible to create an interactive environment for the learners. On the contrary, the learning process based on the use of internet facilitates the ease of the access of the relevant information and knowledge to the learners [25, 27].

This particular learning mode is reflected in the form of assistant mode, and blended or mixed mode [28]. Hence, this mode of learning process illustrates the uniqueness of the learning network [29, 30]. This mode of learning is regarded as synchronous and asynchronous learning based on the optional timings of interactive activities [23, 24, 31].

The synchronous learning facilitates the learning process with many alternatives of establishing interactive connections among the learners and the instructors. The learners are proficient in having direct interactions with their instructors by means of video conferencing and chat rooms. In addition to this, this mode of learning entails the benefits of prompt feedbacks from the instructors on their progress in the acquisition of knowledge [31].

Conversely, the process of asynchronous learning is implemented in a way that the learners are allowed to communicate with the instructors at the time of their choice. In this mode, interaction is carried out by means of emails, forums and thread discussions as there is no restriction of accessibility and availability for both the learners and the instructors [25, 27, 32]. Irrespective of all the privileged aspects of the learning process, there are certain shortcomings with the prompt feedbacks from the instructor that affects the effective outcomes performance of the learners.

2.3. Significance of E-learning

Has asserted that e-learning system tends to minimize the processing and cost related requirements by managing the provision of services and the materials through its efficient infrastructure [6]. The learners and the instructors have the full-time accessibility and availability of the relevant resources in a real-time manner, irrespective of the concerns of time and place. As a result, the need for media storage is reduced along with increased interactions among the individuals involved based on enhanced motivation [33].

According to the higher education institutions have to allocate ample amount of budget to the activities of learning and the development of related infrastructure [34].

Such a large amount is required for the provision of best quality services in an adequate and prompt manner. However, the non-profitable nature of this business sector makes the delivery of budget restricted. Thus, the complexities of the learning environment of the Schools make the overall situation challenging for the management; thus, there are certain chances of impacting the performances of the learning outcomes adversely [23]. In addition to this, with the restricted or limited budget, the management of IT resources, learning strategies, instructors and the learners get difficult at all the levels.

As it is explaining in reference [35], the pedagogy approach of e-learning is the best and the most efficient solution of eradicating the challenges associated with the traditional mode of the learning process. It tends to be a dynamic process of learning that results in the maximization of the management efficiency on the basis of its flexible services. Besides the attribute of flexibility, the features of accessibility, resources utilization, and availability minimize the needs of the traditional environment of learning. Thus, the expenses required for the learning resources are reduced. More specifically, the automated management of the relevant processes and personnel make the entire process free of errors, which makes the services provision credible [6, 36].

Nonetheless, the maximum utilization of all the benefits of the e-learning system is based on its successful implementation. Therefore, considerable efforts are required for the attainment of the advantages of e-learning platform in the learning environment of educational institutions.

2.4. E-learning and ICT (Information and Communication Technology)

The system of e-learning represents the features of distant learning that entail the studying essentials of needing correspondence [37]. In this regard, the integration of Information and Communication Technology (ICT) has transformed the meanings of distant learning. E-learning is the educational process that facilitates the process of knowledge delivery even at remote distances. As a result, the educational setting attains flexibility that is the most needed aspect of this era [36]. The students or even the instructors are not required to attend the regular classes or to appear in the exams. Everything acquires electronic representation that eradicates the notions of traditional learning practices.

According to [3], the use of ICT in an interactive manner facilitates the learning needs of the individuals, which includes the learning resources of teleconferencing, internet, and intranet within the learning settings. Thus, the platform of e-learning turns out to be learner-centred that is well-designed having electronic mediation for all the individuals, irrespective of time-related concerns. Nonetheless, the overall system is designed in alliance with the instruction principles.

According to explain in references [25], the combined impact of the framework of networks and ICT is utilized by e-learning through the integration of interactive devices for knowledge delivery among the learners. [26], has asserted that the associated administrative tasks of the educational institutions are also served by the pedagogical characteristics of e-learning. It reflects that e-learning encompasses the attributes of an entire learning unit that makes it a credible source of acquiring knowledge in this rapidly developing world [37, 38].

In addition to this, it is affirmed that the process of e-learning is not similar to the traditional practices of learning as there are numerous alternative approaches to acquire knowledge based on the level of interest. [39], has described that the learning process needs to be serving the needs of the learners for attaining effective performance outcomes. Therefore, the activities of e-learning are regarded as being LMS “Learning Management System” and LCMS “Learning Content Management System” as well on the basis of both the synchronous and asynchronous learning. This process has been well-defined by [25], as e-learning is the manifestation of personalized access to the learning material that facilitates both the educational and training needs in all the educational settings [17, 38]. Thus, interaction and accessibility turn out to be the most significant contributors to the successful development of this platform in the digitally revolutionized world.

Consequently, the ensured accessibility and availability of education in the Iraqi Schools would be best served by the deployment of e-learning at all the levels. It is based on the fact the common people of Iraq have lost their position both in the economy and educational sectors as well. The learning environment of Iraq is not adequate with respect to the needs of the learners from the process of learning. Therefore, it would be a great favour for the Iraqi Schools to develop e-learning platforms within the institutions.

2.5. E-learning

According to in reference [5], a radical change has been experienced in the traditional mode of the learning process. It is noted that the process of learning and teaching has evaded the restrictions of classroom environment [21]. In today’s educational settings across the world, the higher educational institutes are broadly having a technology-based learning environment. According to [40], around 75% of the Schools of US have been reported to use learning process based on the web systems in 2007. The use of mobile technology integrates the influences of social software and Web 2.0 that are aimed at enhancing the credibility of e-learning. As a result, the learners’ expectations and experiences based on the use of mobile-based learning technologies is influenced in terms of the associated processes of learning, collaborating and communicating [41]. Asserted, that the undergraduate students have eagerly adopted the internet-based tools and applications in their personal lives.

According to reference [15], the institutions of higher education are striving for acquiring innovative models of learning and teaching for serving the needs of the learners seeking connectivity and autonomy along with socio-experiential educational modes. According to numerous studies, podcasts, RSS, bookmarking, blogs, and virtual environments have been used as the most common and most significant applications of web 2.0; thus, enhancing the credibility of learning the process.

2.6. Learning Management System (LMS)

According to the study of reference [8], the benefits of e-learning are enhanced by the integration of LMS software within the process. LMS provides the environment for the instructors or the administrators to develop and organise the learning material and the associated content. In this process, communication tools assist the personnel involved to manage the activities of interactions, involving the management of the learners as well. The majority of the LMSs utilize internet-based services and elements for enabling the students' accessibility to the materials present online along with enhancing the teachers' potential of administrating the learners' progress remotely. Among the features of LMS, the most feasible and competent aspects are of content management, user logging, activities' tracker, grades management, generation reporting, and the relevant tools of communication that include chat, forums, teleconferencing, discussion groups, threads, and others.

As it is explained in reference [5], the most important element of LMS is its enhanced aspect of LCMS, "Learning Content Management System" that assists in creating, modifying, managing, and publishing the learning material and content for coping with the increasing demands of technological developments. LCMS utilizes the detailed information regarding the scores, navigation habits, and question choices of the learners for assisting the content managers by providing them access to the crucial information of the learners. Thus, the effectiveness of the content is ensured with the collaborative impacts of particular instructional strategies, learner preferences, and the associated delivery technologies. Among of the most common tools of LMS, Moodle, a Tutor, Sakai, and others. These tools and applications are designed by using a modular technique that provides the flexibility of bundling with

other tools and modules for enhancing the featured characteristics pertaining to the required needs [8].

In addition to this, LMS being open-source incorporates the capabilities of multiple platforms, user communities of extensive accessibility, cost-effectiveness, exceptional adaptability, source code modification in accordance with the requirements, and the prospects of security and flexibility.

Moodle

Moodle facilitates the social constructionist aspects of education. This software is provided free of cost based on its intended objectives of social constructivism for efficiently designing courses that are available and accessible online, under the “GNU Public License”. Based on the objectives of this research of serving the needs of providing quality education to the individuals of Iraq, the software of Moodle seems proficient and efficient. This software promotes a group-oriented methodology of education that incorporates the collaborative activities along with the participation in an active manner that results in the effective creation of internet-based learning communities. Besides educating, Moodle also assists the domains of development, training, and business and management entities. Moodle’s network is strong that facilitates the technical management of the customer base [8].

Its instructive characteristics make it preferred among the instructors along with its proficient adaptability towards the environment of education. Its credibility is governed based on its rapid and incessant adoptability by multiple institutes of higher education.

A tutor

It is also LMS-based open-source software that is developed by “Inclusive Design Institute”. It is also licensed by “GNU Public License” as Moodle. It is featured by interoperability and accessibility standards that make it unique among the LMS software solutions. It enables the content managers to export the content and even the entire course to other system or server. With its adaptability feature, learners proficiently access the modified aspects of the system [8]. It facilitates the users to enhance the navigation aspects of feel and look of the system that suits their learning

abilities and styles. Collectively, the features of content management enhance the potential of the personnel to deal with the associated requirements of learning.

Sakai

This software solution is developed by Sakai Foundation that entails the cumulative efforts of the community, including organisations, educational institutes, and the individuals as well. Thus, a common platform of CLE “Collaboration and Learning Environment” is developed. Its development entails the support of Java on the basis of its designed features of a “service-oriented suite”. Sakai is extensible, reliable, scalable and interoperable as well that makes it best suited for the purpose of online content management [8].

Like other applications of LMS, it facilitates the content managers with its featured characteristics of document distribution, course management, grade-book, chatting, discussion, assignments management, and even the attribute of online examination. Even the element of group-based research and projects is facilitated by collaborative tools. The users are allowed to modify the provided applications and tools according to their needs. Thus, the intended objectives of this software solution are achieved in terms of the development of an enriched environment of learning in a flexible and adaptable manner.

2.7. E-learning and TAM

According to explained in reference [12], TECHNOLOGY Acceptance Model (TAM) is based on the rationale that the impact of the external variables is significant on the behavioural acceptance of the technology. In this regard, the role of users’ attitudes and beliefs is considerable as these behaviours reflect the effectiveness of instrumentality linked to the attitudes and activities of the users or the learners in the case of educational institutes. Beliefs are related to the subjective assessment of an individual that is based on their behavioural performance resulting particular outcomes, while the attitudes of the individuals are the perceptions or the feelings related to their performance of the behaviours. TAM has been examined by numerous studies [5, 8, 15, 27, 40].

In terms of adopting and using e-learning [42], asserted that the increasing demand of adopting e-learning for enhancing the education status of the societies has increased the need of investigating the model of TAM so that its integration with the e-learning platform could be guaranteed. In this regard, its significance has been reviewed by the analysis of CWAM “Course Website Acceptance Model” in terms of determining the relationships of the elements of “Perceived Usefulness”, “Perceived Ease of Use”, and “Intention to Use”. As a result, it was observed that these determinants have assisted in determining the potential of these elements with respect to the effective outcomes of electronic applications for the purpose of learning and teachings based on technology [5, 15]. Moreover, the attitudes of the individuals towards perceived usefulness also assists in enhancing their beliefs aimed at boosting their learning expectations and the relevant experiences.

As it is explained in reference [43], the personnel involved in the higher educational institutions are referred as the mere users and even learners of the e-learning system. Besides the elements of TAM, even the presentation of the information content is also significant that depicts the individuals’ preferred access of the online courses that is reflected from their navigational preferences. In addition to this, the characteristics of the learners and the used system tend to serve as the external variables of attaining effective outcomes of the process of e-learning; thus, the model of TAM turned out to be proficient in determining the technological acceptance of the individuals with the process of learning in an internet-based environment. According to [44], the assessment of behavioural acceptance of the individuals is needed at all the levels for determining the success of the e-learning systems in terms of the involvement and the participation level of the individuals, including both the learners and the instructors as well. Therefore, TAM serves as the best theoretical model along with added benefits of extended e-learning and multimedia context [45]. Thus, it has emphasized the needs of comprehending the background context of the elements of PEOU.

Therefore, the component of self-efficacy serves as the significant determinant of PEOU at all the levels of the learning process. Besides, the prospect of objective usability tends to assist in determining the extent of PEOU with respect to the potential of e-learning platform in the higher educational institutes. Thus, the self-efficacy of e-learning and the dispositional barriers have a strong relationship, yielding significant outcomes. It is argued that the practitioners must consider the

disposition of the learners, followed by determining the techniques of enhancing the self-efficacy of the learners towards the adoption of e-learning system [3].

It is based on the fact that the successful deployment of the e-learning platform is dependent on the personal confidence and preference of the individuals, being the target of the software deployment.

According to explained in reference [46], the effective depiction of perceived behaviour of the individuals is based on the socially influencing variable of “subjective norm” that reflects the performance behaviour of the individuals. Therefore, the impacts of social influences on the users’ commitment towards their attitudes towards the use of technology-based learning need to be determined for the sake of understanding, predicting and explaining the usage of the system to be deployed along with the acceptance behaviour as well [47].

Asserted that subjective norm has considerable effects on the behavioural intentions of the individuals towards the adoption of e-learning system.

Conversely, studies have also described that the effectiveness and the successful implementation of e-learning platform have no significant effect of the subjective norms of the individuals. In this regard, the implementation of SEM (“Structural Equation Modelling”) is suggested to resolve the inconsistencies of the software deployment by [44].

Accordingly, the effective variables are categorized as based on system context, individual context, social context, and the organisational context as well. Thus, social context deals with the social influences on the acceptance of the technological innovation, while the organisational context entails the organisations’ influence of supporting the technological needs of the information accessibility.

According to the explanation in reference [46], the organisational context has impacts on the “Perceived Usefulness-PU”, and “Perceived Ease of Use-PEO” of the e-learning system [48].

Emphasized that the higher level of information availability and accessibility is essential for predicting the individuals’ PEOU According to [7], the level of ease of use predicts the accessibility of e-learning platform in serving the needs of university students, by regarding it as an important factor of organisational context. In relation to the needs of determining the behaviours of individuals with respect to the model of TAM [1], has regarded the element of an ERP system as integrated, mandatory, packaged and customized software system that is related to the

operational aspects of the organisation, in this case, educational institutions of Iraq. Although the essentials of ERP are based on high levels of expectation, yet the outcomes performance has not been as significant as expected from the perspectives of organisational enhancement, as it results in eradicating the prospects of cost-effectiveness. According to [32], the operating environment of the educational institutions has attained significant changes in the level of education. Nonetheless, the factor of user acceptance has always been a challenge for the successful acceptance of e-learning. In this regard, the implications of TAM have been effectively predicted with respect to the acceptance of the pedagogical platform of e-learning.

According to the study of reference [12], TAM is capable of being proficiently deployed as a source of predicting the readiness and willingness of the individuals towards the adoption of an e-learning system over the traditional practices of the learning environment. In addition to this, it is also asserted that the involved personnel needs to present the positive aspects of the technological environment of learning to motivate the learners and enhance their behavioural intentions for using the technology of e-learning. Therefore, the managers or the administrative domain of the organisation or the educational institutions must have the proficiencies and potential of training and development for improving the effectiveness of the e-learning platform, and the associated performance of the instructors [10].

Accordingly, it is noted that the attribute of motivating the learners eradicates the impacts of Perceived usefulness along with enhancing the influence of “Perceived Ease of Use-PEOU”. For that reason, the educational developers and learning technologists must ensure that the interfaces of e-learning are entirely user-friendly for eradicating the perspectives of adverse impacts of technology on the expected performance and productivity [7].

CHAPTER 3

RESEARCH METHODOLOGY

3.1. Introduction

In this chapter, the adopted research methods for exploring the formulated research objectives are described. The collection of data is regarded as the most crucial stage of conducting a research, as the attainment of the research objectives is directly dependent on the research methodology. Therefore, the significance of selecting the best possible research method demands the researcher to be exceptionally cautious. According to the study of reference [49], the prime aim of a research is to acquire coherent and cohesive research outcomes, and research method is the determiner that governs the success of this prime objective of a research [49].

In accordance with the research of the research methodology yields enhanced the potential of the researcher to remain focused throughout the completion of the entire study [50].

Resultantly, the period of study completion is affirmed to be efficiently systemized. Based on the recognized significance of research method, the researcher has vigilantly planned all the essentials of collecting and analysing the relevant data to successfully comprehend the significance of deploying of ICT infrastructure in Iraqi educational settings using TAM.

3.2. Research Approach

If the researcher is focused and keeps the research approach aligned with all the activities involved in the data collection process, the success of the research is ascertained. Based on this perceptive, the research approach has been classified into three main types:

Qualitative Research Approach: In this particular approach, the researcher has the availability and accessibility of the flexible and efficient instruments of research. Using 'Descriptive or Narrative Analysis Techniques', the collected data is proficiently analysed. Generally, exploratory research design is employed in this type of research approach for investigating the underlying opinions and motivations [51].

As a result, the completion of the research governs that the researcher has appropriately generated the research outcomes that are affirmed to have coherence, cohesiveness, and authenticity [52].

Quantitative Research Approach: In accordance with the study of a quantitative research implies cause-and-effect thinking', along with the aspects of defining the variables, and employing different methods of observation, measurement, and application of statistical tests [53]. This particular research approach has the significant attributes of objectivity, and reliability while constructing the variables to be analysed [54, 55].

Mixed Research Approach: This approach employs both the aforementioned approaches of qualitative and quantitative research for the purpose of collecting and analysing the data. As it is explained in reference [56], has asserted that mixed research approach centrally combines the two most efficacious methods of collecting data; thus, generates the outcomes that could be impracticable or less reliable with either of the two approaches.

The study has emphasized the significance of the two methods used as a mixed method for conducting a particular study [57].

It is asserted that these approaches have distinct attributes that eventually yields more coherent results based on multiple perspectives of different nature. The credibility of the research outcomes depends on the scope of the research that needs to be adequately aligned throughout the study period [58, 59].

Accordingly, this particular research has adopted "Mixed Research Approach" for presenting the solution of the deployment of ICT infrastructure in the educational settings of Diyala, Iraq by means of using TAM to encounter the associated obstacles. The research outcomes reflect the effectiveness of the mixed method approach, in terms of serving as a catalyst in the achievement of consistent, reliable and comprehensible results.

3.3. Research Purpose

According to the research of reference [49], the research purpose reflects the formal procedure on which the entire research plan is based [49]. For that reason, the researcher is expected to substantiate the purpose of the research at the initiation of the research plan [49, 60]. In order to facilitate the researchers [61], has affirmed the purpose of the research to be of three types based on diverse nature of the study area:

Exploratory: Exploratory research purpose is appropriate for the research area that has not been explored before. This particular study purpose is focused on the inspection of the ideas or opinions having secondary form rather than primary data acquisition [62]. The research outcomes based on this particular research purpose have the outlook of implying statistical approaches, as the research proceeds. The particular objectives having an exploratory impact are succeeded by using open-ended survey questions.

Descriptive: the Descriptive purpose is regarded as being "Conclusive", for it carries the inclusion of the massive amount of data to achieve the formulated objectives. Differing from the exploratory purpose, descriptive purpose entails focused areas of research as the nature of the research outcomes are pre-determined, rather than being merely explored [63]. Accordingly, this particular research purpose demands the statistical inference to evaluate the entire population, rather than generating the insights into the research objectives.

Explanatory: Being the third stage of a research purpose, the explanatory purpose of the research regards it as being "Casual", along with the prospect of being controlled. Dealing with the "cause and effect thinking" prospects of the research method; this purpose is effective in working with the defined variables.

Accordingly, the study based on this particular purpose entails the attributes of interpreted relationship of the defined variables, differing from the observational aspect of descriptive purpose [62, 63].

Based on the pre-determined objectives of this particular study, the purpose of the research is affirmed to be Explanatory. The variables of TAM model in the deployment of ICT infrastructure in the educational settings of Diyala, Iraq are

already defined; therefore, this particular study further evaluates the efficacy of TAM in mitigating the obstacles in developing and building an Online Educational Portal of The General Directorate of Education in Diyala, Iraq.

3.4. Research Design

According to a research design represents the integral framework of the entire research plan [55]. Being integral, the research design imitates the projected success of the research [64, 65 , 66].

Has described research design as the controlled framework of examining the problem focus of the research, entailing the essentials of conducting the research [64], multiple research designs have been presented by the researchers that describe the study type in a predictable way; including Descriptive, Review-based, Correlational, and Causal as the most efficient ones [66,67].

In this particular research, multiple designs have been adopted, inclusive of "Review-based", "Descriptive" (survey), and "Correlational" for accomplishing the formulated objectives of the research. For emphasizing the proficiencies of e-learning in effectively developing and improving the educational status of the Iraqi environment; along with describing the influence of the constraints in implementing the ICT infrastructure in the educational settings; and developing the guidelines for effective deployment of ICT infrastructure using TAM, the researcher has adopted "Review-based" design. In this regard, a comprehensive review of the relevant past studies has been studied. Besides, the objectives of identifying the possible problems during e-Learning activation in Iraq, and determining the constraints of implementing ICT infrastructure in the educational settings, the Descriptive design has been adopted using survey questionnaire see appendix A1.

Moreover, the collected data has been evaluated based on the correlation research design that entails the association of the identified variables, which are "Perceived Ease of Use-PEU", "Perceived Usefulness-PU" and "Attitude towards Usage-ATU" as Independent variables, and the "Behavioural Intention to Use-BIU" as dependent variables in this case. As a result, the benefits of implementing ICT infrastructure in the educational settings of Diyala, Iraq have been analysed.

3.5. Data Source

As it is explained in reference [61], has affirmed the significance of data sources in making a study successful. The sources are required to be credible and reliable for ensuring the authenticity of the research outcomes. As a result, these data sources are categorized as:

Primary Sources: These are the direct sources of data collection having the availability of first-hand information [60].

Secondary Sources: These are the indirect sources; including published journals, articles, reports, textbooks or other texts from credible databases [60].

In this particular study, both the data sources have been used. Using credible internet sources, the relevant data, and information has been collected as secondary data. Publications, peer-reviewed journals, and reports from the online databases of JSTOR, ProQuest, ScienceDirect, EBSCOhost, and others were accessed. Consequently, the researcher has collected sufficient amount of data in cost-effective and time-efficient manner. With respect to primary data, a survey questionnaire was conducted among the participants from different practical position and age groups (like students, teachers, and education administrative).

Besides, the research also includes the component of a qualitative questionnaire that comprised of around (22) questions based on the demographic information of the learners, see appendix A1, and the significant aspects of TAM for e-learning implementation. These aspects of TAM included the "Perceived Ease of Use-PEU", "Perceived Usefulness-PU", "Attitude towards Usage-ATU", and the "Behavioural Intention to Use-BIU" of the learners. Moreover, certain external variables were also inquired with respect to the research objectives, including the institutional issues, management issues, technological issues, pedagogical issues, and resource support issues as well.

The questionnaire was conducted within the sample size of (210) from different practical position and age groups like students, teachers, and education administrative, see in appendixA1. As a result, the data related to the effectiveness or benefits of the deployment of ICT infrastructure within the e-learning settings of Iraq was efficiently collected. It is noted that the researcher has the flexibility of identifying and reviewing multiple aspects of the subject matter as the learners'

perspectives and the scholarly opinions and results both are accessible [68 ,69, 70]. Even though the analysis of the responses of the questionnaire has been time-taken in collaboration with the reviewed literature, yet the accuracy of the attained outcomes has eradicated its impact.

3.6. Population of the Study

The population of the research involves the groups or individuals who are characterized based on similar interests. According to the study of the participants or the respondents who are selected or targeted for a particulate study must have common traits to reflect aptness for the research. In this particular study, the selected population has been the participants from different practical position and age groups (like students, teachers, and education administrative) of the educational setting of Iraq.

3.7. Sampling Strategy

With respect to the prospect of primary data collection, the study requires sampling strategy to be the most effective and proficient. Sampling is referred as acquiring a subset of the entire research population for the purpose of collecting primary data. Based on the associated concerns of the time, financial resource, geographic accessibility, and others with the primary data collection, sampling strategy holds greater significance [71]. Since every research is based on the objectives of reliable outcomes, the sampling must be appropriate and reliable; thus, the sample of the study needs to be "Representative" to ensure unbiased presentation of the population [72].

In order to apply the sampling technique, either probability or convenience sampling strategy is adopted. Probability sampling strategy entails the specified aspects to be considered while approaching the respondents of the survey. For instance, the researcher has to specify the number of the individuals who would be considered, their particulars of age, experience, interest, and others are also specified. Conversely, the convenience sampling strategy is non-probability; thus, entailing the prospect of random sampling opportunities [71, 72].As a result, the participants are equally treated or provided equal opportunities of contributing to the research

accomplishment. Moreover, the concerns of proximity and accessibility that are associated with the collection of primary data are also mitigated.

3.8. Sample Size

The selected sample size for collecting the primary data through survey has been 210. The selected participants belonged to different practical position and age groups (like students, teachers, and education administrative) within the educational settings of, Iraq.

3.9. Statistical Technique

In order to analyse the quantitative data, collected through survey questionnaire, the researcher has used the Descriptive statistics. The designed questionnaire has been considerably focused on evaluating the responses of the learners or potential users of the ICT infrastructure towards its deployment, using the framework of TAM. Descriptive statistics assist in exploring the responses of a particular segment of the population, in terms of mean, mode, median, percentage analysis, standard deviation, and other statistics.

3.10. Research Instrument

With respect to the primary data collection, the selected instrument has been of "Questionnaire". The questionnaire is a collection of questions having the accurate answer as options that are selected by the respondents; thus, contributing to the success of the study [73].

The questions could be open or close-ended, depending on the nature and the focus of the study. If the questions are open-ended, the questionnaire is regarded as unstructured that enables the respondents to express their opinions or insights, pertaining to the research objectives or the topic under consideration. On the other side, the close-ended questions reflect the structured questionnaire, in which the respondents have to select the answer from the provided options [57]. In this particular study, the close-ended questionnaire has been used for collecting the

relevant responses, having around 22 questions, based on demographic information and the relevant information of the research objectives.

3.11. Variable Description

The identified variables to be used for generating the required objectives of the study are associated with the implication of the framework of TAM (Technology Acceptance Model):

Independent variables:

- Perceived Ease of Use-PEU
- Perceived Usefulness-PU
- Attitude towards Usage-ATU

Dependent Variable:

- Behavioural Intention to Use-BIU
- Institutional issues
- Management issues
- Technological issues
- Pedagogical issues
- Resource support issues

3.12. Ethical Consideration

The success of the research is greatly dependent on the assurance of the ethical considerations. The prospects of confidentiality and social norms, including the respondents' right to information, and rights to privacy are essentially considered. In this particular study, certain other ethical aspects were also considered, including carefulness, respect for intellectual property, competence, openness, objectivity, integrity, and non-discrimination. Moreover, the respondents were also allowed to leave the research if they want. With respect to the authenticity of the secondary sources, credible databases were accessed. Besides, the associated considerations of accrediting the acquired knowledge were also ensured, if needed.

3.13. Methodology Summary

The adopted research methodology to yield the effective research outcomes, in accordance with the pre-determined objectives of this particular study, is summarized as:

Research Approach	Qualitative and Quantitative Approach - Mixed Approach
Research Purpose	Explanatory
Research Design	Review-based (Literature Review), Descriptive (Questionnaire Survey), and Correlational Design.
Data Source	Primary and Secondary
Population of the Study	Students, teachers, and education administrative of different practical position and age groups from the educational setting of Diyala, Iraq.
Sampling Strategy	Convenience
Sample size	210
Research Instrument	Questionnaire
Statistical Analysis	Descriptive

CHAPTER 4

RESULTS AND ANALYSIS

4.1. Introduction

The chapter incorporates the analysis of the collected findings collected through a survey. The objective of interpreting the collected information is to analyse and examine the research problem that was highlighted in the initial sections of the study. It is important to note that the data analysed in the proceeding sections were collected by carrying out the survey with two hundred and ten (210) participants belonged from the educational settings of Iraq. The participants belonged from different age groups and positions like educational administrative, teachers, and students. In order to statistically examine the collected findings, the researcher had used diverse techniques that include descriptive statistics, reliability test, and regression and correlation analysis.

4.2. Demographic Analysis

Demographic analysis can be understood as the technique that is used for establishing an understanding of the racial composition, gender, and age of the population. Demographic analysis helps in understanding that how these characteristics of the specific population are changed over the passage of time, specifically due to the basic demographic processes, i.e., migration, death, and birth. In the present research work, the researcher had selected various different variables for demographic analysis. These include gender, age group, academic rank, experience in higher education, and experience in learning management system (LMS).

Below mentioned Table 1 incorporates the description of the gender of the selected participants. In accordance with the findings shown in Table 1, out of 210 participants, 109 were male and 97 were female. However, 4 participants did not respond to the question. Gender distribution is shown in the below-provided figure 1.

Table 1: Gender

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Male	109	51.9	52.9	52.9
Female	97	46.2	47.1	100.0
Total	206	98.1	100.0	
Missing System	4	1.9		
Total	210	100.0		

Source: Author's own estimation

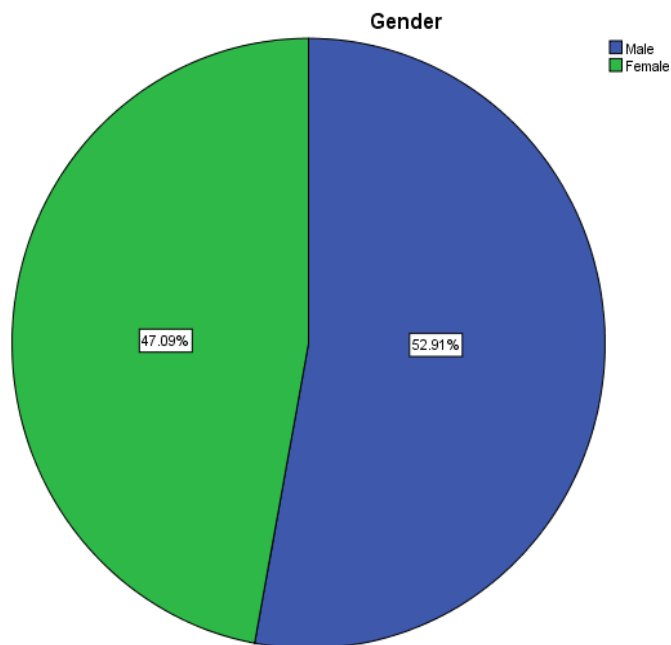


Figure 1: Gender Distribution of the Participants

The respondents who had participated in the research belonged from different age groups. Amid 210 participants, 34.8 percent were under 18. However, 26.2 percent were in the age group of 18-25 years and 29 percent were in the age group of 25-45. On the other hand, the age group 45 or more had 9 percent respondents. It is important to note that 1 percent of the respondents had left this field empty. The findings are shown in Table 2 and figure 2.

Table 2: Age Group

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Under 18	73	34.8	35.1	35.1
18 - 25	55	26.2	26.4	61.5
25 - 45	61	29.0	29.3	90.9
45 or more	19	9.0	9.1	100.0
Total	208	99.0	100.0	
Missing System	2	1.0		
Total	210	100.0		

Source: Author's own estimation

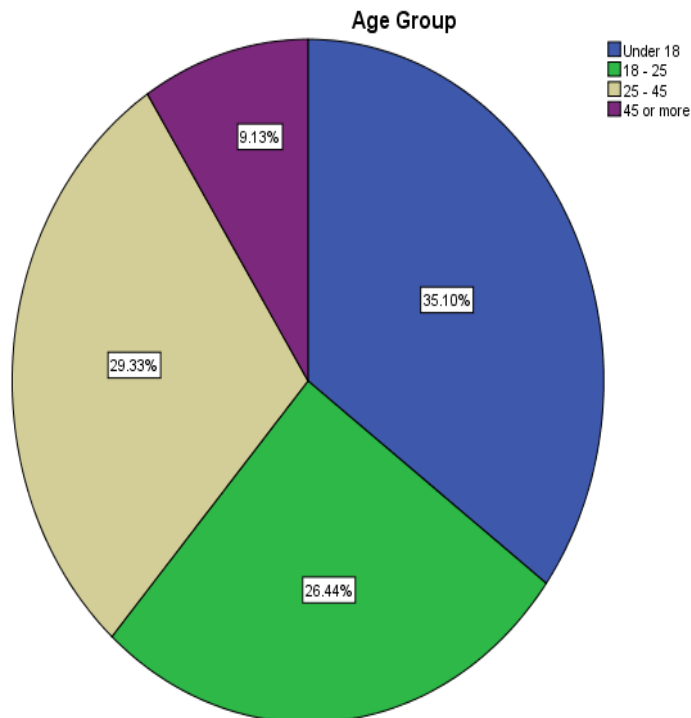


Figure 2: Age Group Distribution of the Participants

Table 3 shows the distribution of the academic ranks of the participants. The analysis of the table has revealed that 1.9 percent was a professor, 1.4 percent was an associate professor, 1.9 percent was an assistant professor, 31.9 percent were an instructor, 2.4 percent were an administrative employee, and 19.5 percent were employees. Moreover, 35.7 percent were students and 5.2 were marked themselves in ‘others’ category. It has been established from the findings included in the table that the majority of the respondents were a student. The findings are also shown in figure 3.

Table 3: Academic Rank

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Professor	4	1.9	1.9	1.9
Associate Professor	3	1.4	1.4	3.3
Assistant Professor	4	1.9	1.9	5.2
Instructor	67	31.9	31.9	37.1
Administrative employee	5	2.4	2.4	39.5
Employee	41	19.5	19.5	59.0
Student	75	35.7	35.7	94.8
Others	11	5.2	5.2	100.0
Total	210	100.0	100.0	

Source: Author’s own estimation.

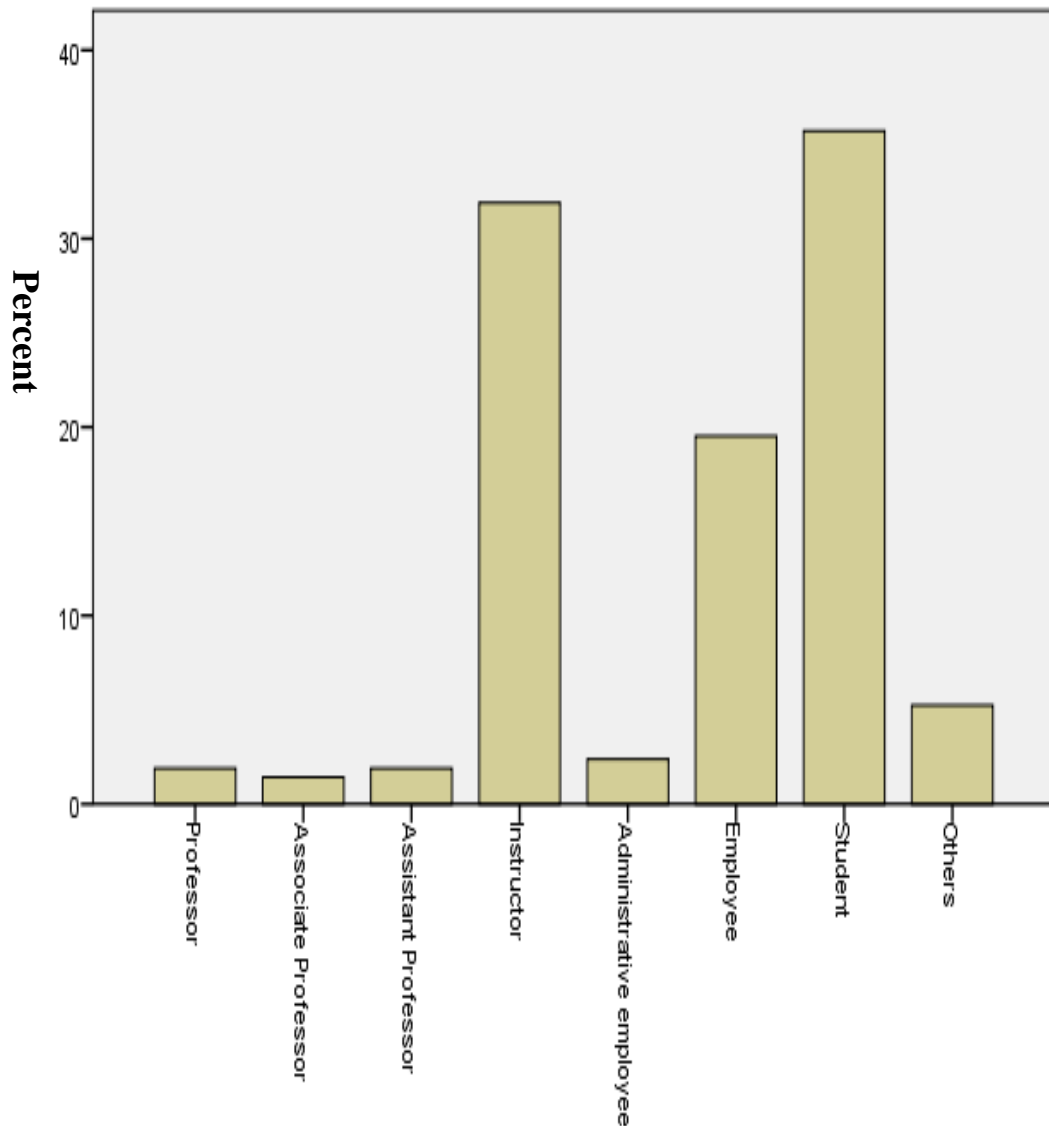


Figure 3: Academic Rank Distribution

When the experience of the participants, in higher education, was analysed it was revealed that only 9 percent of the participants had an experience of less than 1 year. On the other hand, 4.8 percent had the experience of 1-3 years, 3.3 had the experience of 3-5 years, and 2.9 percent had the experience of 5-10 years. In contrast, 4.3 percent had the experience of more than 10 years and 73.8 percent said that they do not have experience in higher education. 1.9 percent of the respondents did not disclose their experience and left this field empty. It shows that the majority of the respondent did not have experience in higher education. The findings are shown in Table 4 and figure 4.

Table 4: Experience in Higher Education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 1 year	19	9.0	9.2	9.2
	1 - 3 years	10	4.8	4.9	14.1
	3 - 5 years	7	3.3	3.4	17.5
	5 - 10 years	6	2.9	2.9	20.4
	More than 10 years	9	4.3	4.4	24.8
	No Experience in higher education	155	73.8	75.2	100.0
Total		206	98.1	100.0	
Missing	System	4	1.9		
Total		210	100.0		

Source: Author's own estimation

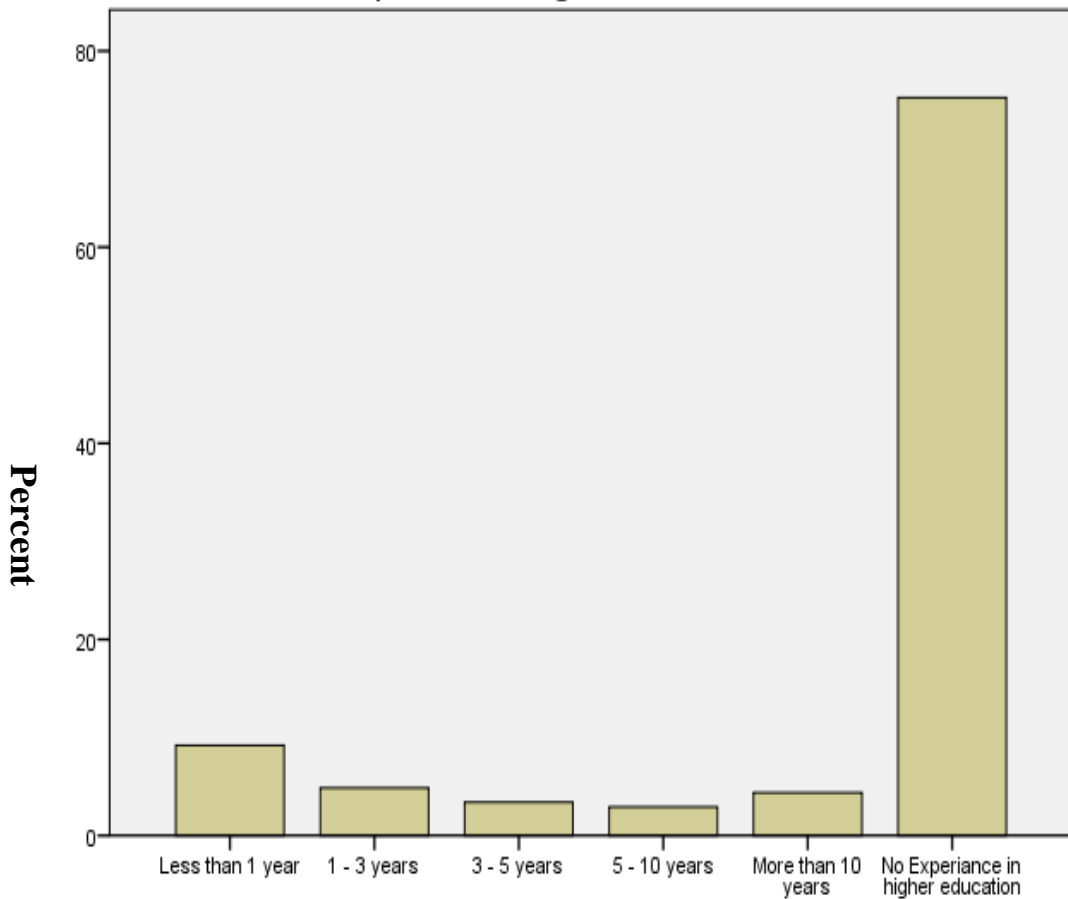


Figure 4: Experience in Higher Education

When the participants were asked about the experience in learning management system (LMS), 66.7 percent said that they have not used learning management system. On the other hand, 10 percent said that they have used LMS for less than a year. However, 4.8 percent had the experience of 1-3 years, 6.7 percent had the experience of 3-5 years, and 11 percent said that they have the experience in LMS for more than 5 years. Amid 210 respondents, 1 percent participants did not respond to the question. It has been analysed from the collected findings that the majority of the respondents had never used this computer-based application, i.e., LMS. Therefore, it is essential to spread awareness and deploy ICT infrastructure in the educational settings of Iraq. The results are shown in Table 5 and figure 5.

Table 5: Experience in Learning Management System (LMS)

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Have not used learning Management System	140	66.7	67.3	67.3
Less than a year	21	10.0	10.1	77.4
1 - 3 years	10	4.8	4.8	82.2
3 -5 years	14	6.7	6.7	88.9
More than 5 years	23	11.0	11.1	100.0
Total	208	99.0	100.0	
Missing System	2	1.0		
Total	210	100.0		

Source: Author's own estimation

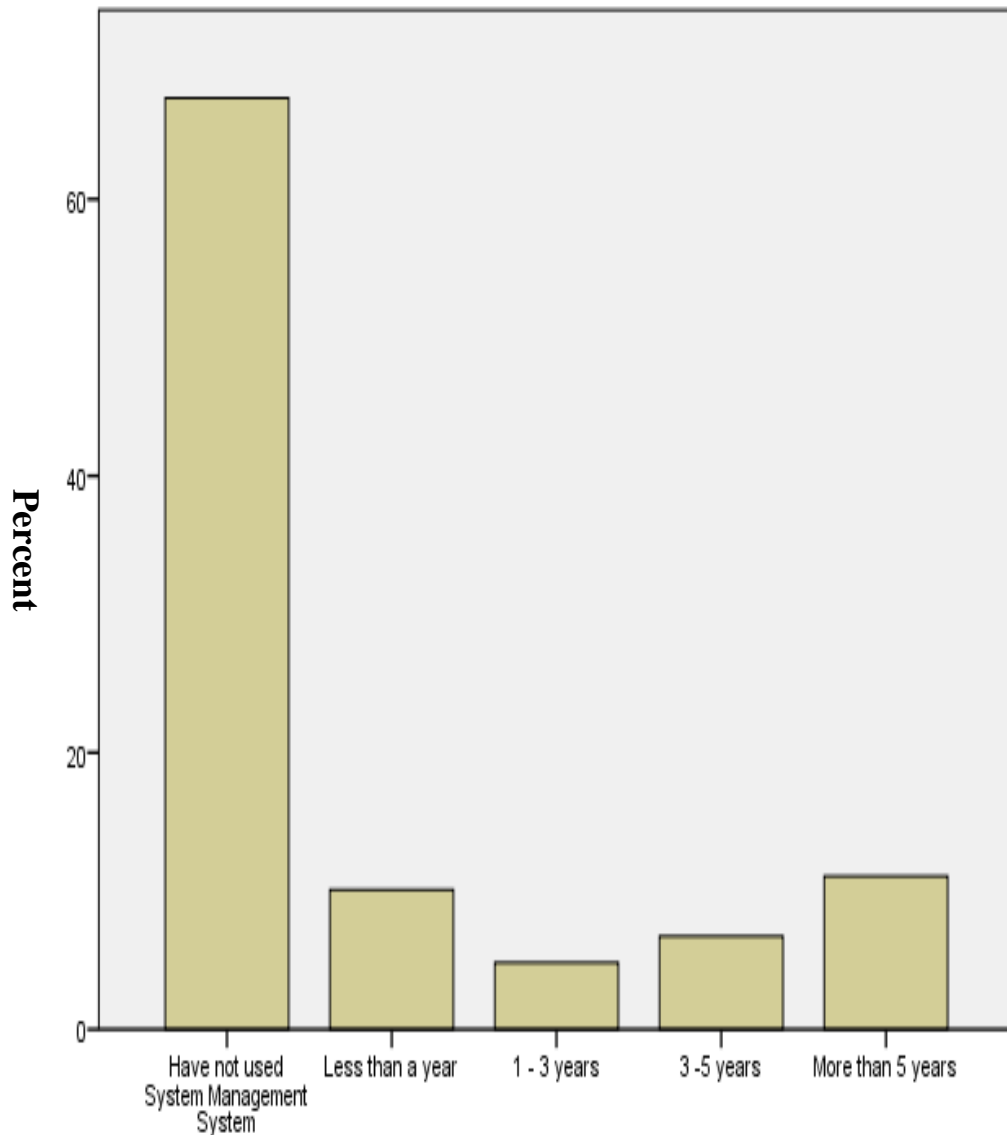


Figure 5: Experience in Learning Management System (LMS).

4.3. Descriptive Statistics

This section encapsulates the descriptive statistics of the elements that are associated with TAM. In particular, these elements include Perceived Ease of Use (PEU), Perceived Usefulness (PU), Attitude toward Usage (ATU), and Behavioural Intention to Use (BIU). In addition to this, mode and median statistics have also been used in this section for the sake of analysing the ordinal variables.

4.3.1. Perceived Ease of Use (PEU)

When the participants were asked if LMS is clear and simple for them, 66.7 percent disagreed with the statement. On the other hand, 11.9 percent said that they strongly disagree; 6.2 percent gave a neutral response. However, 7.1 percent said that they are strongly agreed with the statement and 7.1 percent said that they are agreed with the statement. In the same context, only 1 percent did not respond to the question.

The findings show that the majority of the respondents did not have ample knowledge and expertise of using LMS. Table 6 mentioned below, shows the collected findings.

Table 6: LMS is clear and simple for me

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	140	66.7	67.3	67.3
	2.00	25	11.9	12.0	79.3
	3.00	13	6.2	6.3	85.6
	4.00	15	7.1	7.2	92.8
	5.00	15	7.1	7.2	100.0
	Total	208	99.0	100.0	
Missing	System	2	1.0		
Total		210	100.0		

Source: Author's own estimation

“The practice need to deal with LMS would be soft to learn”, when this statement was shared with the participants, 52.9 percent disagreed with the statement. 14.3 percent said that they strongly disagree with the statement. 10.5 percent had neutrally responded to the statement. Conversely, 8.6 percent said that they are strongly agreed with the statement and 12.4 percent were agreed with the shared idea. Moreover, 1.4 percent of the respondents did not give any response to this question. The results are shown in below mentioned table 7.

Table 7: The practice need to deal with LMS would be soft to learn

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	111	52.9	53.6	53.6
	2.00	30	14.3	14.5	68.1
	3.00	22	10.5	10.6	78.7
	4.00	18	8.6	8.7	87.4
	5.00	26	12.4	12.6	100.0
	Total	207	98.6	100.0	
Missing	System	3	1.4		
Total		210	100.0		

Source: Author's own estimation

When the respondents were asked if it would be easy for them to become skillful to use LMS, 66.2 percent were disagreed with the idea. Similarly, 13.8 percent were strongly agreed with the statement. On the other hand, 5.2 percent gave a neutral response and 5.7 percent were strongly agreed with the statement. However, 7.6 percent were agreed with the statement; hence, showing that a limited number of people have enough confidence towards their skills of learning LMS.

Therefore, it is essential for the concerned authorities to spread knowledge about LMS so that people can easily develop their skills in this particular area. The results are shown in below mentioned table 8.

Table 8: Become a skillful to using LMS It would be easy to me

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	139	66.2	67.1	67.1
	2.00	29	13.8	14.0	81.2
	3.00	11	5.2	5.3	86.5
	4.00	12	5.7	5.8	92.3
	5.00	16	7.6	7.7	100.0
	Total	207	98.6	100.0	
Missing System		3	1.4		
Total		210	100.0		

Source: Author's own estimation

In order to examine the perceived ease of use, in terms of flexibility, was analysed, the participants were asked if LMS are flexible to participate with. In response to this statement, 53.8 percent disagreed and 17.1 strongly disagreed with the statement. However, 8.1 percent gave a neutral response; 9.5 said that they are strongly agreed with the statement. Apart from this, 11.0 percent of the respondents said that they are agreed with the statement. It is important to bring into the notice that these responses do not include the responses of 0.5 percent participants, as they did not respond to this statement. The results are shown in table 9 below.

Table 9: LMS are flexible to participate with

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	113	53.8	54.1	54.1
	2.00	36	17.1	17.2	71.3
	3.00	17	8.1	8.1	79.4
	4.00	20	9.5	9.6	89.0
	5.00	23	11.0	11.0	100.0
	Total	209	99.5	100.0	
Missing System		1	.5		
Total		210	100.0		

Source: Author's own estimation

When the respondents were asked if LMS interaction can be understandable, 49.5 percent disagreed with the statement. However, 8.6 percent strongly disagreed with the statement. 11.9 percent neutrally responded to the statement. On the contrary, 12.9 percent of the respondents said that they are strongly agreed and 16.7 percent were agreed with the statement. The analysis of the collected findings has revealed that limited participants had the understanding of LMS interaction and affirmative actions are needed to be taken to enhance the understanding of people regarding LMS. The findings are represented in below mentioned table 10.

Table 10: LMS interaction can be understandable

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	104	49.5	49.8	49.8
	2.00	18	8.6	8.6	58.4
	3.00	25	11.9	12.0	70.3
	4.00	27	12.9	12.9	83.3
	5.00	35	16.7	16.7	100.0
	Total	209	99.5	100.0	
Missing	System	1	.5		
	Total	210	100.0		

Source: Author's own estimation

4.3.2. Perceived Usefulness (PU)

In order to assess the perceived usefulness, the participants were asked if LMS will help them in advancing their job rendering. In response to this question, 53.3 percent participants disagreed with the statement. However, 18.6 percent said that they strongly disagree with the statement. On the other hand, 13.3 percent gave a neutral response and 4.3 percent said that they are strongly agreed with the statement. Only 10 percent said that they are agreed with the statement.

It shows that very few of the respondents have an understanding about the perceived usefulness of LMS, in terms of job rendering. Below mentioned table 11 incorporates the collected findings.

Table 11: LMS will help me in advance my job rendering

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	112	53.3	53.6	53.6
	2.00	39	18.6	18.7	72.2
	3.00	28	13.3	13.4	85.6
	4.00	9	4.3	4.3	90.0
	5.00	21	10.0	10.0	100.0
Total		209	99.5	100.0	
Missing System		1	.5		
Total		210	100.0		

Source: Author's own estimation

The perceived usefulness of the LMS was analysed by asking the participants if doing the job with using LMS would allow them to achieve their tasks more shortly. In response to the question, 57.1 percent disagreed with the statement. On the other hand, 15.2 percent were strongly agreed and 14.3 percent had neutrally responded to the statement. Moreover, 4.3 percent were strongly agreed and 8.1 percent were agreed with the statement. The results are shown in below mentioned table 12.

Table 12: Doing my job with using LMS would allow me to achieve tasks more shortly

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	120	57.1	57.7	57.7
	2.00	32	15.2	15.4	73.1
	3.00	30	14.3	14.4	87.5
	4.00	9	4.3	4.3	91.8
	5.00	17	8.1	8.2	100.0
	Total	208	99.0	100.0	
Missing	System	2	1.0		
	Total	210	100.0		

Source: Author's own estimation

When the participants were asked if LMS will be useful to their job, 54.3 percent disagreed with the statement. 13.8 percent said that they strongly disagree and 16.7 percent gave a neutral response. 5.2 percent said that they are strongly agreed with the statement and only 9 percent said that they are agreed with the statement. While responding to the statement, 1 percent of the participants did not give any response towards the usefulness of LMS to their job. The results are shown in table 13 below.

Table 13: Overall LMS will be useful to my job

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	114	[54].3	[54].8	[54].8
	2.00	29	13.8	13.9	68.8
	3.00	35	16.7	16.8	85.6
	4.00	11	5.2	5.3	90.9
	5.00	19	9.0	9.1	100.0
	Total	208	99.0	100.0	
Missing	System	2	1.0		
	Total	210	100.0		

Source: Author's own estimation

4.3.3. Attitude toward Usage (ATU)

In order to recognise the attitude of the participants towards the usage of LMS, the participants were asked if they like the intelligence of using an LMS. In response to the statement, 46.2 percent of the participants disagreed with the statement. However, 9 percent said that they strongly disagree with the statement. 16.7 percent gave a neutral response and 14.8 percent said that they are strongly agreed with the statement. Furthermore, 12.9 percent of the participants said that they are agreed with the statement. On the basis of the collected evidence, it can be affirmed that very few of the participants had knowledge about the intelligence that is associated with LMS. Table 14, mentioned below incorporates the findings that were collected from the participants.

Table 14: I like the intelligence of using an LMS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	97	46.2	46.4	46.4
	2.00	19	9.0	9.1	55.5
	3.00	35	16.7	16.7	72.2
	4.00	31	14.8	14.8	87.1
	5.00	27	12.9	12.9	100.0
	Total	209	99.5	100.0	
Missing	System	1	.5		
	Total	210	100.0		

Source: Author's own estimation

When the statement, "I implicate it is a pretty comprehension to use LMS" was shared with the participants, 48.1 percent of them disagreed and 11.0 percent strongly disagreed with the statement. On the contrary, 13.8 percent of the participants gave a neutral response. In contrast, 13.3 percent said that they are strongly agreed with the statement and 12.9 percent said that they are agreed with the statement. It shows that the majority of the participants did not have a positive attitude towards using LMS. The discussed findings and distribution of percentages are presented in table 15 below.

Table 15: I implicate it is a pretty comprehension to use LMS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	101	48.1	48.6	48.6
	2.00	23	11.0	11.1	59.6
	3.00	29	13.8	13.9	73.6
	4.00	28	13.3	13.5	87.0
	5.00	27	12.9	13.0	100.0
	Total	208	99.0	100.0	
Missing	System	2	1.0		
	Total	210	100.0		

Source: Author's own estimation

When the participants were asked if using LMS give a favourable understanding, 48.1 percent disagreed with the statement. Moreover, 9 percent strongly disagreed with the statement. On the other hand, 13.3 percent neutrally responded to the statement. In contrast, 15.7 percent said that they strongly agree with the statement and 13.3 percent were agreed with the statement. The acquired findings are represented in below mentioned table 16; thereby, showing that a minimum number of participants understands the favourable aspects of LMS.

Table 16: Using an LMS gives a favorable understanding

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	101	48.1	48.3	48.3
	2.00	19	9.0	9.1	57.4
	3.00	28	13.3	13.4	70.8
	4.00	33	15.7	15.8	86.6
	5.00	28	13.3	13.4	100.0
	Total	209	99.5	100.0	
Missing	System	1	.5		
Total		210	100.0		

Source: Author's own estimation

4.3.4. Behavioural Intention to Use (BIU)

In order to analyse whether the participants are intentional to use LMS in future, the participants were asked if they are planning to have affirmative cooperation with LMS. In response to the statement, 72.9 percent disagreed with the statement. On the contrary, 10.5 percent strongly disagreed with the statement. Apart from this, 4.3 had neutrally responded to the statement; 4.8 were strongly agreed with the statement and 7.1 were agreed with the statement. The analysis of the responses shows that very few of the participants are planning to use LMS in future. The accumulated responses are represented in table 17 below.

Table 17: I plan to be affirmative cooperation with LMS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	153	72.9	73.2	73.2
	2.00	22	10.5	10.5	83.7
	3.00	9	4.3	4.3	88.0
	4.00	10	4.8	4.8	92.8
	5.00	15	7.1	7.2	100.0
	Total		209	99.5	100.0
Missing	System	1	.5		
Total		210	100.0		

Source: Author's own estimation

The participants were asked if they are planning to utilise LMS in the after time, 72.9 percent disagreed with the statement and 9.5 percent said that they strongly disagree with the statement. Moreover, 5.2 percent were neutral towards their plan of utilising LMS in the after time. On the other hand, 4.8 percent were strongly agreed with the statement and 7.1 were agreed with the statement; therefore, showing that a limited number of the participants are planning to LMS in the after time.

Table 18: I plan to utilize an LMS in the after time

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 1.00	153	72.9	73.2	73.2
2.00	20	9.5	9.6	82.8
3.00	11	5.2	5.3	88.0
4.00	10	4.8	4.8	92.8
5.00	15	7.1	7.2	100.0
Total	209	99.5	100.0	
Missing System	1	.5		
Total	210	100.0		

Source: Author's own estimation

Below mentioned table 19 shows that mean and standard deviation that was found in the responses of the participants during the survey.

Table 19: Descriptive Statistics

Questions	N	Mean	Std. Deviation
LMS is clear and simple for me	208	1.7500	1.27215
LMS interaction can be understandable	209	2.3828	1.58323
Become a skill full to using LMS It would be easy to me	207	1.7295	1.25962
LMS are flexible to participate with	209	2.0622	1.414[54]
The practice need to deal with LMS would be soft to learn	207	2.1208	1.4[54]79
Doing my job with using LMS would allow me to achieve tasks more shortly	208	1.8990	1.27571
LMS will help me in advance my job rendering	209	1.9856	1.32461
Using LMS in my career would enhance my productivity	209	2.1483	1.29793
Overall LMS will be useful to my job	208	2.0000	1.32607
I implicate it is a pretty comprehension to use LMS	208	2.3125	1.49829
I like the intelligence of using an LMS	209	2.3876	1.49937
Using an LMS give a favourable understanding	209	2.3684	1.52642
I plan to utilize an LMS in the after time	209	1.6316	1.22206
I plan to be affirmative cooperation with LMS	209	1.6220	1.21517
Valid N (list wise)	201		

Source: Author's own estimation.

4.4. External Variables

Table 20-23 incorporate the responses of the participants regarding the issues that could impact the deployment of LMS in the Schools of Iraq. The items are represented in each table show the areas that are needed to be improved, prior deploying LMS in Iraqi Schools. It has been established from the analysis of the tables that the participants think that the development of learning skills is important for the resolution of institutional issues. Moreover, the development of software and appropriate infrastructure planning is also identified to be the optimal strategy to resolve the technological issues. Apart from this, it has also been identified that managing e-learning environment, updating and monitoring of security measures will be helpful in handling the administration issues. The participants also think that the support issues can be resolved through technical support and management of online and offline resources. The responses are also presented in figures 6-9.

Table 20: Institutional framework Issues

	Frequency	Percent	Valid Percent	Cumulative Percent
1	2	3	4	5
Valid	3	1.4	1.4	1.4
Faculty and Staff support	4	1.9	1.9	3.3
Faculty and Staff support, Learning Skills Development	42	20.0	20.0	23.3
Financial Aid	2	1.0	1.0	24.3
Financial Aid, Faculty and Staff support, Learning Skills Development	10	4.8	4.8	29.0
Financial Aid, Instructional Quality	3	1.4	1.4	30.5
Financial Aid, Instructional Quality, Faculty, and Staff support, Learning Skills Development	14	6.7	6.7	37.1
Financial Aid, Instructional Quality, Learning Skills Development	4	1.9	1.9	39.0
Financial Aid, Learning Skills Development	8	3.8	3.8	42.9
Instructional Quality, Faculty and Staff support	3	1.4	1.4	44.3
Instructional Quality, Faculty and Staff support, Learning Skills Development	15	7.1	7.1	51.4
Instructional Quality, Learning Skills Development	3	1.4	1.4	52.9
Learning Skills Development	27	12.9	12.9	65.7
Nothing	1	.5	.5	66.2
Organisational change and Readiness Assessment	15	7.1	7.1	73.3
Organisational change and Readiness Assessment, Faculty and Staff support	1	.5	.5	73.8
Organisational change , Faculty and Staff support, Learning Skills Development	4	1.9	1.9	75.7
Organisational change , Faculty and Staff support, Learning Skills Development	4	1.9	1.9	75.7

1	2	3	4	5
Organisational change , Faculty and Staff support, Learning Skills Development	4	1.9	1.9	75.7
Organisational change and Readiness Assessment, Financial Aid	8	3.8	3.8	79.5
Organisational change and Readiness Assessment, Financial Aid, Faculty and Staff support, Learning System.	3	1.4	1.4	81.0
Organisational change and Readiness Assessment, Financial Aid, Instructional Quality, Faculty and Students.	21	10.0	10.0	91.0
Organisational change and Readiness Assessment, Financial Aid, Instructional Quality.	1	.5	.5	91.4
Organisational change and Readiness Assessment, Financial Aid, Learning Skills Development	3	1.4	1.4	92.9
Organisational change and Readiness Assessment, Instructional Quality	1	.5	.5	93.3
Organisational change and Readiness Assessment, Instructional Quality, Faculty and Staff support.	2	1.0	1.0	94.3
Organisational change and Readiness Assessment, Instructional Quality, Learning Skills.	3	1.4	1.4	95.7
Organisational change and Readiness Assessment, Learning Skills Development	9	4.3	4.3	100.0
Total	210	100.0	100.0	

Source: Author's own estimation.

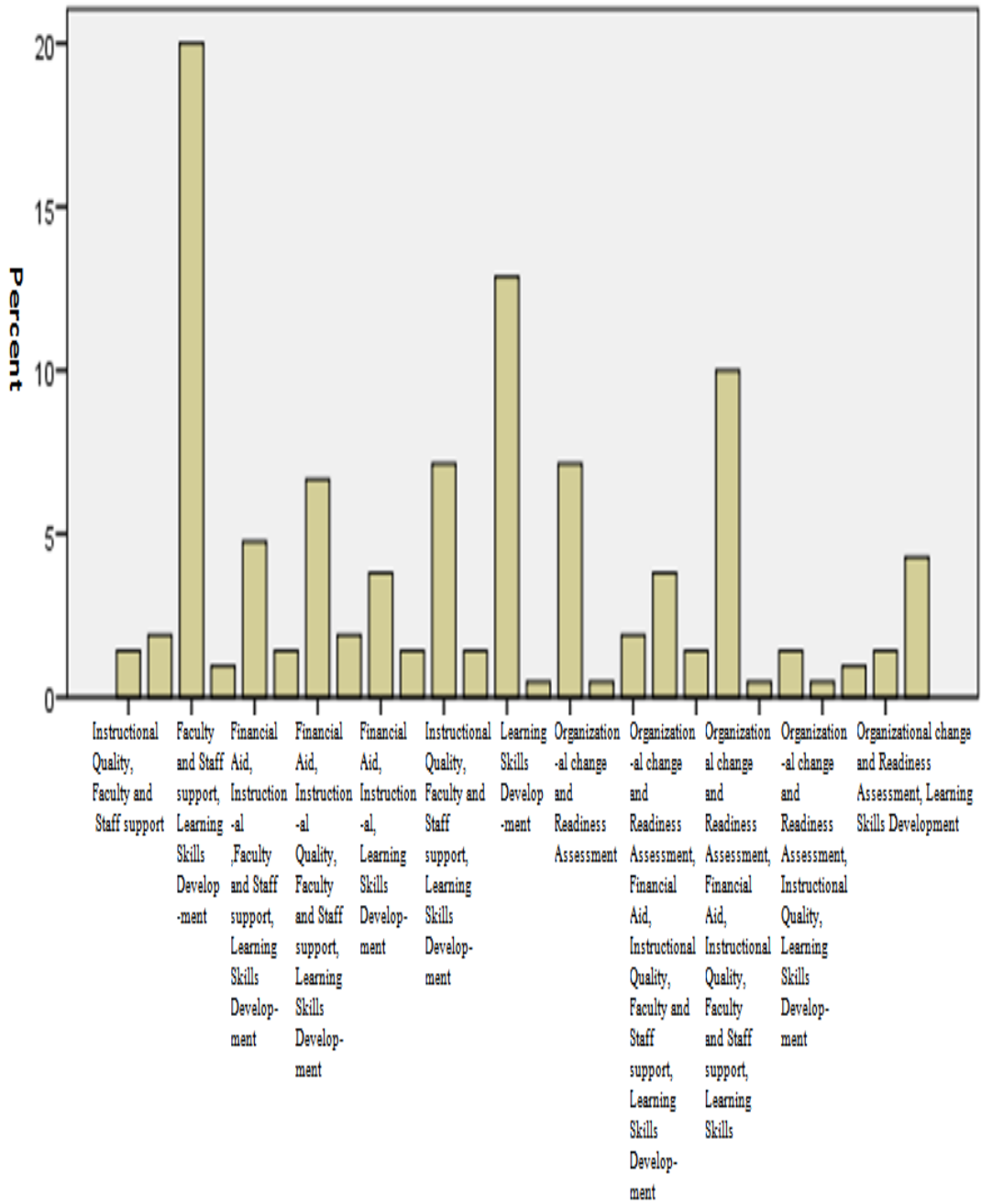


Figure 6: Institutional Framework Issues.

Table 21: Administration Issues

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3	1.4	1.4	1.4
Managing content development process	6	2.9	2.9	4.3
Managing content development process, Managing E-learning environment	13	6.2	6.2	10.5
Managing content development process, Managing E-learning environment, Updating, and Monitoring of Security	23	11.0	11.0	21.4
Managing content development process, Updating and Monitoring of Security Measures	1	.5	.5	21.9
Managing E-learning environment	19	9.0	9.0	31.0
Managing E-learning environment, Updating and Monitoring of Security Measures	72	34.3	34.3	65.2
Nothing	1	.5	.5	65.7
Project Manager's Skills	15	7.1	7.1	72.9
Project Manager's Skills, Managing content development process	2	1.0	1.0	73.8
Project Manager's Skills, Managing content development process, Managing E-learning environment	7	3.3	3.3	77.1
Project Manager's Skills, Managing content development process, Managing E-learning environment, U	19	9.0	9.0	86.2
Project Manager's Skills, Managing E-learning environment	4	1.9	1.9	88.1
Project Manager's Skills, Managing E-learning environment, Updating, and Monitoring of Security Measures	6	2.9	2.9	91.0
Project Manager's Skills, Updating and Monitoring of Security Measures	1	.5	.5	91.4
Updating and Monitoring of Security Measures	18	8.6	8.6	100.0
Total	210	100.0	100.0	

Source: Author's own estimation.

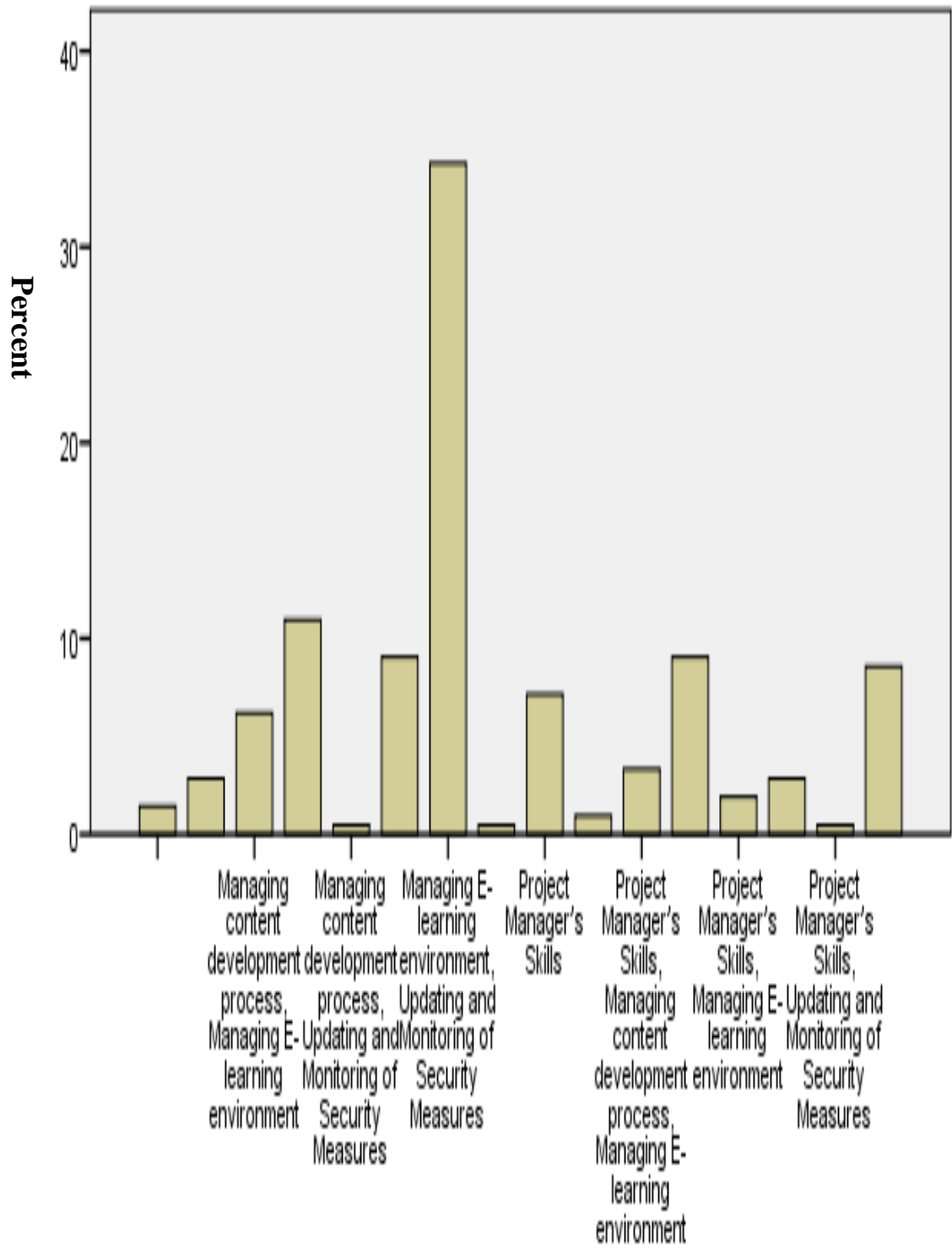


Figure 7: Administration Issues.

Table 22: Technological progress Issues

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	4	1.9	1.9	1.9
Hardware	4	1.9	1.9	3.8
Hardware, Software	9	4.3	4.3	8.1
Infrastructure	18	8.6	8.6	16.7
Infrastructure, Hardware	1	.5	.5	17.1
Infrastructure, Hardware, Software	5	2.4	2.4	19.5
Infrastructure, Planning	84	40.0	40.0	59.5
Infrastructure, Planning, Hardware	4	1.9	1.9	61.4
Infrastructure, Planning, Hardware, Software	46	21.9	21.9	83.3
Infrastructure, Planning, Software	3	1.4	1.4	84.8
Infrastructure, Software	3	1.4	1.4	86.2
Nothing	1	.5	.5	86.7
Planning	12	5.7	5.7	92.4
Planning, Hardware	2	1.0	1.0	93.3
Planning, Hardware, nothing	1	.5	.5	93.8
Planning, Hardware, Software	11	5.2	5.2	99.0
Planning, Software	2	1.0	1.0	100.0
Total	210	100.0	100.0	

Source: Author's own estimation

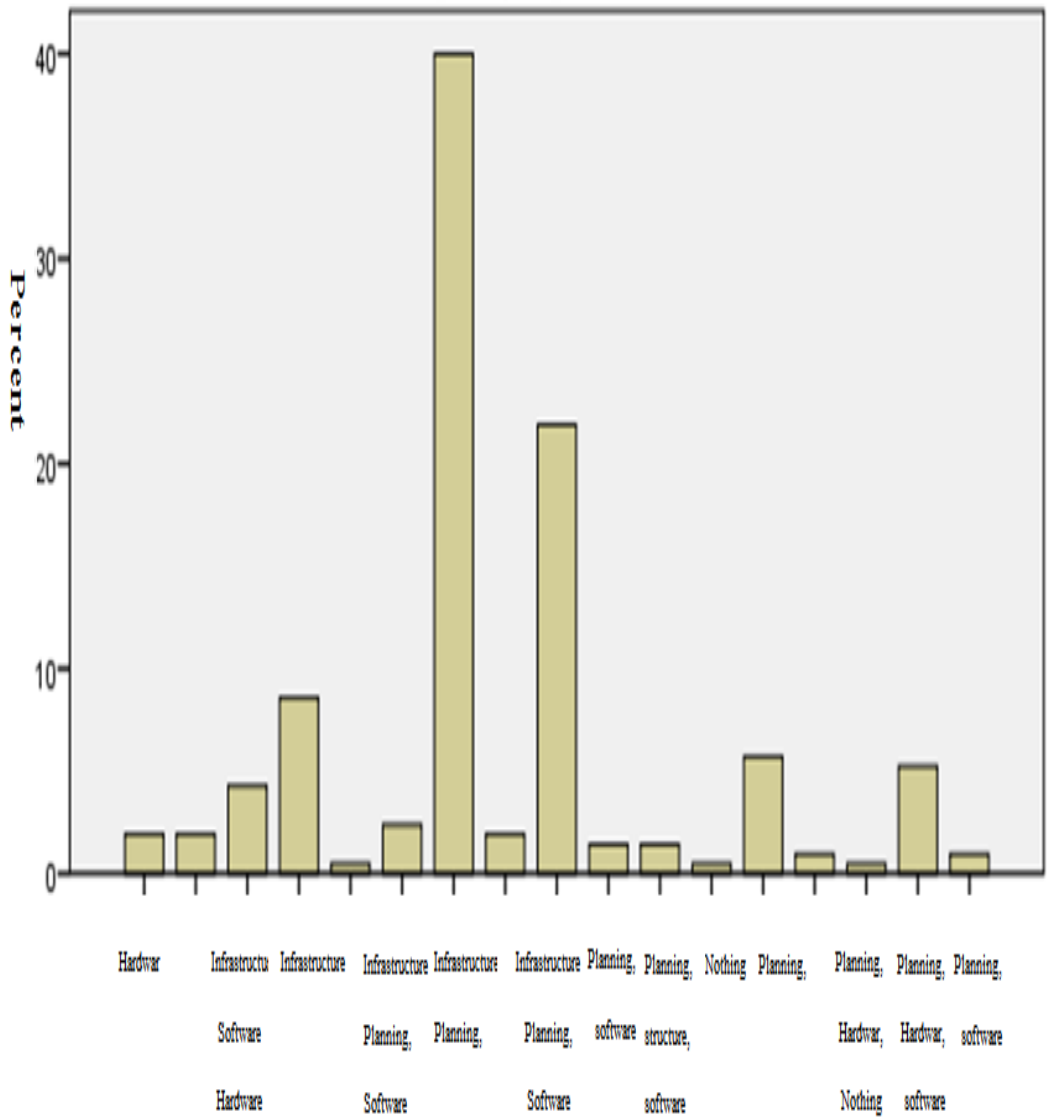


Figure 8: Technological Progress Issues.

Table 23: Support Issues

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3	1.4	1.4	1.4
Instructional and Counselling Support	27	12.9	12.9	14.3
Instructional and Counselling Support, Online and Offline Resources	16	7.6	7.6	21.9
Instructional and Counselling Support, Technical Support	6	2.9	2.9	24.8
Instructional and Counselling Support, Technical Support, Online and Offline Resources	38	18.1	18.1	42.9
Nothing	1	.5	.5	43.3
Online and Offline Resources	44	21.0	21.0	64.3
Technical Support	11	5.2	5.2	69.5
Technical Support, Online and Offline Resources	64	30.5	30.5	100.0
Total	210	100.0	100.0	

Source: Author's own estimation.

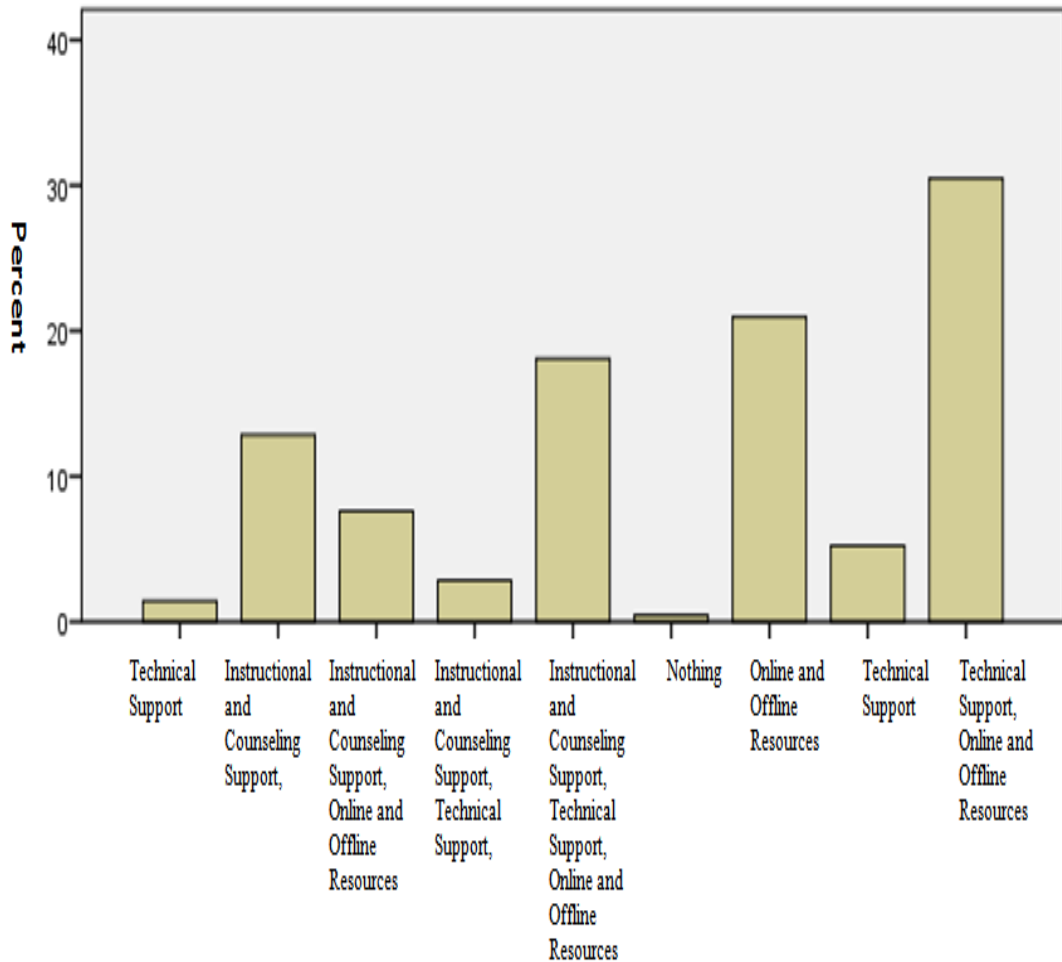


Figure 9: Support Issues

4.5. Regression Analysis

Regression analysis can be understood as the statistical technique that is primarily used to recognise the linear relationship amid two or more variables. It has been established that regression is usually utilised for causal inference and prediction of certain variables. In the present dissertation, the TAM model has been analysed that has presented an idea that several factors are responsible for influencing the decision of adopting or using technology. In the research, the impact of perceived usefulness and perceived ease of use on behavioural intention to use (BIU) and attitude towards use (BTU) has been analysed. These variables are examined in the context of the e-learning users belonging from the Schools of Iraq.

Table 24 mentioned below has examined that the impact of PU and PEU is statistically significant in the prediction of both BIU and ATU. The beta (coefficient) values of PU and PEU are found to be positive in both models. Therefore, it can be established that the impact of perceived usefulness and ease of use is significantly positive in impacting the behavioural intention and attitude of the users towards LMS. It is important to note that the acquired results are consistent with the theory of TAM.

Table 24: Testing Significance Using Regression Formal Analysis

Model	Attitude Toward Usage			Behavioural Intention to Use		
	B	T	Sig.	B	T	Sig.
(Constant)	0.456	3.526	0.001	0.002	0.017	0.986
Perceived Ease of Use	0.189	2.115	0.036	0.425	5.824	0.000
Perceived Usefulness	0.757	8.328	0.000	0.383	5.156	0.000
R Square	0.589			0.605		
F Statistic	147.897			157.678		

Independent variables: PEU and PU

Dependent variables: ATU/BIU

When the relationship between ATU and BIU was tested, it was found that both of the variables have a positive influence on each other. In particular, the model was statistically significant, as shown in table 25.

Table 25: Testing Significance between ATU and BIU

Dependent Variable: Behavioural Intention to Use			
	B	T	Sig.
(Constant)	0.424	3.3[54]	0.001
Attitude Toward Usage	0.51	11.136	0.000

Independent variables: ATU

Dependent variables: BIU

4.6. Correlation Analysis

Table 26 shows that PEU and PU are statistically significant with ATU, in the given case of Iraqi institutions. It shows that PEU and PU may impact towards adopting and using LMS in Iraqi Schools.

Table 26: Correlations

		Perceived Ease of Use	Perceived Usefulness	Attitude Toward Usage
Perceived Ease of Use	Pearson Correlation	1	.809**	.672**
	Sig. (2-tailed)		.000	.000
	N	209	209	209
Perceived Usefulness	Pearson Correlation	.809**	1	.762**
	Sig. (2-tailed)	.000		.000
	N	209	209	209
Attitude Toward Usage	Pearson Correlation	.672**	.762**	1
	Sig. (2-tailed)	.000	.000	
	N	209	209	209
Behavioural Intention to Use	Pearson Correlation	.744**	.735**	.612**
	Sig. (2-tailed)	.000	.000	.000
	N	209	209	209

Source: Author's own estimation

Table 27 shows that PEU and PU are statistically significant with BIU at 0.01 levels. Therefore, it can be contended that the PEU and PU of LMS may positively influence the behavioural intention of the Iraqi Schools.

Table 27: Correlations

		Behavioural Intention to Use
Perceived Ease of Use	Pearson Correlation	.744**
	Sig. (2-tailed)	.000
	N	209
Perceived Usefulness	Pearson Correlation	.735**
	Sig. (2-tailed)	.000
	N	209
Attitude Toward Usage	Pearson Correlation	.612**
	Sig. (2-tailed)	.000
	N	209
Behavioural Intention to Use	Pearson Correlation	1
	Sig. (2-tailed)	
	N	209

** . Correlation is significant at the 0.01 level (2-tailed).

CHAPTER 5

CONCLUSION AND FUTURE WORK

5.1. CONCLUSION

The research work has investigated the barriers that are being faced in developing and building an online educational portal of the general directorate of education in Diyala. It has been established that the current critical situations of Iraq are not favourable for both the students as well as the teachers, in terms of accessing the learning institutions. Therefore, appropriate alternatives are needed to be adopted by the educational institutions of Iraq so as to fulfil the learning needs of the students and to meet the international standards of education. In this situation, e-learning is found to be one of the most effective alternatives that could play a vital role in serving the learning needs of the Iraqi students. Therefore, it is needed to develop and deploy the e-learning platform (LMS: Learning Management System) for the population of Iraq, so that they can compete with their counterparts. However, it is important to identify the potential barriers that could create hurdles in the deployment or implementation of ICT infrastructure.

In this regard, the present research work was aimed at analysing the barriers faced by the educational institutions in building an online educational portal in Iraq. In order to accomplish this aim, diverse objectives were formulated. The objectives revolved around the analysis of the impacts of PEU (perceived ease of use) and PU (perceived usefulness) on BIU (behavioural intention to use). Other objectives include the examination of the impacts of PEU (perceived ease of use) and PU (perceived usefulness) on ATU (attitude towards usage). In order to successfully accomplish the mentioned aim and objectives, the researcher had adopted both qualitative and quantitative research approach, i.e., mixed research

approach. The main objective of selecting this research approach was to cohesively understand the barriers that could impact the implementation of ICT infrastructure in Iraq.

Moreover, the researcher had made use of both, primary and secondary data sources to collect ample amount of relevant information. Secondary data was collected by accessing multiple authentic and credible databases, reports, and peer-reviewed articles. On the other hand, the primary data was gathered by carrying out the survey questionnaire among the participants having different age groups and working on different positions (including education administrators, teachers, students, etc.).

The survey questionnaire was designed to analyse and examine the variables of TAM in correspondence to the e-learning infrastructure implementation. In particular, the variables that were examined included: Perceived Ease of Use-PEU, Perceived Usefulness-PU, Attitude towards Usage-ATU, and the Behavioural Intention to Use-BIU of the learners. Apart from this, some external variables were also examined that included: management issues, technological issues, pedagogical issues, and resource support issues. It is important to note that the survey questionnaire was distributed among 210 participants who were selected by using convenience sampling technique. The survey questionnaire was based on closed-ended questions having five (5) Likert scale options, i.e., disagree (1), strongly disagree (2), neutral (3), strongly agree (4), agree (5). The total number of questions that were included in the questionnaire was thirty (30).

The collected data was analysed by using different statistical techniques that include descriptive analysis, regression analysis, and correlation analysis. It is significant to bring into the notice that all of these analyses were used to critically inspect the variables of TAM to identify the hurdles or barriers in LMS implementation.

The interpretation and in-depth analysis of the collected findings had revealed that a number of factors are involved in influencing the decision of deploying or adopting technology. The findings, acquired from regression analysis, have revealed that the impact of PU and PEU are statistically significant in predicting both, BIU and ATU towards using LMS in Iraqi Schools. In addition to

this, it has also been established that ATU and BIU are also statistically significant with each other and have positive impacts on each other. Apart from this, the results found from correlation analysis show that PEU and ATU are statistically significant; thereby, showing that PEU does influence ATU towards using or implementing technological infrastructure. Additionally, it has also been examined that PU also has a positive correlation with ATU, which depicts that PU also impacts the ATU of the users to deploy or adopt the technology. Thereby, it is recommended to the concerned authorities and the relevant stakeholders of the Iraqi educational sector to focus on the learning and development of the potential users, in terms of using LMS.

It will ultimately impact the PEU and PU of the user; thereby, influencing ATU of the users. Along with this, the correlation between PEU and PU was also examined with respect to BIU.

In this account, it has been examined from the acquired findings that PUE has a positive correlation with the BIU. On the other hand, PU was also found to be statically significant with BIU; thereby, showing that PUE and PU of the users directly influence the BIU. On the basis of these findings, it is recommended that the concerned entities, working within the Iraqi educational sector, should focus on the variables that could positively impact the perception of users towards the ease of use and usefulness of LMS (learning management system). It is due to the fact that both of these variables have a positive correlation with “behavioural intention to use” as well as “attitude towards usage”.

Moreover, external variables were also examined in the study to identify the core issues that could hinder the adoption of technology infrastructure in Iraqi Schools. In this account, the external variables that were examined included: institutional framework issues, administration issues, technological progress issues, and support issues. On the basis of the collected responses, it has been examined that support issues can be resolved through technical support, provided by offline and online resources. On the other hand, the institutional framework issues can be handled by developing the learning skills of the faculty members. Moreover, it is also found that the administrative issues can be easily handled by the management of e-learning environment as well as by monitoring and updating the security

measures. Additionally, infrastructure planning would result in resolving the technological progress issues. Thereby, it is recommended to the Iraqi Schools to take all of these factors into the consideration, while designing and implementing e-learning system in their educational settings.

5.2. FUTURE WORK

- Support issues can be resolved through technical support, provided by offline and online resources.
- Institutional framework issues can be handled by developing the learning skills of the faculty members.
- Administrative issues can be easily handled by the management of e-learning environment as well as by monitoring and updating the security measures.
- Infrastructure planning would result in resolving the technological progress issues. Thereby, it is recommended to the Iraqi schools to take all of these factors into the consideration, while designing and implementing e-learning system in their educational settings.

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APPENDIX A1

QUESTIONNAIRE

Problems of Building an Online Educational Portal in Iraq

This questionnaire is prepared regarding my Master's Degree project. Answering the questionnaire will only take 10-15 minutes of your time; Meanwhile I am sure the results which will be obtained by this questionnaire will have an important positive effect on evaluation e-learning use in Iraq. Since the data obtained from the survey will be used for scientific objectives, there is no need for your identity information. It will be highly appreciated if you answer all the questions without leaving any blanks.

Thank you for your contribution.

Demographic Information

1. Experience in Learning Management System (LMS)

Mark only one oval.

- Have not used a Learning Management System
- Less than a year
- 1-3 years
- 3-5 years
- More than 5 years

2. Academic Rank

Mark only one oval.

- Professor
- Associate Professor
- Assistance Professor
- Instructor
- Administrative employee
- Employee
- Student
- Others

3. Age group

Mark only one oval.

- Under 18
- 18 - 25
- 25 - 45
- 45 or more

4. Experience in higher Education

Mark only one oval.

- Less than 1 year
- More than 1 year and less than 3 years
- More than 3 years and less than 5 years
- More than 5 year and less than 10 years
- More than 10 years
- No Experience in higher Education

5. Gender

Mark only one oval.

- Male
- Female

Perceived Ease of Use (PEU)

Learning management system (LMS): is a software application for the administration, documentation, tracking, reporting and delivery of electronic educational technology (also called e-learning) courses or training programs ((e.g. Moodle, Blackboard, Sakai)).

6. The practice need to deal with LMS would be soft to learn

Mark only one oval.

1 2 3 4 5

Disagree Agree

7. Become a skillful to using LMS It would be easy to me

Mark only one oval.

1 2 3 4 5

Disagree Agree

8. LMS interaction can be understandable

Mark only one oval.

1 2 3 4 5

Disagree Agree

9. LMS are flexible to participate with

Mark only one oval.

1 2 3 4 5

Disagree Agree

10. LMS is clear and simple for me

Mark only one oval.

1 2 3 4 5

Disagree Agree

Perceived Usefulness (PU)

Learning management system (LMS) : is a software application for the administration, documentation, tracking, reporting and delivery of electronic educational technology (also called e-learning) courses or training programs ((e.g. Moodle, Blackboard, Sakai)).

11. In overall LMS will be useful to my job.

Mark only one oval.

	1	2	3	4	5	
Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Agree

12. LMS will help me in advance my job rendering

Mark only one oval.

	1	2	3	4	5	
Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Agree

13. Doing my job with using LMS would allow me to achieve tasks more shortly

Mark only one oval

	1	2	3	4	5	
Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Agree

Attitude Toward Usage (ATU)

Learning management system (LMS): is a software application for the administration, documentation, tracking, reporting and delivery of electronic educational technology (also called E-learning) courses or training programs ((e.g. Moodle, Blackboard, Sakai)).

14. Using a LMS give a favorable understanding

Mark only one oval.

	1	2	3	4	5	
Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Agree

15. I like the intelligence of using a LMS

Mark only one oval.

	1	2	3	4	5	
Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Agree

16. I implicate it is a pretty comprehension to use LMS

Mark only one oval.

	1	2	3	4	5	
Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Agree

Behavioural Intention to Use (BIU)

Learning management system (LMS) : is a software application for the administration, documentation, tracking, reporting and delivery of electronic educational technology (also called e-learning) courses or training programs ((e.g. Moodle, Blackboard, Sakai)).

17. I plan to utilize a LMS in the aftertime

Mark only one oval.

	1	2	3	4	5	
Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Agree

18. I plan to be affirmative cooperation with LMS

Mark only one oval.

	1	2	3	4	5	
Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Agree

External Variables

Which of following variables you believe need to be improved before starting the use of LMS

19. Support Issues *Check all that apply.*

- Instructional and Counseling Support
- Technical Support
- Online and Offline Resources
- Other:

20. **Institutional framework Issues** *Check all that apply.*

- Organizational change and Readiness Assessment
- Financial Aid
- Instructional Quality
- Faculty and Staff support
- Learning Skills Development
- Other:

21. **Administration Issues**

Check all that apply.

- Project Manager's Skills
- Managing content development process
- Managing E-learning environment
- Updating and Monitoring of Security Measures
- Other:

22. **Technological progress Issues**

Check all that apply.

- Infrastructure
- Planning
- Hardware
- Software
- Other:

APPENDIX A2

CURRICULUM VITAE

PERSONAL INFORMATION

Surname, Name: Al Abdullah, Wafaa Waheeb

Date and Place of Birth: 16 August 1978, Baghdad

Marital Status: Married

Phone: 009647700252252 & 905357163716

Email: wafaalwazan@yahoo.com



EDUCATION

Degree	Institution	Year of Graduation
M.Sc.	THE UNIVERSITY OF TURKISH AERONAUTICAL ASSOCIATION INSTITUE OF SCIENCE AND TECHNOLOGY Mathematics and Computer Science, Information Technology Program	2017
B.Sc.	Al Yarmouk University College, College of Science ,Computer Science Dept.	2004
High School	Al- Thryer School	1999

WORK EXPERIENCE

Year	Place	Enrollment
2006-2007	Directorate of Statistics- Diyala	Data entry
2008- Present	General Directorate of Education- Diyala	Programmer

FOREIGN LANGUAGES

English

HOBBIES

Sewing, Chess, Traveling, Reading

Source: Author's own estimation.