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# *Towards the successful integration of e-learning systems in higher education in Iraq: a student perspective*

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## **Abstract**

This study aims to analyse the factors that can explain the adoption and effective use of a new e-learning system in Iraq. To achieve this, it uses a selection of factors that are present in the technology acceptance model (TAM) and the unified theory of acceptance and use of technology (UTAUT) model, and it includes three additional factors. The study hypothesises new relationships between the selected factors. Questionnaires were distributed to 300 university students in Iraq. Partial least squares-structural equation modelling (PLS-SEM) was used to analyse the data received. The findings suggest that perceived usefulness (PU), perceived ease of use (PEOU), subjective norms (SNs), information quality (IQ), system quality (SQ), technical support (TS) and self-efficacy (SE) have significant effects on behavioural intention (BI). In turn, BI and TS have significant direct effects on the actual use (AU) of e-learning systems. The factors age, gender and experience significantly moderated some of the relationships in the model. The research has several implications for policy makers, universities and the management of e-learning systems.

**Keywords:** e-learning adoption, TAM, UTAUT, Iraqi universities, Salahaddin University-Erbil, partial least squares

## **Introduction**

e-Learning has been defined as “learning facilitated and supported through the utilization of information and communication technology (ICT)” (Masrom, 2007, p.1). Previous studies have explained the difficulties in operating successful e-learning systems in developing countries (e.g. Al-Azawei, Parslow, & Lundqvist, 2016). In particular, the existing body of literature on e-learning adoption in higher education in Arab countries is limited in comparison to literature that focuses on other regions in the world (Al-Azawei *et al.*, 2016; Mirza & Al-Abdulkareem, 2011). Within the context of using e-learning in higher education, Iraq represents a unique case. The country has suffered from wars and an unstable political situation for many years (Ameen, 2017) which effected how universities work and advance in education. Furthermore, the basic resources required for e-learning systems to work such as electricity and a strong network connection are lacking in comparison to the majority of other Arab countries. The country is behind in terms of policy making related to the use of technology and in terms of technological advancement than the majority of other Arab countries (Ameen, 2017). This makes university

students in Iraq less aware of the importance of e-learning and their behaviour and preferences maybe different from the preferences of students in other Arab countries. The country is considered to be lagging behind other countries in the developed and developing world, which is due to challenges resulting from a lack of facilities, a lack of financial support, limited access to technology, and political unrest (Mako & Sullivan, 2014). According to the United Nations Development Programme (UNDP) 2016 report, only 42% of students in Iraq are satisfied with their educational experience. Previous research has found that e-learning can be an effective tool to raise the standards and quality of education (Mirza & Al-Abdulkareem, 2011).

Although some universities in Iraq have started using e-learning systems, they are still in the early stages (Elameer & Idrus, 2010a; Elameer & Idrus, 2010b). In 2010, the United Nations Educational Scientific and Cultural Organisation (UNESCO) launched the Avicenna Virtual Campus to improve the quality of learning by integrating online learning into higher education through an online virtual learning environment (UNESCO, 2017). This project has been implemented in many European and Arab countries (Salahaddin University-Erbil, 2016). Iraqi universities joined the project when it was launched in 2015. The training of instructors and some students began at this time, although the training focused mainly on the instructors. The project has great potential but also presents challenges, which need to be investigated.

To the best of our knowledge, the vast majority of the existing studies on the successful use of e-learning systems in Iraq have focused on the infrastructure or the perspectives of IT staff, lecturers or instructors, collecting data from them (Elameer & Idrus, 2010a; Elameer & Idrus, 2011; Fahad, Hassan, Sulaiman & Rahman, 2015; Sabr & Naemah, 2017; Thabit & Hajran, 2015). Only a few studies have been concerned with the students' perspective. For example, Jamil (2017) analysed the factors that can affect Iraqi students' behavioural intention (BI) towards the use of e-learning systems by using factors in the basic technology acceptance model (TAM) developed by Davis (1989). Al-Azawei, Parslow and Lundqvist (2017) conducted a study with the same purpose and used the same model. However, there is a gap in the literature in terms of conducting in-depth research to analyse the factors that can affect Iraqi students' intention, preferences and opinions relating to the successful use of the e-learning platform available to them. Existing research has focused on the basic factors from previous technology acceptance models, rather than introducing additional factors that can explain the adoption and use of an e-learning system in Iraq. Examples of these additional factors are factors related to the quality of the e-learning system as a whole and factors related to the support university students in Iraq can obtain while using the e-learning system since it is still a new system in terms of its use. It is important to take such factors into account as the country is less technologically advanced and the technological infrastructure is less advanced in comparison to other Arab countries (Ameen, 2017; Ameen & Willis, 2018). This is perhaps one of the main reasons e-learning systems were introduced at a later stage than the majority of other Arab countries. It also affects how e-learning systems are used by students. The inclusion of such additional factors provides a deeper understanding of the context of the use of e-learning in Iraqi universities.

To address the gap stated above, this study analyses the factors that can explain the adoption and effective use of the new e-learning system in Iraq by including a selection of factors from the TAM (Davis, 1989) and UTAUT model (Venkatesh *et al.*, 2003) and three additional factors, and by hypothesising new relationships between these factors. Therefore, it enhances our understanding of the factors that may influence e-learning adoption in Iraq in order to improve the quality of education in the country.

## **Background on the use of e-learning in Iraqi universities**

Previous studies have shown that Iraqi universities are interested in integrating e-learning systems (Fahad *et al.*, 2015). However, in most Iraqi universities there is a lack of experience and effective planning with regard to e-learning systems (Elameer & Idrus, 2010a; Sabr & Neamah, 2017). Some universities in Iraq have started using e-learning systems, but they are still in the early stages (Elameer & Idrus, 2010a; Sabr & Neamah, 2017).

Andersson and Grönlund (2009) grouped the challenges for e-learning use into four main categories: course challenges, challenges related to the characteristics of the individual (student or teacher), technological challenges, and contextual challenges (organisational, cultural and societal challenges). In general, the culture in Iraq is high in power distance (Greet-Hofstede, 2016). Within this culture, students view lecturers as the main source of information for their learning and they rely heavily on them to make progress with their learning (Andersson & Grönlund, 2009). This situation offers both challenges and advantages. When students rely on lectures in this way, they may prefer not to move away from traditional teaching methods (i.e. face to face). However, in high power distance and collectivistic cultures, such as the society in Iraq (Greet Hofstede, 2016), younger people (including students) tend to respect and listen to older people (including lecturers) and follow their advice and guidance.

## **Research model and hypotheses development**

The acceptance and use of technologies has been widely investigated in previous studies. One of the first theories used in technology acceptance was the theory of reasoned action (TRA) developed by Fishbein & Ajzen (1980). This was primarily developed to understand and predict human social behaviour (decision making). The TRA was followed by the TAM, which is one of the most well-known models of technology acceptance. The two main constructs in the TAM are perceived ease of use (PEOU [how easy a system is to use]) and perceived usefulness (PU [the outcomes gained from using a system]).

Venkatesh and Davis (2000) developed the TAM further to create the TAM2, which focused purely on organisational settings (for employees). The authors added subjective norms (SNs) as one of the main constructs of the model. Later, Venkatesh *et al.* (2003) developed the UTAUT. The model included four main predictors: performance expectancy (usefulness), effort expectancy (ease of use), social influence (SNs), and facilitating conditions, which are referred to as “the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system” (Venkatesh *et al.*, 2003, p. 453). The model was then extended by Venkatesh, Thong and Xu (2012), who developed the extended UTAUT (UTAUT2) to study technology adoption in the consumer context. In the UTAUT (Venkatesh *et al.*, 2003) and the UTAUT2 (Venkatesh *et al.*, 2012), age, gender and experience were included as moderators that can affect the relationships between the independent factors and the dependent factors. These moderating factors were found to be significant in previous studies on technology adoption in Arab and other countries (Ameen, 2017; Venkatesh & Davis, 2000).

The model proposed in the present study uses four independent variables, most of which were present in the TAM (Davis, 1989) and UTAUT (Venkatesh *et al.*, 2003). Previous studies have emphasised the importance of the overall infrastructure and user-friendliness of the system (Elameer & Idrus, 2011). For example, page and site design, context design, navigation, accessibility and usability were part of a framework created by Elameer & Idrus (2011). Considerable attention was paid to the technical aspects of the e-learning system, because the level of ICT infrastructure in Iraq is considered to be low (Heshmati *et al.*, 2013). This makes it unrealistic to investigate and analyse the factors that may encourage students to adopt an e-

learning system without investigating the quality of the system and the ICT infrastructure in the country as a whole. Therefore, the conceptual model proposed in this research integrates three additional factors, which are expected to have strong effects in the model: technical support (TS), system quality (SQ) and information quality (IQ).

Venkatesh *et al.* (2003) found that attitude does not have a significant effect on intention. They stated that attitude can be found within the effects of performance expectancy (usefulness) and effort expectancy (ease of use). Thus, this study did not include attitude. Instead, following the findings of Venkatesh *et al.* (2003), the research framework included BI to mediate between the independent variables in the model and USE. We also hypothesised new relationships between these factors, which have not been explored in previous studies (see figure 1).

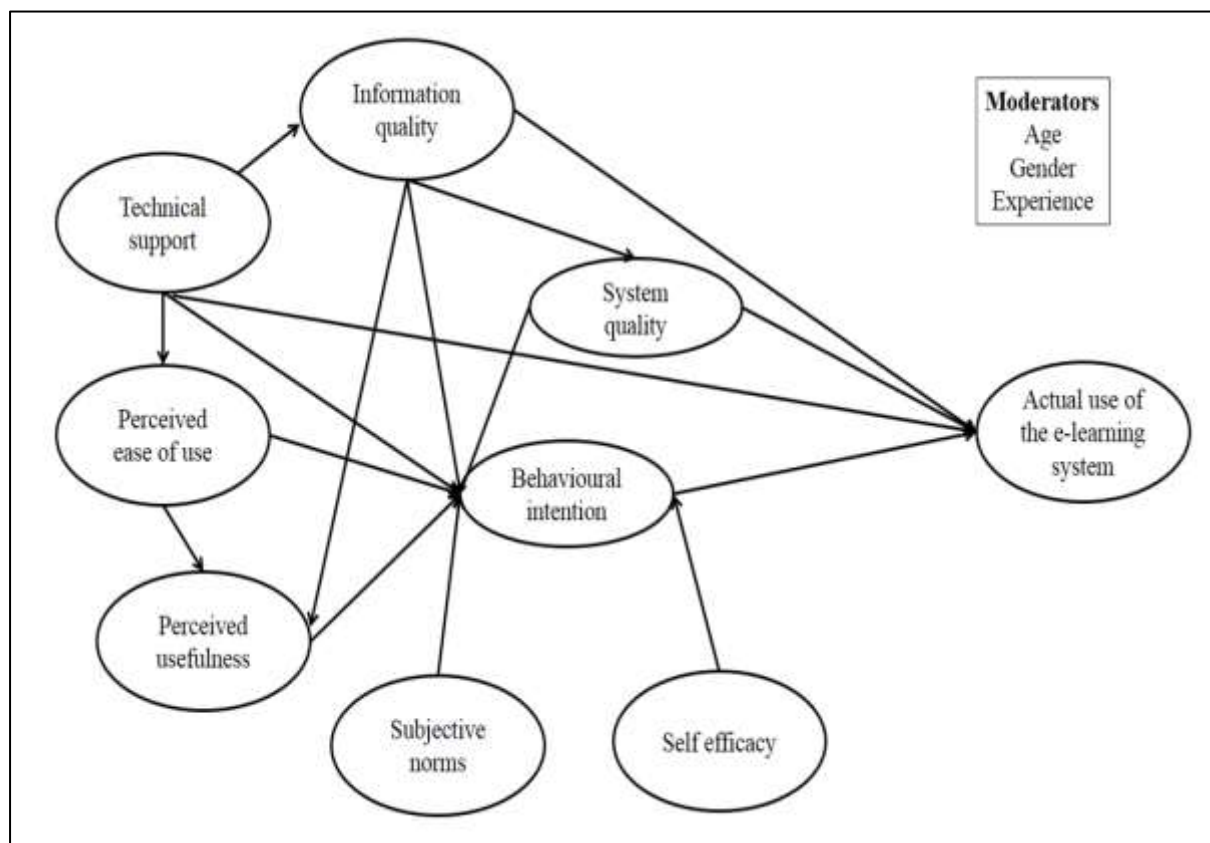


Figure 1: Proposed research model

The following sections illustrate the main constructs of the model developed in this study.

#### *Perceived usefulness (PU)*

PU has been defined as the degree to which a person believes that using a particular system would enhance his or her performance (Davis, 1989; Davis, Bagozzi & Warshaw, 1989; Venkatesh *et al.*, 2003). From a student's perspective, integrating e-learning into the learning process in higher education may be useful because it enables them to access various resources and lecture slides at any time, it saves them time, it is more flexible and it gives them greater control over their work, which enhances productivity in learning. Therefore, we propose the following hypothesis:

H1: PU will have a significant effect on students' BI to use the e-learning system in the Iraqi context.

#### *Perceived ease of use (PEOU)*

PEOU has been defined as the degree to which a person believes that using a particular system would be free of effort (Davis, 1989; Davis *et al.*, 1989; Venkatesh *et al.*, 2003). It has been found to have a significant effect on PU (Davis *et al.*, 1989; Moreno, Cavazotte & Alves, 2017). If an e-learning system is easy to use, students will realise more of its benefits. Thus, we propose the following hypothesis:

H2: PEOU will have a significant effect on students' PU and BI to use the e-learning system in the Iraqi context.

#### *Subjective norms (SNs)*

SNs are defined as "the person's beliefs that specific individuals or groups think he/she should or should not perform the behaviour and his/her motivation to comply with the specific referents" (Fishbein & Ajzen, 1980, p. 8). This construct has also been found to be significant in other studies (e.g. Venkatesh *et al.*, 2003). Students can be influenced to use e-learning systems by their instructors or their peers. Therefore, we propose the following hypothesis:

H3: SNs will have a significant effect on students' BI to use the e-learning system in the Iraqi context.

#### *Self-efficacy (SE)*

SE has been defined as "an individual's self-confidence in his or her ability to perform tasks across multiple computer applications domains" (Monsuwe, Dellaert & Ruyter, 2004, p. 105). Individuals with low e-learning SE cannot cope with the system if it is complex and they will not persist with their efforts. As a result, they are less likely to overcome any challenges they may face when using a system. Thus, we propose the following hypothesis:

H4: SE will have a significant effect on students' BI to use the e-learning system in the Iraqi context.

#### *Technical support (TS)*

The TS provided by a university to students using an e-learning system has a significant effect on whether the system is adopted. Making an efficient support and advice team available may increase students' BI to use the e-learning system. It may also increase their perceptions of how easy the system is to use and their AU of the system. In addition, the presence of effective TS can help to explain the quality of the information available on the e-learning platform. Thus, we propose the following hypothesis:

H5: TS will have a significant effect on students' IQ, PEOU, BI and AU to use the e-learning system in the Iraqi context.

#### *Information quality (IQ)*

IQ refers to the quality of the content and information provided on an e-learning system (Aparicio, Bacao & Oliveira, 2017). IQ is measured by considering five main dimensions: completeness, timelessness, accuracy, relevance, and steadiness of the system output (Aparicio *et al.*, 2017; Delone & Mclean, 2003). If students do not find the information on their

university's e-learning platform important, up to date, relevant to the modules they are studying and of a high quality, they are unlikely to use the e-learning system. Lwoga (2014) found that IQ is an important determinant of e-learning adoption. Delone and Mclean (2003) explained that IQ is proven when the e-learning platform provides students with useful content. Previous studies have explained that it has become increasingly important to evaluate the quality of e-learning systems by measuring the quality of the information and materials that can be accessed through the system (Alla & Faryadi, 2013). Although the factors IQ and SQ are distinct, the main dimensions of IQ (accuracy, relevance and accessibility) have a direct effect on the quality of the e-learning system (Alla & Faryadi, 2013). If students are to be able to use the e-learning system, the content should not distract them. The layout and structure of the e-learning system depends on the quality of the information and how acceptable, available and relevant the information is to students. Hence, we expect IQ to have a significant effect on SQ. In addition, the quality of the information provided on the e-learning system is a significant determinant of whether the students perceive the system to be useful (Alsabawy, Cater-Steel & Soar, 2016). Thus, we propose the following hypothesis:

H6: IQ will have a significant effect on students' SQ, PU, BI and AU to use the e-learning system in the Iraqi context.

#### System quality (*SQ*)

SQ is a significant predictor of e-learning system adoption (Lwoga, 2014). Furthermore, because the concept of using e-learning is still new to universities in Iraq, it is important to investigate SQ and its effect on BI among university students. According to Lwoga (2014), there are five main sub-factors of SQ: responsiveness, usability, availability, reliability and adaptability. SQ can be thought of as the facilitating conditions (Venkatesh *et al.*, 2003) that enable the e-learning system to be used effectively. We propose that SQ has a significant direct effect on BI and AU. This is because, even if students have a strong intention to use the e-learning system, a low-quality interface with a long response time can affect how it is used. Therefore, we propose the following hypothesis:

H7: SQ will have a significant effect on students' BI and AU to use the e-learning system in the Iraqi context.

#### Behavioural intention (*BI*)

BI is an indication that a person is ready to behave in a certain way (Ajzen, 1991). It has been found to be a significant predictor of the AU of a technology system (Venkatesh & Davis, 2000). Thus, we propose the following hypothesis:

H8: BI will have a significant effect on students' AU of the e-learning system in the Iraqi context.

In addition to the direct relationships hypothesised, we hypothesise that age, gender and experience will moderate the relationships between the independent factors and the dependent factors in our proposed model. A study on e-learning adoption conducted by Al-Gahtani (2016) highlighted the importance of accounting for differences between individuals, including age, gender and experience. Age differences have been shown to be influential in the context of technology adoption (Venkatesh & Morris, 2000). For example, Venkatesh *et al.* (2003) found that age moderates the effects of the following factors on BI: the usefulness of the system, how easy it is to use, social influence and the conditions that facilitate its use. Within the context of e-learning, an older student can have a lower level of SE (Tarhini, Hone & Liu, 2014). Gender

can also be a significant moderator in the adoption of an e-learning system, as female students are influenced by SNs while male students are not (Tarhini *et al.*, 2014). This may be the case for Iraqi female students because of the cultural restrictions on these women (Geert Hofstede, 2016). These increase Iraqi women's awareness of the opinions of others and society in general (Ameen, 2017). However, analysing the moderating effects of age, gender and experience on all relationships in the proposed model provides a more informed view of which relationships in the model are moderated by these three factors. Testing the moderating effects on selected relationships only may not provide accurate information on the effects of each moderator. Therefore, we propose that the moderators age, gender and experience will have significant moderating effects on the relationships in our proposed model in accordance with the following hypothesis:

H9: Age, gender and experience will moderate all relationships in the proposed model.

## Research methods

The quantitative approach has been widely used in previous studies of technology acceptance (e.g. Davis, 1989; Davis *et al.*, 1989; Tarhini, Hone & Liu, 2015). In this research, questionnaires were distributed to 300 students at Salahaddin University-Erbil. Convenience sampling was used. Salahaddin University was selected because it was the first and only institution in the Kurdistan region of Iraq to use the e-learning system in collaboration with UNESCO and the Iraqi Ministry of Higher Education. The use of convenience sampling was justified because it allowed us to collect data from students based on whether they were available or not. The data were collected from undergraduate and postgraduate students in different departments. All the students had undertaken the e-learning system training programme provided by the university. Collecting data from these students allowed us to understand how the e-learning system could be used effectively and find new ways to improve it. In addition, it allowed us to measure the AU of the system. The questionnaire was distributed in Arabic and in English. It was written in both English and Arabic because some of the students at the university could read and write in English but not in Arabic, while others could only read and write in Arabic. Moreover, the use of both languages was advised by several academics at the university.

The questionnaire included an open-ended question to gather students' views on the challenges associated with using e-learning systems in higher education in Iraq. In addition, the questionnaire included the constructs of the proposed model and their measurement items. These items and their sources are provided in Online Supplementary File 1. The items were measured using a 7-point Likert scale, ranging from 1 (*strongly disagree*) to 7 (*strongly agree*).

The analysis of the data was conducted using partial least squares-structural equation modelling (PLS-SEM) with SmartPLS V3.0 software. PLS-SEM makes it possible to analyse data with small sample sizes (Hair, Hult, Ringle & Sarstedt, 2014). We analysed the quantitative data in two stages: first, testing the measurement model; second, testing the structural model.

To analyse the differences in how the model fitted among different groups, a partial least squares – multi-group analysis (PLS-MGA) was conducted to test the effects of the moderators. The PLS-MGA is a non-parametric approach that was developed by Henseler, Ringle & Sinkovics, (2009). It was adopted in this research by using the partial least squares (PLS) path analysis for each sub-sample (group). *P* values of 0.05 or lower or 0.95 or higher indicate that there are significant differences between the paths in the groups (Henseler *et al.*, 2009).

## Results



### *Descriptive statistics*

The participants were students from the Science, Business and Computer Engineering faculties in Salahaddin University-Erbil. In total, 181 questionnaires were completed. Of those who responded, 43% were male and 57% were female. The respondents were between the ages of 18 and 37. The respondents indicated that they had been using the system for between one and six months. Most of them were undergraduates (89.5%) and the rest were postgraduates (10.5%). In answer to the questions on training, 68% of the respondents stated that there is a need for more experienced trainers and higher-quality training. Furthermore, 12% said that some of the training needs to be provided during lectures. As recommended by 20% of the respondents, during the training sessions it is important to explain the benefits of using the system. Only 43.1% of the respondents thought that they were using the e-learning system effectively. When asked whether they thought that using e-learning systems was important, 79.6% of the respondents agreed.

The lack of access to electricity was identified as a major challenge facing e-learning adoption in Iraq by 96% of the participants, followed by a slow Internet connection (94%), a lack of access to the Internet (91%), a lack of facilities provided by the university (90%), the high cost of using the Internet (90%), and a culture that does not promote the use of technology for learning (86%).

### *Analysis of the measurement model – examination of reliability and validity*

The first stage of the PLS-SEM analysis was to assess the measurement model by testing the validity, reliability and loadings of its items and constructs. According to Hair *et al.* (2014), Cronbach's alpha (CR) should be greater than or equal to 0.70. CR was greater than 0.70 in all cases, suggesting good reliability. The convergent validity was assessed using the average variance extracted (AVE), which should be greater than or equal to 0.5 (Hair *et al.*, 2014). The AVE values of all the constructs were greater than 0.5; therefore, they have convergent validity. The discriminant validity was assessed by examining the cross-loadings of each construct. The Fornell-Larcker criterion was used to examine the discriminant validity. The minimum value for factor loadings should be 0.70 (Hair *et al.*, 2014). Hence, some items were removed due to their low loadings; these were SE6, SQ4, SQ6 and IQ1.

### *Analysis of the structural model and hypotheses testing*

We tested the hypotheses represented in the model (see figure 2) by examining the magnitude and significance of the path loads between the latent variables. The values generated by the bootstrapping method indicate that the loads corresponding to hypotheses (H1, H2, H4 and H8) are statistically significant and positive ( $p < 0.001$  to  $0.05$ ). This suggests that the collected data provide empirical support for those propositions. H5, H6 and H7 are partially supported as the relationships between IQ and AU, TS and BI and SQ and AU are insignificant. The load related to hypothesis H3 is not statistically significant so it is rejected. The model was able to explain 53% of the variance in BI and 45% in the AU of the e-learning system. Figure 2 synthesises these findings.

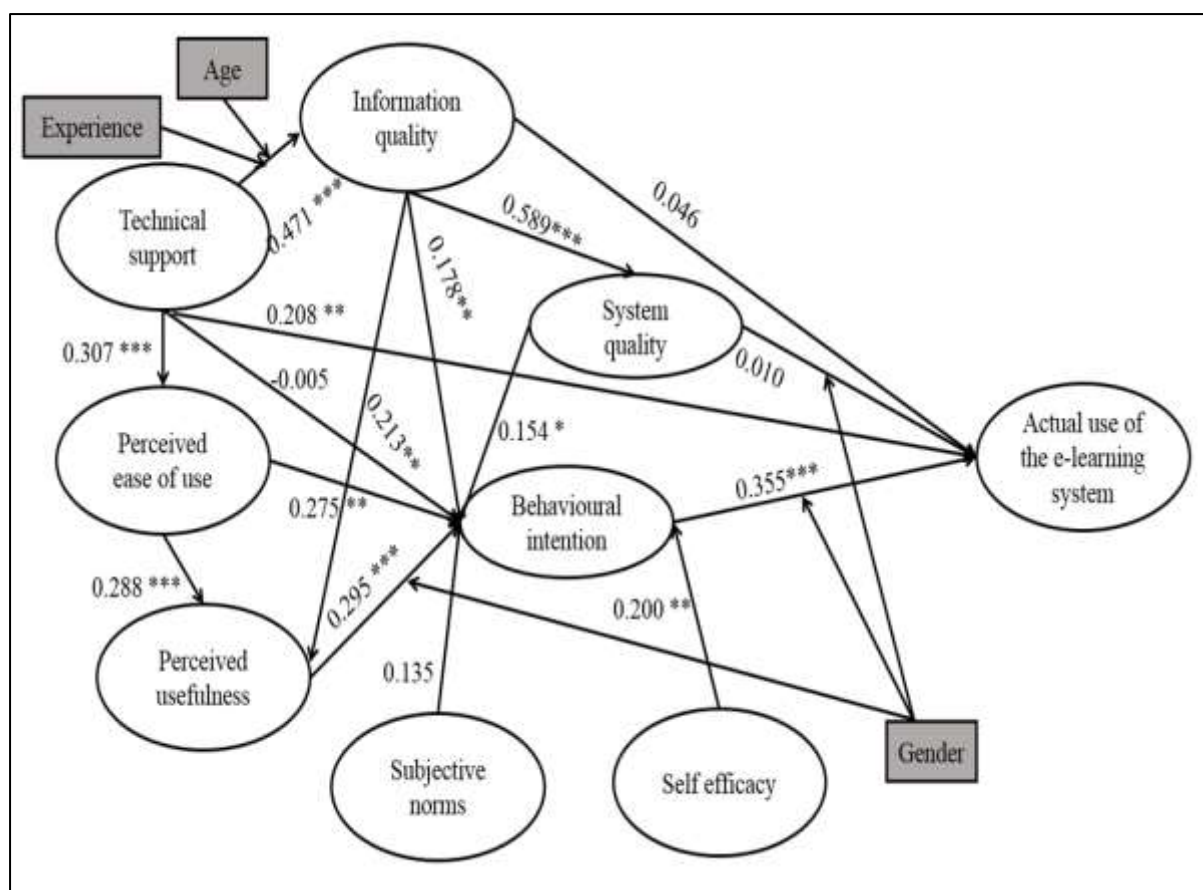


Figure 2: Results of the structural model

### Multi-group analysis

The results of the multi-group analysis showed that age moderated only one relationship in the model (TS and IQ:  $p$  value = 0.010). The effect of TS on IQ was more significant among the older students. Gender moderated three relationships in the model: BI and AU ( $p$  value = 0.041), PU and BI ( $p$  value = 0.997) and SQ and AU ( $p$  value = 0.979). Experience moderated only one relationship in the model (TS and IQ:  $p$  value = 0.035). Therefore, H9 was only partially supported, as the moderating factors moderated some of the relationships in the model (See Tables 1, 2 and 3 in Online Supplementary File 2).

## Discussion and conclusion

In this research, we have analysed the factors that can explain the adoption and use of e-learning systems in Iraqi higher education. To the best of our knowledge, this is the first study to have considered the factors that can explain e-learning adoption in Iraq from the students' perspective; therefore, it addresses the lack of studies in this area. This is particularly significant because e-learning has been found to be important in improving the educational experience of students (Mirza & Al-Abdulkareem, 2011), yet recent reports have found that only 42% of Iraqi students are satisfied with their experience (UNDP, 2016). The results of this study have several implications for universities and policy makers.

Less than half of the participants thought that they were using the e-learning system effectively, so the system must be improved further to increase effective use. Importantly, the descriptive statistics showed that most of the participants thought that the speed of their internet connection

was not adequate for using the e-learning system. This is a major issue that needs further investigation, because fast internet connectivity is crucial for students to access and use the e-learning system. Several other major challenges relating to the use of e-learning in Iraq were identified by the students. These included the lack of access to electricity; slow Internet connection; lack of access to the Internet; lack of facilities provided by the university; the high cost of using the Internet and a culture that does not promote the use of technology for learning. Hence, to address these challenges there is a need for collaboration between the Iraqi Ministry of Higher Education, staff members (including lecturers and instructors), policy makers and service providers.

Similar to the results of previous studies (Davis *et al.*, 1992; Venkatesh & Davis, 2000), our results support the importance of PU for the acceptance of e-learning technology. PU is followed by PEOU. This result is consistent with the findings of Davis *et al.* (1989), who stated that PEOU is especially important in the early stages of a system's use. The results of this research showed that IQ, SQ, PEOU, PU and SE had a significant effect on BI, while BI and TS had a significant effect on USE. PEOU had a significant effect on PU, confirming the findings of Davis *et al.* (1989). In addition, some interesting findings emerged from the analysis with regard to the relationships between IQ, SQ and TS. TS had a significant effect on IQ and USE, which indicated that it is important to have a strong technical support team in order to signpost students to the relevant information, make the system easier to use and increase students' use of the system. The quality of the information provided in the e-learning system has a strong influence on how students view the quality of the system as a whole and the benefits of using it.

This study found that SE had a significant effect on students' BI to use the e-learning system and that TS had a significant direct effect on their AU of the system. Therefore, it is vital to build students' confidence in using the system by giving them training of an outstanding quality and providing a technical support team that includes experts in using the system. It was also found that IQ had a significant direct effect on BI. Therefore, e-learning centre managers should ensure that the system provides high-quality materials that are relevant to the students' modules and easy to access through the system. Future training for students should provide guidance on how they can obtain high-quality information through online journals, articles and books.

The moderating factors of age, gender and experience did not significantly moderate most of the relationships in the model. Age only moderated the relationship between TS and IQ. Although the younger students did not think that TS affected how they evaluated the quality of the information provided on the e-learning system, the older students showed that this was the most important factor affecting their adoption and use of the system. This may be because older individuals do not use technology as extensively as younger individuals do (Ameen, 2017). Thus, they need more guidance to locate the relevant information on the platform. Hence, service providers and curriculum designers should ensure that a strong technical support team is available to assist older students with finding the relevant information. Furthermore, although the results showed that overall SNs had an insignificant effect on Iraqi students' BI to use the e-learning system, this effect was significant among the older students. Therefore, it is vital to emphasise the significant role of instructors in convincing older students to adopt an e-learning system.

PU and SQ were significant factors for the adoption and use of e-learning systems among the female students only. There is a large gender gap in technology adoption in Iraq (Ameen & Willis, 2018). Since females in Iraq have a lower level of access to technology and have a lower

experience level in using technology than males (Ameen & Willis, 2018), they value the usefulness of the e-learning system more than males and they are more sensitive to the quality of the e-learning system than males do. The findings showed that the male students were more prepared to use an e-learning platform than the female students as their behavioural intention to use the e-learning system is higher than the female students' behavioural intention. This can be related to the large gender gap in the use of technology in Iraq (Ameen, 2017). Hence, lecturers and service providers should target female students to enhance their use of e-learning systems; for example, by providing training sessions that are tailored for female students.

In terms of the moderating effect of experience, students with a higher level of experience thought that the presence of a technical support team could improve how they perceived the quality of the information provided on the platform. However, there was not much difference between students with low or high levels of experience in terms of how long they had been using the system for, and the relationship was significant in both groups.

Instead of training instructors and then relying heavily on them to teach the students, the students should be trained directly. To improve training for students, universities should provide sessions run by experts in using the e-learning system, who can fully explain the various features and what they can help students to achieve. As the usefulness of the e-learning system is significant, trainers need to emphasise the importance and benefits of using the system. Furthermore, to enhance the usefulness of the system, up-to-date, high-quality information that can be translated into Arabic should be provided. It is important to assess the quality of the information provided through the e-learning system and how it complements students' face-to-face learning, in addition to providing the required level of TS to the students. Thus, policy makers in Iraq should carefully develop strategies for improving the content that students can access through the system.

This study has some limitations. Convenience sampling was used to collect data from the students. Therefore, the data may not be representative of the entire population. In addition, this research was conducted when students were in the early stages of adopting the system. To investigate whether the significance of the factors changes over time, future studies could collect data in the later stages of adoption, using a larger sample size, and compare the results with the findings of this research.

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## **Statements on open data, ethics and conflict of interest**

- a. The data collected in this research can be accessed freely.
- b. A full ethical approval procedure claim took place and ethical approval was obtained from the Anglia Ruskin University Ethics Committee. The authors of this research strictly followed all ethical guidelines provided by Anglia Ruskin University.
- c. We confirm that there is no conflict of interest in the work produced here.

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