

Measuring instructors continued intention to reuse Google Classroom in Iraq: a mixed-method study during COVID-19

Mahmood H. Hussein and Siew Hock Ow

Department of Software Engineering, Faculty of Computer Science and Information Technology, University of Malaya, Kuala Lumpur, Malaysia

Ishaq Ibrahim

Department of da'wah and Islamic Management, Faculty of Leadership and Management, Universiti Sains Islam Malaysia, Nilai, Malaysia, and

Moamin A. Mahmoud

Institute of Informatics and Computing in Energy, Universiti Tenaga Nasional, Selangor, Malaysia

Abstract

Purpose – The use of learning management systems (LMSs) such as Google Classroom has increased significantly in higher education institutes during the COVID-19 pandemic. However, only a few studies have investigated instructors' continued intention to reuse LMS. The purpose of this study is to investigate the factors that influence instructors' intention to reuse an LMS in higher education institutes.

Design/methodology/approach – This study adopted a mixed-method research design. In the quantitative section, an integrated model of technology acceptance model and information system success model is proposed to explore the effects of system quality, service quality, information quality, perceived ease of use and perceived usefulness on instructors' satisfaction and how their satisfaction will influence their intention to reuse Google Classroom in the future. In the qualitative section, to gain more understanding, instructors were asked to identify the challenges that inhibit the adoption of e-Learning technologies in public universities in Iraq and what are their recommendations to rectify them.

Findings – The findings revealed that service quality had no positive influences on the satisfaction of instructors, while other factors had varying levels of influence, the findings further showed that inadequate internet service and students lack of interest are the biggest challenges instructors faced during their experience with Google Classroom.

Research limitations/implications – To improve the generalizability of the results, future studies are recommended to include larger samples, in addition, further studies are also advised to take individual traits such as age and gender into consideration.

Originality/value – The outcomes of this study are expected to benefit researchers, policymakers and LMS developers who are interested in factors that affect instructors' intention to reuse LMS in higher education institutes in developing countries.

Keywords Distance learning, Higher education, E-Learning, Information systems, Google classroom, Learning management system, Technology acceptance

Paper type Research paper



Introduction

On 1 April 2020, the British Broadcasting Corporation (BBC) reported that the United Nations Secretary-General António Guterres said that the novel Coronavirus or COVID-19 pandemic is the most challenging crisis since World War II (WWII) (BBC, 2020). Additionally, on 10 May 2020, the World Health Organization (WHO) stated that the pandemic has affected the lives of billions of people in 215 countries, areas and territories (WHO, 2020). To prevent this pandemic, governments and health officials around the world have issued stay-at-home instructions to millions, while social distancing – the act of putting physical space of not less than 2 m between people – has also been a key measure in curbing the spread of COVID-19, entering the public consciousness. All of this is to say that this pandemic – especially because of its infectivity and the little we know of it – has enforced changes to billions of lives. Education is one of the sections that experienced major challenges, to cope these challenges the United Nations Educational, Scientific and Cultural Organization (UNESCO) provided a detailed list of digital platforms, applications and tools to help both parents and educators facilitate safe learning and teaching (UNESCO, 2020).

This paper is focused on the measures taken by Iraqi authorities in the face of the COVID-19 pandemic, specifically with regard to the teaching and learning at institutions of higher learning. Iraq's Ministry of Higher Education and Scientific Research (MOHESR) called on universities to adopt e-Learning technologies, as a way for institutions to communicate with students and allow them to continue their education (MOHESR, 2020). However, this transition to e-Learning poses some challenges to numerous Iraqi educators and students due to a number of difficulties. Firstly, Iraq suffered from long wars and many political upheavals (Ameen, 2017), which hindered its attempts to modernize its technological capabilities, thereby reducing the country's ability to transition to e-learning. In fact, Iraq was the last country in the Middle East to embrace e-Learning technology (Matar *et al.*, 2011). This has resulted in Iraqi universities not being equipped with state-of-the-art information and communications technology (ICT) (Al-Azawei *et al.*, 2017; Elameer and Idrus, 2011). In fact, a number of educators and students have also cited the lack of advanced ICT facilities as one of the main reasons that impede the integration of e-learning in universities (Al-Azawei *et al.*, 2016). Another factor that plays a major part in the ubiquitous utilization of e-Learning technologies is connectivity, internet penetration in Iraq increased to 48.3% in 2017 from 1% in 2009. Although this surge is notable, it remains below the penetration rate of most Middle Eastern countries (Al-Azawei *et al.*, 2016; Internet World Stats, 2015; Internet World Stats, 2017). Finally, the power grid in Iraq is dysfunctional, hence, unreliable access to electricity will inhibit both universities and students in effectively making the transition to e-Learning technology (Al-Najjar and Jawad, 2016).

Research questions

In these challenging times, a significant number of higher education instructors, some of whom with no prior experience in e-Learning have begun to use distance learning applications such as Google Classroom as a platform through which they perform their teaching activities and communicate with their students (De Vynck and Bergen, 2020). To investigate instructors' continued intention to reuse Google Classroom and understand the challenges they faced is essential for the development of this domain of research. Therefore, the current study was guided by the following research questions:

- RQ1.* Which variables have a statistically significant influence on instructors' continued intention to reuse Google Classroom during the COVID-19 pandemic?

In addition, owing to the poor state of ICT infrastructure in Iraq, particularly, in public universities. This study asked instructors the following question:

- RQ2. What are the challenges and barriers that instructors faced during the COVID-19 pandemic that could inhibit the integration of e-Learning technologies in Iraq's public universities?

Literature review

Distance learning

Distance learning has been recognized as the most appropriate and safe form of teaching and learning during the COVID-19 pandemic. Distance learning represents a transition from the traditional method of teaching in physical space such as lecture halls and classrooms, to the online realm, where the instructor and students are separated geographically (Conrad, 2004; Moore, 1993).

Although distance learning has changed dramatically in recent decades (MacDonald and Ahern, 2015; Sanchez-Gordon and Luján-Mora, 2018), there are many factors that affect instructors' decision to switch from the traditional method to online or distance learning. For example, technological literacy could be perceived as an issue for numerous newcomers to distance learning. In fact, Wingo *et al.* (2017) reported that the instructor's belief about her or his competencies to use online course management applications is the single most important factor that affects instructors' decision to adopt online teaching. In addition, instructors have stated that their workload is very high and, as online learning requires more effort and preparation than the traditional method, it is understandable that many instructors will need more time and training before adopting distance learning (Berge *et al.*, 2002; Luongo, 2018; Mandernach *et al.*, 2007).

Despite the abovementioned barriers, there has been an upsurge of interest in distance learning. Amid the COVID-19 pandemic, Google classroom emerged as one of the most widely used applications in the area of distance learning (De Vynck and Bergen, 2020). Google Classroom is a learning management system (LMS) for instructors to create a digital classroom for students to communicate with their instructors and fellow classmates (Iftakhar, 2016; Phan, 2015). Part of Google classroom's popularity can be explained by the fact that it is free to use the software, which makes it an appropriate learning tool for developing countries, where financial resources are limited (Azhar and Iqbal, 2018; DiCicco, 2016).

While many studies were carried out in developed countries to examine instructors' continued intention to reuse educational LMSs at institutions of higher learning, very limited research has been carried out in developing countries to investigate the same issue (Mouakket and Bettayeb, 2015).

Technology acceptance model

In 1989, Fred Davis proposed the technology acceptance model (TAM) (Davis, 1989); this model has its roots in the theory of reasoned actions (TRA) developed by Fishbein and Ajzen (1977). According to TAM, the perceived ease of use for end-users along with their perceptions of the usefulness of the technology are the two essential factors that drive acceptance of new technology (Davis, 1989; Lam *et al.*, 2011; Pai and Huang, 2011).

This evaluation tool has been implemented to assess users' acceptance of different technological applications (Almarashdeh, 2016; Chow *et al.*, 2012; Teo and Zhou, 2014; Wu, 2011), TAM functions across gender (Teo, 2010), languages (Teo and Milutinovic, 2015) and

cultures (Teo *et al.*, 2012). Although TAM provides valuable insights into users' acceptance of technology, a number of scholars noted that TAM has a few limitations. For example, Gillenson and Sherrell (2002) and Park (2010) argued that the utilization of TAM could lead to inconclusive results due to the lack of explanatory variables. Furthermore, Holden and Rada (2011) articulated that the lack of consideration for system characteristics is a critical weakness in TAM, which could provide useful information that explains why users accept and adopt a particular technological tool. In a bid to overcome these limitations, the present study will use the Information System Success Model (ISSM), which has been previously used in the domain of education (Almarashdeh, 2016; Mohammadi, 2015; Wang and Wang, 2009).

Information system success model

The ISSM developed by Delone and Mclean (1992, 2003) was a product of an extensive review of literature on numerous variables related to information systems success (Molla and Licker, 2001; Roh *et al.*, 2005). The ISSM has been identified as one of the most well-known techniques to examine the effectiveness or failure of a given information system (Halawi *et al.*, 2008; Wang and Wang, 2009).

In the ISSM, the success of a given information system can be tested by using up to eight interdependent variables: system quality, information quality, service quality, system use, intention to use, user satisfaction, individual impact and organizational impact, which suggests that Delone and Mclean's (1992, 2003) model view information system as a multidimensional and interconnected concept.

The ISSM model has been used widely to explore and investigate users' intention to reuse a particular information system in several domains of research (e.g. e-Commerce (Wang, 2008), social network services (Lee and Kim, 2017) and knowledge management systems (Wang and Lai, 2014)). Additionally, the ISSM was also used to elucidate instructors' intentions to reuse LMSs in the context of e-Learning (Sharma *et al.*, 2017). While there is compelling evidence demonstrating the effectiveness of ISSM in predicting and explaining users' intentions to reuse various information systems, there have been very limited empirical investigations into instructors' continued intention to reuse Google Classroom from an information system perspective, especially in developing countries.

Information communication technology in Iraq

Allameh and Zare (2011) stated that improving organization effectiveness requires investment in ICT infrastructure, such infrastructure functions as the base for computer technology, communication and the delivery of reliable services (Jabbouri *et al.*, 2016; Melville, 2010; Mitchell *et al.*, 2012).

Iraq has also recognized the potential of ICT in driving the advancement of many sectors and contributing to the building of modern society (Al-Khafaji *et al.*, 2012; Al-Khafaji *et al.*, 2014). Post-2003, there was an attempt to develop Iraq's ICT by the public and private sectors, however, due to deteriorating security and political corruption, these attempts were significantly reduced (Alyasiri and Abdulbaqi, 2012). Therefore, Heshmati *et al.* (2013) stated that ICT infrastructure in Iraq is underdeveloped across many sectors, especially, in the sector of education (Alalgawi *et al.*, 2014).

To support Iraq's efforts to modernize its infrastructure, particularly at the higher education level. UNESCO established and funded the Avicenna, which is an online virtual learning environment (UNESCO.org, 2017). However, a number of scholars stated that this project is still in its early stages of development (Al-Azawei *et al.*, 2017). In fact, a number of studies looked at the state of e-Learning technologies in Iraq's public universities and

identified inadequate ICT infrastructure, limited technical support, ICT literacy and a culture that does not encourage the utilization of technology in learning (Al-Azawei *et al.*, 2016; Ameen *et al.*, 2019).

During the COVID-19 pandemic, similar issues persisted as instructors from four middle-eastern countries (e.g. Iraq, Palestine, Algeria and Egypt) stated that limited ICT skills to communicate remotely, slow internet connection and inadequate training to use technology properly as key reasons for limiting the potential of distance learning (Lassoued *et al.*, 2020).

Prior studies on continued intention

Both instructors and students use LMS. However, Islam and Azad (2015) argued that instructors' utilization of LMS is deeper and more thorough. Therefore, providing evidence pertaining to instructors' continued intention to use LMS is essential due to the huge investments involved in the process (Sharma *et al.*, 2017). Particularly, in the wake of the COVID-19 pandemic where access to government spending will be heightened further due to the devastating economic impact of this public health crisis.

Sørebo *et al.* (2009) suggested a model based on the information system continuance model and self-determination theory understand the factors that affect instructors' decisions to reuse LMS in higher education, responses from 124 Norwegian instructors revealed that perceived usefulness and perceived playfulness positively influenced instructors' continued intention to reuse LMS. In another study, Al-Busaidi and Al-Shihi (2012) aimed to investigate the effects of instructors' characteristics, LMS's characteristics and organizational characteristics on instructors' satisfaction of LMS and how this satisfaction will affect their continued intention to reusing LMS for distance learning or in a blended learning environment. Al-Busaidi and Al-Shihi (2012) found after surveying 82 instructors from Oman that instructors' satisfaction plays a key role in their determination to reuse LMS in blended learning settings or purely for distance learning.

In Finland, Islam (2015) used the extended information system continuance model with ease of use to highlight the key determinants that relate to instructors' continued intention to reuse LMS. In his intervention, Islam (2015) noted that satisfaction along with perceived usefulness played a significant role in instructors' continued intention to reuse LMS. Sharma *et al.* (2017) proposed a framework that incorporated the instructor's personal characteristics into the ISSM to describe instructors' continued reuse of LMS in higher education contexts. A total of 219 instructors from a university in Oman assessed this framework, their responses demonstrated that system quality, personal innovativeness, service quality and technology experience had a significant role in instructors' continued intention to reuse LMS. In a recent study, San-Martin *et al.* (2020) used the extended ISSM in an attempt to get an insight into the determinants that motivate instructors' continued intention to reusing LMS. The outcome of their intervention, which is derived from a sample of 90 Spanish instructors, showed that system quality had a significant impact on instructors' continued intention to reuse LMS.

It is evident from previous research studies that different models were implemented to investigate instructors continued intention to reuse various types of LMSs. However, there is a notable paucity of empirical research aimed at assessing instructors' continued intention to reuse LMS via the lens of a hybrid model that integrates the ISSM with TAM. Therefore, it is necessary to provide additional evidence to understand the factors that shape instructors continued intention to reuse LMS in higher education, especially, in developing countries. Moreover, research studies in this domain are predominantly quantitative, hence, in an attempt to provide an in-depth understanding of instructors' experience with Google Classroom, the present study conducted semi-structured interviews that aimed to highlight

the challenges and potential barriers to the adoption of e-Learning technologies in Iraq's public universities and share their recommendations for resolving these issues.

Research model and hypotheses

System quality

This measure of ISSM is mainly concerned with the impact of LMS characteristics such as its reliability, stability and efficiency on instructors' abilities to perform their teaching tasks and promote students' learning (Almarashdeh, 2016; Freeze *et al.*, 2019; Mohammadi, 2015). System quality has been found to have a significant positive effect on instructors' satisfaction in the context of LMSs (Al-Busaidi and Al-Shihi, 2012; Almarashdeh, 2016). Therefore, the hypothesis is proposed as follows:

- H1.* System quality has a positive influence on instructors' satisfaction in using Google Classroom.

Service quality

This measure is primarily concerned with the quality of support instructors receive from the LMS that aims to facilitate their utilization (Mohammadi, 2015; Wang and Wang, 2009). Service quality was reported to have a significant positive effect on instructors' satisfaction in LMSs (Al-Busaidi and Al-Shihi, 2012; Almarashdeh, 2016). Thus, the second hypothesis of this study is stated as follows:

- H2.* Service quality has a positive influence on instructors' satisfaction in using Google Classroom.

Information quality

Information quality is characterized as the degree to which instructors' teaching practices are improved after using the information they acquired from the LMS (Delone and Mclean, 1992; Wang and Wang, 2009). The effect of information quality on instructors' satisfaction in LMSs is identified in some earlier studies (Al-Busaidi and Al-Shihi, 2012; Almarashdeh, 2016). As a result, it is hypothesized as follows:

- H3.* Information quality has a positive influence on instructors' satisfaction in using Google Classroom.

Perceived ease of use

This variable is a TAM measure characterized by the instructors' assumptions that using a particular LMS would be seamless, and free of effort and cognitive load (Almarashdeh, 2016; Davis, 1989). Research has revealed that perceived ease of use has a positive relationship with instructors' satisfaction (Almarashdeh, 2016; Islam and Azad, 2015). Therefore, we proposed the following hypothesis:

- H4.* Perceived ease of use has a positive influence on instructors' satisfaction in using Google Classroom.

Perceived usefulness

Perceived usefulness is another TAM measure that addresses the extent to which instructors believe that using a certain LMS will help them improve their job performance and teaching (Almarashdeh, 2016; Davis, 1989). Perceived usefulness has a significantly positive impact on the instructors' satisfaction (Islam and Azad, 2015; Islam, 2015; Islam, 2011; Larsen *et al.*, 2009; Mouakket and Bettayeb, 2015). Therefore, the hypothesis is proposed as follows:

- H5. Perceived usefulness has a positive influence on instructors' satisfaction in using Google Classroom.

Satisfaction

Satisfaction is a fundamental measure of information system success and has been regarded as a surrogate measure of system effectiveness (Delone and Mclean, 2003; Petter *et al.*, 2008; Xiao and Dasgupta, 2002; Zviran and Erlich, 2003). Satisfaction is recognized as the extent to which instructors believe that the LMS is meeting their expectations and informational requirements (Almarashdeh, 2016). In the domain of information systems, a number of scholars have found a significant positive effect between satisfaction and intention to reuse LMSs (Al-Busaidi and Al-Shihi, 2012; Islam and Azad, 2015; Islam, 2015; Mouakket and Bettayeb, 2015; Sørøbo *et al.*, 2009). Consequently, it is hypothesized as follows:

- H6. Satisfaction has a positive influence on instructors' intention to reuse Google Classroom.

Intention to reuse

This variable refers to the instructors' continued intention to reuse the LMS in the future for their teaching practices (Bhattacharjee, 2001; Chang, 2013; Islam and Azad, 2015). Generally, the continued intention in information systems is significantly determined by users' satisfaction (Bhattacharjee, 2001). Similarly, research in the domain of LMS has shown that instructors' continued intention to using LMS is also affected by satisfaction (Al-Busaidi and Al-Shihi, 2012; Islam and Azad, 2015; Islam, 2015; Mouakket and Bettayeb, 2015; Sørøbo *et al.*, 2009). Figure 1 shows the framework of the present study.

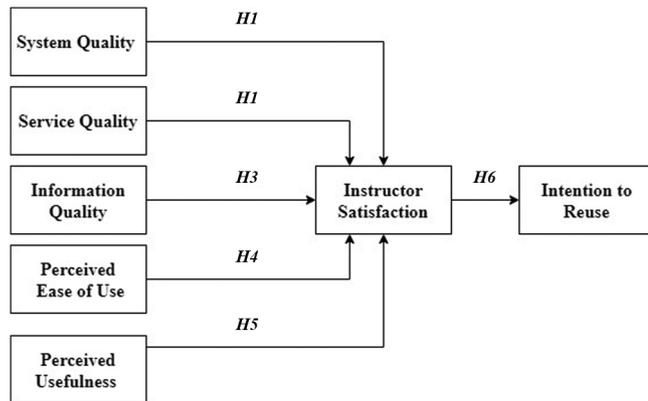


Figure 1.
The proposed model

Research method

The present study uses a mixed-method research methodology, focusing on collecting, mixing and analysing quantitative and qualitative data in a single study (Creswell and Plano Clark, 2006). Moreover, by using both research methods, this research will be able to approach the same topic from multiple angles, resulting in a deeper comprehension of the research problem and questions (Creswell and Plano Clark, 2017; Karadag, 2015). To examine which factors drove instructors' continued intention, quantitative survey data was collected, the confirmatory factor analysis (CFA) method was used to check the model fit and path analysis was implemented to investigate the structural relations among the variables of the proposed method. Concerning the challenges that instructors faced, qualitative data was collected from instructors regarding the specific potential barriers in Iraq that serve as challenges to technology adoption.

Research instruments

The research tool used in this study included a questionnaire for the quantitative section and open-ended questions for the qualitative part. Babakus and Mangold (1992) recommended using a five-point Likert rating scale ranging from 1 (strongly disagree) to 5 (strongly agree) to increase response rate and feedback quality. Therefore, the quantitative section which comprises 29 items used this scaling method to grade instructors' responses, including 6 items for perceived usefulness, 5 items for system quality and perceived ease of use, 4 items for service quality and 3 items for information quality, instructors' satisfaction and intention to reuse. The qualitative section was modified from a measure developed by Tarus *et al.* (2015). It constitutes two open-ended questions; 1. What challenges and potential barriers do public universities in Iraq face that hinder the successful implementation of e-Learning? 2. What are your recommendations for addressing these challenges?

To ensure the validity of the research instruments, the survey items for the quantitative and qualitative sections were translated into Arabic. After the translation, two experienced translators reviewed the original items, to ensure that the meaning of both versions was the same and the intention of each item was kept intact.

Data collection

To adhere to social distancing rules, the present study implemented an online questionnaire to survey full-time instructors from one of the most reputable public universities in northern Iraq. Instructors were either emailed or approached via an instant messaging mobile application. The questionnaire was open for 15 days, before responding to the questionnaire, instructors were made aware that their participation is voluntary and that their data will remain confidential for the use of this paper only.

Participants

Table 1 details the demographic description of the research sample, where 53% of the responses were obtained from female instructors and 47% of the respondents were male instructors. The majority of the research sample were between 36 and 45 years old, at 50.9%. Additionally, the research population had considerable experience in traditional teaching, as 52.2% of the instructors had between 11 and 20 years of teaching experience. Participants' knowledge in using technology for teaching was very limited, as 80% of instructors had between zero and one year of experience in using technology in the domain of education.

ITSE
18,3

388

Table 1.
Demographics of
participants

Gender	Frequency	(%)
Female	64	53.00
Male	56	47.00
<i>Total</i>	120	100.0
Age		
30 or below	3	2.6
31–35 years old	10	8.3
36–40 years old	30	25.1
41–45 years old	31	25.8
46–50 years old	23	19.1
51–55 years old	11	9.1
56 or above	12	10
<i>Total</i>	120	100.0
Years of experience (traditional learning)		
Below 5 years	14	11.7
6–10 years	17	14.2
1–15 years	36	30.0
16–20 years	27	22.5
Over 20 years	26	21.6
<i>Total</i>	120	100.0
Years of experience (e-Learning)		
0	42	35.0
1 year	54	45.0
2 years	10	8.4
3 years	6	5.0
4 years	1	0.8
5 years	1	0.8
6 years or above	6	5.0
<i>Total</i>	120	100.0

Descriptive statistics

Table 2 demonstrates the descriptive statistics for each variable in the proposed model. Table 2 shows that perceived ease of use recorded the mean score of 3.94 out of 5, which suggests that the instructors believe that using Google Classroom was an effortless task. On the other hand, service quality recorded the lowest mean score of 3.17 out of 5, which points out that instructors did not view the services offered by Google Classroom favourably. In addition, in the present study, all the standard deviation values were below 1.00, which indicates that variations among instructors' opinions were very narrow. Further, the

Table 2.
Descriptive statistics

Variable	Mean	Standard deviation	Skewness	Kurtosis
System quality	3.66	0.58	−0.921	1.751
Service quality	3.17	0.61	−0.537	0.630
Information quality	3.36	0.74	−1.00	1.216
Perceived ease of use	3.94	0.68	−0.237	0.474
Perceived usefulness	3.23	0.84	−0.573	−0.123
Satisfaction	3.37	0.79	−0.856	0.950
Intention to reuse	3.44	0.94	−0.811	0.097

skewness and kurtosis values suggest that the data is normally distributed and within the recommended values of ± 2 (Liu *et al.*, 2019).

Data analysis and findings

Quantitative findings

Data analysis. In accordance with the two-stage data analysis process proposed by Anderson and Gerbing (1988). This study, in the first stage, used the statistical package for the social sciences (SPSS, V25) to analyse the participants' demographic data and establish the reliability of the model by examining the Cronbach's alpha value. In the second stage, analysis of a moment structures (AMOS, V26) was used to conduct structural equation modelling (SEM) to evaluate the measurement of the proposed model and examine the structural model.

Evaluation of the measurement model

The CFA was implemented to test if the survey items in a given construct are loaded as expected on their latent constructs (Mouakket and Bettayeb, 2015; Teo and Zhou, 2014). Hair *et al.* (1998) suggest that constructs in questionnaires should include more than two items and the factor loading value of each item should be more than 0.40. The results displayed in Table 3 show that the factor loading values of the proposed research instrument range between 0.604 and 0.868, which is in line with the recommended values.

Cronbach's alpha was tested to measure the internal consistency of the research instrument. Hair *et al.* (2005) and Nunnally (1994) indicated that for internal consistency values to be sufficient, a value of 0.70 or higher is preferred. Table 3 exhibits that the Cronbach's values range between 0.760 and 0.953. Hence, exceeding the recommended values.

Concerning the goodness-of-fit measurements, the chi-square (X^2) is often recognized as one of the most significant indicators of a good fit (Davey, 2009; Wang and Wang, 2009). The X^2 value in this research is 7.09 with a p -value of 0.214 as demonstrated in Table 4. This value suggests that the model is fit and in line with previous theories (Almarashdeh, 2016). However, experts noted that in some cases X^2 might increase if the study comprising a big research sample or the research instrument was constituted of many items (Hair *et al.*, 2005). Therefore, Hair *et al.* (2005) cautioned against using X^2 as the only indicator of goodness-of-fit, advising researchers to include other absolute and incremental measures to examine the goodness-of-fit.

In addition to the X^2 value, the present study used six indices to measure the goodness-of-fit of the proposed model. As detailed in Table 4, the X^2 value at five degrees of freedom was 1.418, which is below the recommended value of 3 (Wang and Wang, 2009). The root mean square error of approximation (RMSEA), with a value of 0.059, is lower than the acceptable threshold of 0.07 (Wang and Wang, 2009). Goodness-of-Fit (GFI), recorded a value of 0.984, which is greater than the 0.80 threshold recognized by Mohammadi (2015). Similarly, the Adjusted Goodness-of-Fit statistic (AGFI), with a value of 0.909, is higher than the suggested value of 0.80 (Wang *et al.*, 2009). The Comparative Fit Index (CFI), with a value of 0.997, which exceeds the recommended value of 0.90 (Wang *et al.*, 2009). As illustrated in Table 4, the goodness-of-fit indices were higher than their respective common acceptance levels. Hence, based on these values, it was concluded that the model demonstrated a good fit.

Table 3.
Survey item factor
loading and
Cronbach's alpha

Item	Question	Factor loading	Cronbach's alpha	Source
<i>System quality</i>				
SQ1	Google Classroom offers flexibility as to time and place of use	0.608	0.760	Pituch and Lee (2006) and Wang and Wang (2009)
SQ2	Google Classroom provides functions I need to successfully conduct my teaching activities	0.740		
SQ3	I have appropriate and sufficient software and hardware on my personal computer to use Google Classroom	0.668		
SQ4	I can easily access Google Classroom anytime I need to use it	0.604		
SQ5	Google Classroom has well-designed user interfaces	0.759		
<i>Service quality</i>				
SEQ1	The training manuals provided by the Google Classroom support team can enhance my ability to use Google Classroom	0.663	0.811	Ngai, Poon and Chan (2007) and Wang and Wang (2009)
SEQ2	I can communicate with Google Classroom support when I encounter technical problems and require quick responses	0.706		
SEQ3	Google Classroom support team can quickly fix my technical problems	0.868		
SEQ4	Google Classroom support team can provide sufficient support regarding the use of Google Classroom	0.792		
<i>Information quality</i>				
IQ1	Google Classroom can provide me sufficient information to enable me to do my tasks	0.719	0.859	Al-Busaidi and Al-Shihi (2012) and Wang and Wang (2009)
IQ2	Google Classroom can provide the precise information I need	0.674		
IQ3	The information provided by Google Classroom is complete	0.734		

(continued)

Item	Question	Factor loading	Cronbach's alpha	Source
<i>Perceived ease of use</i>				
PEU1	Google Classroom is easy to use	0.618	0.910	Mohammadi (2015) and Wang and Wang (2009)
PEU2	Google Classroom is easy to learn	0.699		
PEU3	Google Classroom is easy to access	0.627		
PEU4	It is easy for me to become skilled at using Google Classroom	0.672		
PEU5	It is easy for me to understand how to perform tasks using Google Classroom	0.731		
<i>Perceived usefulness</i>				
PU1	Google Classroom helps to save time	0.691	0.905	Davis (1989), Mohammadi (2015) and Wang and Wang (2009)
PU2	Using Google Classroom enhances my interactions with the students	0.652		
PU3	Google Classroom helps to improve my performance	0.757		
PU4	Using Google Classroom can help students enhance their learning effectiveness	0.732		
PU5	Using Google Classroom gives me greater control over my work	0.719		
PU6	Overall, I find WBLs useful in my job	0.797		
<i>Satisfaction</i>				
SAT1	I am generally satisfied with my experience with the use of Google Classroom	0.835	0.867	Hadji and Degoulet (2016), Isaac <i>et al.</i> (2018)
SAT2	My decision to use Google Classroom was a wise one	0.824		
SAT3	Google Classroom has met my expectations	0.762		
<i>Intention to reuse</i>				
IR1	Assuming that you have access to Google Classroom, you intend to reuse it	0.820	0.953	Wang (2008)
IR2	You will reuse Google Classroom in the future	0.834		
IR3	You will frequently use Google Classroom in the future	0.810		

Table 3.

Hypothesis testing

SEM is a confirmatory statistical method that allows the researcher to test a number of hypotheses about the model and consider each hypothesis individually (Hoyle and Smith, 1994; Ullman and Bentler, 2012).

This research proposes six hypotheses, as manifested in Table 5, the information quality, system quality and perceived usefulness contributed significantly to instructors' satisfaction with Google Classroom ($p < * 0.000$) and perceived ease of use was also found to significantly promote instructors' satisfaction with Google Classroom ($p < 0.05$). Further, instructors' satisfaction significantly influenced their intention to reuse the learning platform ($p < * 0.000$). However, service quality had no significant effect on instructors' satisfaction ($p > 0.05$).

Qualitative findings

Research studies in the domain of education are primarily dominated by quantitative studies (Dabic and Stojanov, 2014; Hilal and Alabri, 2013). However, when a researcher aims to investigate the state of practice or human aspects of education and their points of view, then, qualitative research can be very useful (Dabic and Stojanov, 2014). Qualitative research has been described as "research that attempts to describe existing conditions without analysing relationships among variables" (Fraenkel and Wallen, 1993).

Boyatzis (1998) and Bradley *et al.* (2007) stated that thematic classification is an effective method to classify recurrent concepts and statements about the subject being investigated. Hence, in the next two sections, the thematic analysis method was used to classify instructors' responses with regard to the challenges and possible barriers instructors faced during their experience with Google Classroom, and their suggestions to improve the state of e-Learning adoption in Iraq's public universities.

Challenges

This section will address the first question of Tarus *et al.* (2015) measure, which attempts to highlight the challenges instructors experienced when they used Google Classroom. As

Table 4.
The values of fit indices

Notation	Model value	Recommended value
X ² -statistic	7.092 ($p = 0.214$)	$p > 0.05$
X ² /DF	1.418	<3
RMSEA	0.059	<0.07
GFI	0.984	>0.80
AGFI	0.909	>0.80
CFI	0.997	>0.90

Table 5.
Hypotheses testing results

No.	Hypothesis	<i>p</i>	Result
H1	SYQ → SAT	***	Supported
H2	SEQ → SAT	0.087	Not supported
H3	IFQ → SAT	***	Supported
H4	POU → SAT	0.04*	Supported
H5	PU → SAT	***	Supported
H6	SAT → IR	***	Supported

Notes: *Significance value: 0.05. ***Significance value: 0.001

Table 6 shows, instructors' challenges were classified under three types, namely, external challenges, which refer to the challenges native to Iraq and its higher learning institutions (Al-Azawei *et al.*, 2016). Internal challenges are concerned with one's effort to move from the traditional teaching method to a more tech-oriented approach (Al-Azawei *et al.*, 2016). In addition to external and internal challenges, a number of instructors provided some comments on the nature of the teaching application itself. Hence, a new classification is created under the label of emerging challenges, which is associated with the limitations that instructors experienced when they used Google Classroom.

In regard to external challenges, an overwhelming number of instructors found poor internet connection to be a major hindrance. Table 6 shows that 44.16% of instructors considered this a major obstacle to e-Learning adoption in Iraq's public universities.

One of the instructors interviewed commented:

Internet connection is the essence of distance learning, therefore, faulty connections will have a detrimental impact on the instructional value of distance learning.

Another instructor further articulated:

Internet services certainly influence the effectiveness of the learning process, as this method of teaching needs fast and reliable connectivity to facilitate the interaction between the learner and educator, in our case, the effectiveness of distance learning is badly affected by the unstable internet services.

Interestingly, not all instructors criticized the low bandwidth issue. One of the instructors said:

I do not view the internet as a big issue, as all lectures are uploaded to [Google] Classroom and students can view and download the lectures at any they want.

Students' lack of interest and interaction was also cited as a key hindrance, with 29.16% citing it as a challenge to adopting tech-based teaching services in Iraq. However, instructors' comments showed that this is a multifaceted issue; with students' financial capabilities, attitude and instructors' teaching style being at the centre of it.

Challenges	No. of instructors	Frequency
<i>External challenges</i>		
Low internet bandwidth	53	44.16
Lack of awareness, interest and motivation	35	29.16
Insufficient financial support	5	4.16
Inadequate training programmes	4	3.33
Frequent electricity shortage	3	2.5
Lack of technical support	1	0.83
Lack of ICT infrastructure	1	0.83
Ambiguous plan and policies	1	0.83
<i>Internal Challenges</i>		
ICTS and e-Learning literacy	12	10
Amount of time required to develop e-Learning content	2	1.66
<i>Emerging challenges</i>		
Lack of personal interaction	13	10.83
Insufficient support for laboratory experiments	8	6.66
Test management and cheating prevention	6	5
Inflexible interface design	6	5

Table 6. External, internal and emerging challenges identified by instructors

Concerning students financial abilities, one of the instructors explained:

Surely, the internet is a major factor [...] as not all students are in a position financially to subscribe to an internet service provider.

Another explained further:

Internet service should be provided free of charge for students who come from financially disadvantaged backgrounds.

Concerning students' attitude, one of the interviewed instructors stated:

Students' activities in Google Classroom are mediocre because they think that the lectures they receive and the tests they take are not accounted for and they will be repeated when they return to lecture halls.

Another instructor also criticized students' attitude by noting the following:

Students' interaction depends on the subject, if they deemed a given subject inessential then their participation would be very weak.

Lack of interest by students can be remedied by adaptive teaching techniques that motivate students, and encourage them to participate and ask questions, one of the instructors remarked:

Students' lack of motivation can be improved when the instructor motivates them and raises their awareness regarding the importance of getting in touch with their lecturers via Google Classroom [...] these methods were effective as students' participation advanced significantly. In addition, these practices also helped students to develop a very good commitment to completing their assignments and even some of them started to compete with their peers to get higher marks.

The findings concerning internal challenges show that 10% of the research sample cited their ICT and e-Learning literacies as a challenge to them. Instructors stated that ICT literacy among instructors was inhibiting, as one of the interviewees described:

A large percentage of instructors and students have limited experience in using e-learning technologies.

Finally, in the section on emerging challenges, 6.66% of instructors referenced inadequate support for laboratory experiments as a challenge native to Google Classroom. Moreover, on the issue of tests management in Google Classroom, 5% of the population were against it, as one of the instructors commented:

I am opposed to testing students in Google Classroom because some of them could cheat, which is unfair to other hardworking students.

Recommendations

The findings from the previous section indicate that instructors in Iraq are facing a number of challenges pertaining to their adoption of e-learning technologies. Therefore, to overcome these challenges, the present study provides a number of recommendations based on instructors' feedback. It is believed that these recommendations could pave the way towards an effective adoption of educational technology in Iraq's higher education institutes:

- Tangible progress in Iraq's effort to adopt educational technology can only be achieved if internet services are substantially improved and made available to higher education institutes and students. Moreover, students from financially disadvantaged backgrounds should also be offered the service at a significantly lower price.

- Throughout their careers and academic lives, the majority of instructors and students in Iraq have limited experience in technology-oriented teaching methods. Therefore, prior to their implementation in universities, both instructors and students should be offered comprehensive training to improve their ICT and e-Learning literacy, help them recognize the potential benefits of online learning and improve their commitment to this teaching method.
- Improving students' and instructors' access to e-Learning materials and resources is also crucial. This can be achieved through the provision of personal computers, laptops and other software and hardware requirements to instructors and students.

Discussion

This analysis is motivated by the lack of research that examines the perspective of instructors' continued intention to reuse LMS (Mouakket and Bettayeb, 2015; Sørebo *et al.*, 2009). Moreover, COVID-19 pandemic was another major factor that prompted this research.

The empirical findings of this study demonstrated one of the six proposed hypotheses was rejected, while the remaining five were supported. This study found that information quality, system quality and perceived usefulness had a statistically significant influence at the level of ($p < * 0.001$) on instructors' satisfaction and perceived ease of use had a significant role at the level of ($p < 0.05$) on instructors' satisfaction. Further, satisfaction played a significantly central role at the level of ($p < * 0.001$) on instructors' continued intention to reuse Google Classroom in the future.

There are two interesting observations pertaining to the empirical findings of this study. Firstly, service quality had no significant contribution to instructors' satisfaction. One possible explanation is that the support provided by Google Classroom was inadequate for instructors who had little to no experience in using e-Learning technologies, which could be the reason why instructors reported the lowest mean on service quality variables (Table 2). Another possible reason could be associated with the emerging challenges instructors faced during their experience (Table 6), as some of them were displeased by the inflexible design of Google Classroom interface. The result that service quality had no significant effect on instructors' satisfaction was inconsistent with Almarashdeh's (2016) outcomes who found service quality to be a key factor in affecting instructors' satisfaction.

Another interesting finding is that although perceived ease of use had a significant impact on instructors' satisfaction it had had a bigger p -value than other variables, in fact, perceived ease of use barely reached the threshold of significance at ($p = 0.041$). In addition to instructors' limited experience in using e-Learning technologies, another possible justification for this could be the rapid transition to distance learning in Iraq, which resulted in a significant number of instructors not receiving proper training.

The remaining outcomes indicate that system quality, information quality and perceived usefulness have improved instructors' satisfaction. These observations are consistent with what has been recorded in earlier studies; namely, that if the used LMS was accessible and reliable and provided instructors with sufficient, accurate and timely information, then their satisfaction will increase significantly (Al-Busaidi and Al-Shihi, 2012; Almarashdeh, 2016). In line with previous studies Islam and Azad (2015); Islam (2011, 2015); Larsen *et al.* (2009) and Mouakket and Bettayeb (2015), our findings showed that perceived usefulness had a significant influence on the satisfaction of instructors, the low p -value ($p < 0.001$) implies that instructors began to recognize the potential of Google Classroom as they acquired more knowledge and experience. Finally, the study found that instructors' satisfaction is an essential indicator of their intention to continue to reuse Google Classroom in the future.

Similarly, in previous studies, this variable has been found to have a central role in driving instructors' intention to reuse LMS (Al-Busaidi and Al-Shihi, 2012; Islam and Azad, 2015; Islam, 2015; Mouakket and Bettayeb, 2015; Sørebo *et al.*, 2009).

The qualitative outcomes of this study highlighted a number of issues. Firstly, access to reliable and stable internet services is the biggest factor that inhibits the adoption of e-Learning. Most of the instructors maintained that internet services are ineffective and costly (\$40 – \$60), this observation is partially supported by Al-Azawei *et al.* (2016), who also found that this to be a key issue for instructors in Iraq. This finding shows that although penetration rates have increased in Iraq over the past few years, efficacy remains at very poor levels. Secondly, the outcomes of the present study revealed that students' lack of interest and motivation was another factor that hinders the adoption of e-learning technologies. However, instructors' feedback uncovered that students' lack of interest is a multidimensional issue with some students responding to motivation and encouragement, while others remained indifferent because they considered the course being taught unimportant. Further, a number of instructors found that Google Classroom has an inflexible interface, including services that aim to facilitate instructors' utilization of Google Classroom. Although this issue was briefly mentioned by instructors, it could be a key reason as to why service quality had no significant contribution to instructors' satisfaction. Furthermore, a few instructors referenced the lack of support for laboratory experiments as a challenge that should be addressed by Google. In a similar vein, some of the instructors were sceptical about testing students within the Google Classroom environment, as they cannot guarantee that all students will abstain from cheating.

In the wake of this global health crisis, almost all instructors in Iraq had to migrate to distance learning. Despite their limited experience with applications such as Google Classroom, they had to interact extensively with various technologies which improved their ICT and e-Learning skills. In addition, instructors had to invent and experiment with a number of techniques to sustain students' engagement and motivate them to learn. Hence, students' and instructors' interaction with technology could pave the way to introduce blended learning into Iraq's public universities. Furthermore, a number of instructors had to guide students on how to use Google Classroom and other related technologies, thus, the workload and stress experienced by these instructors increased enormously during the pandemic. In addition, most instructors were not trained or experienced to handle students' emotional health, despite the well-documented toll on students' mental well-being during the pandemic.

The findings of this study differ from some past studies in the following ways. Firstly, this study proposed an integrated model of TAM and ISSM to address the notable lack of research in the context of instructors' continued intentions to reuse LMS, particularly, in developing countries. Secondly, unlike most studies that focused primarily on empirical findings, this study interviewed instructors in an attempt to identify the challenges they faced during their experience and share their recommendations to rectify these challenges. Hence, the current study is expected to provide valuable information for researchers who are interested in factors that influence instructors' intention to reuse LMS and policymakers who aim to gain insights into the challenges and barriers that impede the adoption of e-Learning technologies in developing countries.

Limitations and future work

It should be noted that this study has the following limitations. Firstly, the number of participants is relatively small, which limits the generalizability of the results. Future studies should include bigger research samples from other public universities to increase the

reliability and validity of the current findings. Secondly, this study did not attempt to investigate the role of individual differences such as instructors' age and gender; therefore, future studies are advised to consider these factors. Finally, when interviewing instructors about the challenges and potential barriers, that impedes the adoption of e-Learning technologies in developing countries, it is also highly recommended that questions are raised over challenges faced when using a particular LMS. Hence, they can inform other instructors about the challenges native to that LMS and provide its developers with invaluable insights into the limitations of their LMSs.

Conclusion

The first goal of this mixed-method study was to empirically assess an integrated model of TAM and ISSM in the context of instructors' continued intention to reuse Google Classroom during the COVID-19 pandemic. The second aim was to highlight the challenges and possible barriers instructors faced during their experience and record their suggestions to improve the state of e-Learning adoption in Iraq's public universities. The findings of this study revealed that service quality had no significant impact on instructors' satisfaction. On the other hand, information quality, system quality, perceived usefulness and perceived ease of use contributed significantly to instructors' satisfaction. This, in turn, significantly drove their intention to reuse Google Classroom. The findings of this paper also demonstrated that instructors identified eight external challenges, two internal challenges and four emerging challenges. Based on these challenges, a number of recommendations were suggested in an attempt to provide a plan that guides the integration of e-Learning technologies in Iraq's public universities. Finally, taken together, the findings of this research could enrich scholars' and policymakers' understanding of the factors that influence instructors' intention to reuse LMS in the future, as well as outlining the challenges that instructors faced during the COVID-19 pandemic.

References

- Alalgawi, D., Sulaiman, R.B., Ab Aziz, N.B., Rosnafisah, B.S. and Norshakirah, B.A. (2014), "Factors affecting teachers adoption of ICT into teaching and learning in Iraq education system", *International Journal of Modern Education Forum*, Vol. 3 No. 2, pp. 46-55.
- Al-Azawei, A., Parslow, P. and Lundqvist, K. (2016), "Barriers and opportunities of e-learning implementation in Iraq: a case of public universities", *International Review of Research in Open and Distributed Learning*, Vol. 17 No. 5, pp. 126-146.
- Al-Azawei, A., Parslow, P. and Lundqvist, K. (2017), "The effect of universal design for learning (UDL) application on e-learning acceptance: a structural equation model", *International Review of Research in Open and Distributed Learning*, Vol. 18 No. 6, pp. 54-87.
- Al-Busaidi, K.A. and Al-Shihi, H. (2012), "Key factors to instructors' satisfaction of learning management systems in blended learning", *Journal of Computing in Higher Education*, Vol. 24 No. 1, pp. 18-39.
- Al-Khafaji, N.J., Shittuline, A.J.K. and Osman, W.R.B.S. (2012), "The effect of resistance to change in the application of e-Government in Iraq", 2012 Tenth International Conference on ICT and Knowledge Engineering, IEEE, pp. 99-103.
- Al-Khafaji, N.J., Shittu, A.J.K. and Osman, W.R.Z.S. (2014), "G2G interaction among local agencies in developing countries based on diffusion of innovations theory", 2014 Fourth International Conference on Digital Information and Communication Technology and its Applications (DICTAP), IEEE, pp. 125-131.

- Allameh, S.M. and Zare, S.M. (2011), "Examining the impact of KM enablers on knowledge management processes", *Procedia Computer Science*, Vol. 3, pp. 1211-1223.
- Almarashdeh, I. (2016), "Sharing instructors experience of learning management system: a technology perspective of user satisfaction in distance learning course", *Computers in Human Behavior*, Vol. 63, pp. 249-255.
- Al-Najjar, S.M. and Jawad, M.K. (2016), "Measuring customers' perceptions and readiness to accept e-commerce in Iraq: an empirical study", *Journal of Marketing Management*, Vol. 4 No. 1, pp. 151-162.
- Alyasiri, H. and Abdulbaqi, N. (2012), "Proposed policy for iraqiict sector (part i)", 2012 International Conference on Future Communication Networks, IEEE, pp. 129-134.
- Ameen, N. (2017), "Arab users' acceptance and use of mobile phones: a case of young users in Iraq, Jordan and UAE", available at: www.researchgate.net/profile/Nisreen_Ameen2/publication/324280641_Arab_users'_acceptance_and_use_of_mobile_phones_a_case_of_young_users_in_Iraq_Jordan_and_UAE/links/5ac9f7fb0f7e9bcd5197b9af/Arab-users-acceptance-and-use-of-mobile-phones-a-case-of-young-users-in-Iraq-Jordan-and-UAE.pdf (accessed 12 June 2020)
- Ameen, N., Willis, R., Abdullah, M.N. and Shah, M. (2019), "Towards the successful integration of e-learning systems in higher education in Iraq: a student perspective", *British Journal of Educational Technology*, Vol. 50 No. 3, pp. 1434-1446.
- Anderson, J.C. and Gerbing, D.W. (1988), "Structural equation modeling in practice: a review and recommended two-step approach", *Psychological Bulletin*, Vol. 103 No. 3, pp. 411-423.
- Azhar, K.A. and Iqbal, N. (2018), "Effectiveness of google classroom: teachers' perceptions", *Prizren Social Science Journal*, Vol. 2 No. 2, pp. 52-66.
- Babakus, E. and Mangold, W.G. (1992), "Adapting the SERVQUAL scale to hospital services: an empirical investigation", *Health Services Research*, Vol. 26 No. 6, p. 767.
- BBC (2020), "Coronavirus: greatest test since world war two, says UN chief", available at: www.bbc.com/news/world-52114829 (accessed 18 April 2020)
- Berge, Z.L., Muilenburg, L.Y. and Haneghan, J.V. (2002), "Barriers to distance education and training: survey results", *The Quarterly Review of Distance Education*, Vol. 3 No. 4, pp. 409-418.
- Bhattacharjee, A. (2001), "Understanding information systems continuance: an expectation-confirmation model", *MIS Quarterly*, Vol. 25 No. 3, pp. 351-370.
- Boyatzis, R.E. (1998), *Transforming Qualitative Information: Thematic Analysis and Code Development*, Sage Publications.
- Bradley, E.H., Curry, L.A. and Devers, K.J. (2007), "Qualitative data analysis for health services research: developing taxonomy, themes, and theory", *Health Services Research*, Vol. 42 No. 4, pp. 1758-1772.
- Chang, C.C. (2013), "Exploring the determinants of e-learning systems continuance intention in academic libraries", *Library Management*, Vol. 34 Nos 1/2, pp. 40-55.
- Chow, M., Herold, D.K., Choo, T.M. and Chan, K. (2012), "Extending the technology acceptance model to explore the intention to use second life for enhancing healthcare education", *Computers and Education*, Vol. 59 No. 4, pp. 1136-1144.
- Conrad, D. (2004), "University instructors' reflections on their first online teaching experiences", *Journal of Asynchronous Learning Networks*, Vol. 8 No. 2, pp. 31-44.
- Creswell, J.W. and Plano Clark, V.L. (2006), "Understanding mixed methods research", *Designing and Conducting Mixed Methods Research*, pp. 1-19.
- Creswell, J.W. and Plano Clark, V.L.P. (2017), *Designing and Conducting Mixed Methods Research*, Sage publications.
- Dabic, T. and Stojanov, Z. (2014), "Techniques for collecting qualitative field data in education research: example of two studies in information technology field", *Singidunum Journal of Applied Sciences*, Vol. 1, pp. 362-367.

-
- Davey, A. (2009), *Statistical Power Analysis with Missing Data: A Structural Equation Modeling Approach*, Routledge.
- Davis, F.D. (1989), "Perceived usefulness, perceived ease of use, and user acceptance of information technology", *MIS Quarterly*, Vol. 13 No. 3, pp. 319-340.
- De Vynck, G. and Bergen, M. (2020), "Google classroom users doubled as quarantines spread", available at: www.bloomberg.com/news/articles/2020-04-09/google-widens-lead-in-education-market-as-students-rush-online?sref=ExbtjcSG (accessed 10 May 2020).
- DeLone, W.H. and McLean, E.R. (1992), "Information systems success: the quest for the dependent variable", *Information Systems Research*, Vol. 3 No. 1, pp. 60-95.
- Delone, W.H. and McLean, E.R. (2003), "The DeLone and McLean model of information systems success: a ten-year update", *Journal of Management Information Systems*, Vol. 19 No. 4, pp. 9-30.
- DiCicco, K.M. (2016), *The Effects of Google Classroom on Teaching Social Studies for Students with Learning Disabilities*, Rowan University.
- Elameer, A.S. and Idrus, R.M. (2011), "National E-Learning strategy to enhance and enrich the Iraqi universities", *US-China Education Review*, Vol. 4 No. 1, pp. 481-496.
- Fishbein, M. and Ajzen, I. (1977), *Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research*, Addison-Wesley, Reading, MA.
- Fraenkel, J.R. and Wallen, N.E. (1993), *How to Design and Evaluate Research in Education*, McGraw-Hill, New York.
- Freeze, R.D., Alshare, K.A., Lane, P.L. and Wen, H.J. (2019), "Is success model in e-learning context based on students' perceptions", *Journal of Information Systems Education*, Vol. 21 No. 2, pp. 173-184.
- Gillenson, M.L. and Sherrell, D.L. (2002), "Enticing online consumers: an extended technology acceptance perspective", *Information and Management*, Vol. 39 No. 8, pp. 705-719.
- Hadji, B. and Degoulet, P. (2016), "Information system end-user satisfaction and continuance intention: a unified modeling approach", *Journal of Biomedical Informatics*, Vol. 61, pp. 185-193.
- Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E. and Tatham, R.L. (1998), *Multivariate Data Analysis*, Vol. 5, Prentice hall, Upper Saddle River, NJ, pp. 207-219.
- Hair, J.F., Black, B., Babin, B., Anderson, R.E. and Tatham, R.L. (2005), *Multivariate Data Analysis*, 6th ed., Prentice Hall, Englewood Cliffs, NJ.
- Halawi, L.A., McCarthy, R.V. and Aronson, J.E. (2008), "An empirical investigation of knowledge management systems' success", *Journal of Computer Information Systems*, Vol. 48 No. 2, pp. 121-135.
- Heshmati, A., Al-Hammadany, F.H. and Bany-Mohammed, A. (2013), "Analysis of internet usage intensity in Iraq: an ordered logit model", *Journal of Knowledge Management, Economics and Information Technology*, Vol. 3 No. 3, pp. 1-21.
- Hilal, A.H. and Alabri, S.S. (2013), "Using NVivo for data analysis in qualitative research", *International Interdisciplinary Journal of Education*, Vol. 2 No. 2, pp. 181-186.
- Holden, H. and Rada, R. (2011), "Understanding the influence of perceived usability and technology self-efficacy on teachers' technology acceptance", *Journal of Research on Technology in Education*, Vol. 43 No. 4, pp. 343-367.
- Hoyle, R.H. and Smith, G.T. (1994), "Formulating clinical research hypotheses as structural equation models: a conceptual overview", *Journal of Consulting and Clinical Psychology*, Vol. 62 No. 3, pp. 429-440.
- Iftakhar, S. (2016), "Google classroom: what works and how", *Journal of Education and Social Sciences*, Vol. 3 No. 1, pp. 12-18.
- Internet World Stats (2015), "Internet usage in the Middle East", available at: www.internetworldstats.com/stats5.htm (accessed 18 April 2020).

- Internet World Stats (2017), "Iraq internet usage and marketing report", available at: www.internetworldstats.com/me/iq.htm (accessed 18 April 2020).
- Isaac, O., Abdullah, Z., Ramayah, T. and Mutahar, A.M. (2018), "Factors determining user satisfaction of internet usage among public sector employees in Yemen", *International Journal of Technological Learning, Innovation and Development*, Vol. 10 No. 1, pp. 37-68.
- Islam, A.N. and Azad, N. (2015), "Satisfaction and continuance with a learning management system", *International Journal of Information and Learning Technology*, Vol. 32 No. 2, pp. 109-123.
- Islam, A.N. (2011), "The determinants of the post-adoption satisfaction of educators with an e-learning system", *Journal of Information Systems Education*, Vol. 22 No. 4, pp. 319-330.
- Islam, A.N. (2015), "The moderation effect of user-type (educators vs. students) in learning management system continuance", *Behaviour and Information Technology*, Vol. 34 No. 12, pp. 1160-1170.
- Jabbouri, N.I., Siron, R., Zahari, I. and Khalid, M. (2016), "Impact of information technology infrastructure on innovation performance: an empirical study on private universities in Iraq", *Procedia Economics and Finance*, Vol. 39, pp. 861-869.
- Karadag, R. (2015), "Pre-Service teachers' perceptions on game based learning scenarios in primary reading and writing instruction courses", *Educational Sciences: Theory and Practice*, Vol. 15 No. 1, pp. 185-200.
- Lam, P., Lee, J., Chan, M. and McNaught, C. (2011), "Students' use of eLearning strategies and their perceptions of eLearning usefulness", *Global Learn*, Association for the Advancement of Computing in Education (AACE), pp. 1379-1388.
- Larsen, T.J., Sørøbø, A.M. and Sørøbø, Ø. (2009), "The role of task-technology fit as users' motivation to continue information system use", *Computers in Human Behavior*, Vol. 25 No. 3, pp. 778-784.
- Lassoued, Z., Alhendawi, M. and Bashitialshaaer, R. (2020), "An exploratory study of the obstacles for achieving quality in distance learning during the COVID-19 pandemic", *Education Sciences*, Vol. 10 No. 9, p. 232.
- Lee, S. and Kim, B.G. (2017), "The impact of qualities of social network service on the continuance usage intention", *Management Decision*, Vol. 55 No. 4, pp. 701-729.
- Liu, H., Wang, L. and Koehler, M.J. (2019), "Exploring the intention-behavior gap in the technology acceptance model: a mixed-methods study in the context of foreign-language teaching in China", *British Journal of Educational Technology*, Vol. 50 No. 5, pp. 2536-2556.
- Luongo, N. (2018), "An examination of distance learning faculty satisfaction levels and self-perceived barriers", *Journal of Educators Online*, Vol. 15 No. 2.
- MacDonald, P. and Ahern, T.C. (2015), "Exploring the instructional value and worth of a MOOC", *Journal of Educational Computing Research*, Vol. 52 No. 4, pp. 496-513.
- Mandernach, B.J., Dailey-Hebert, A. and Donnelly-Sallee, E. (2007), "Frequency and time investment of instructors' participation in threaded discussions in the online classroom", *Journal of Interactive Online Learning*, Vol. 6 No. 1, pp. 1-9.
- Matar, N., Hunaiti, Z., Halling, S. and Matar, Š. (2011), "E-Learning acceptance and challenges in the arab region", in *ICT Acceptance, Investment and Organization: Cultural Practices and Values in the Arab World*, IGI Global, pp. 184-200.
- Melville, N.P. (2010), "Information systems innovation for environmental sustainability", *MIS Quarterly*, Vol. 34 No. 1, pp. 1-21.
- Mitchell, J.I., Gagné, M., Beaudry, A. and Dyer, L. (2012), "The role of perceived organizational support, distributive justice and motivation in reactions to new information technology", *Computers in Human Behavior*, Vol. 28 No. 2, pp. 729-738.
- Mohammadi, H. (2015), "Investigating users' perspectives on e-learning: an integration of TAM and is success model", *Computers in Human Behavior*, Vol. 45 No. 1, pp. 359-374.

-
- MOHESR (2020), "Dr. Al-Suhail calls on adopting E-Learning during corona virus protection procedures", available at: <http://moheer.gov.iq/en/2020/03/09/dr-al-suhail-calls-adopting-e-learning-corona-virus-protection-procedures/> (accessed on 9 May 2020).
- Molla, A. and Licker, P.S. (2001), "E-commerce systems success: an attempt to extend and respecify the delone and MacLean model of is success", *J. Electron. Commerce Res*, Vol. 2 No. 4, pp. 131-141.
- Moore, M.G. (1993), "Theory of transactional distance", *Theoretical Principles of Distance Education*, Vol. 1, pp. 22-38.
- Mouakket, S. and Bettayeb, A.M. (2015), "Investigating the factors influencing continuance usage intention of learning management systems by university instructors", *International Journal of Web Information Systems*, Vol. 11 No. 4, pp. 491-509.
- Ngai, E.W., Poon, J.K.L. and Chan, Y.H. (2007), "Empirical examination of the adoption of WebCT using TAM", *Computers and Education*, Vol. 48 No. 2, pp. 250-267.
- Nunnally, J.C. (1994), *Psychometric Theory 3E*, Tata McGraw-Hill Education.
- Pai, F.Y. and Huang, K.I. (2011), "Applying the technology acceptance model to the introduction of healthcare information systems", *Technological Forecasting and Social Change*, Vol. 78 No. 4, pp. 650-660.
- Park, N. (2010), "Adoption and use of computer-based voice over internet protocol phone service: toward an integrated model", *Journal of Communication*, Vol. 60 No. 1, pp. 40-72.
- Petter, S., DeLone, W. and McLean, E. (2008), "Measuring information systems success: models, dimensions, measures, and interrelationships", *European Journal of Information Systems*, Vol. 17 No. 3, pp. 236-263.
- Phan, W. (2015), "Head back to school with new features in google classroom", Google for Education, available at: www.googblogs.com/head-back-to-school-with-new-features-in-google-classroom-2/ (accessed 21 May 2020).
- Pituch, K.A. and Lee, Y.K. (2006), "The influence of system characteristics on e-learning use", *Computers and Education*, Vol. 47 No. 2, pp. 222-244.
- Roh, T.H., Ahn, C.K. and Han, I. (2005), "The priority factor model for customer relationship management system success", *Expert Systems with Applications*, Vol. 28 No. 4, pp. 641-654.
- Sanchez-Gordon, S. and Luján-Mora, S. (2018), "Technological innovations in large-scale teaching: five roots of massive open online courses", *Journal of Educational Computing Research*, Vol. 56 No. 5, pp. 623-644.
- San-Martín, S., Jiménez, N., Rodríguez-Torrico, P. and Piñero-Ibarra, I. (2020), "The determinants of teachers' continuance commitment to e-learning in higher education", *Education and Information Technologies*, Vol. 25 No. 4, pp. 1-21.
- Sharma, S.K., Gaur, A., Saddikuti, V. and Rastogi, A. (2017), "Structural equation model (SEM)-neural network (NN) model for predicting quality determinants of e-learning management systems", *Behaviour and Information Technology*, Vol. 36 No. 10, pp. 1053-1066.
- Sørenbø, Ø., Halvari, H., Gulli, V.F. and Kristiansen, R. (2009), "The role of self-determination theory in explaining teachers' motivation to continue to use e-learning technology", *Computers and Education*, Vol. 53 No. 4, pp. 1177-1187.
- Tarus, J.K., Gichoya, D. and Muumbo, A. (2015), "Challenges of implementing e-learning in Kenya: a case of Kenyan public universities", *International Review of Research in Open and Distributed Learning*, Vol. 16 No. 1, pp. 120-141.
- Teo, T. (2010), "Establishing gender structural invariance of technology acceptance model (TAM)", *Asia-Pacific Education Researcher*, Vol. 19 No. 2, pp. 311-320.
- Teo, T. and Milutinovic, V. (2015), "Modelling the intention to use technology for teaching mathematics among pre-service teachers in serbia", *Australasian Journal of Educational Technology*, Vol. 31 No. 4, pp. 363-380.

- Teo, T. and Zhou, M. (2014), "Explaining the intention to use technology among university students: a structural equation modeling approach", *Journal of Computing in Higher Education*, Vol. 26 No. 2, pp. 124-142.
- Teo, T., Ursavaş, Ö.F. and Bahçekapili, E. (2012), "An assessment of pre-service teachers' technology acceptance in Turkey: a structural equation modeling approach", *Asia-Pacific Education Researcher*, Vol. 21 No. 1, pp. 191-202.
- Ullman, J.B. and Bentler, P.M. (2012), *Structural Equation Modeling Handbook of Psychology*, John Wiley and Sons, Hoboken, NJ.
- UNESCO (2020), "Distance learning solutions", available at: <https://en.unesco.org/covid19/educationresponse/solutions> (accessed on 9 May 2020).
- UNESCO.org (2017), "Avicenna: a virtual campus", available at: http://portal.unesco.org/en/ev.phpURL_ID=34380&URL_DO=DO_TOPIC&URL_SECTION=201.html
- Wang, Y.S. (2008), "Assessing e-commerce systems success: a respecification and validation of the DeLone and McLean model of is success", *Information Systems Journal*, Vol. 18 No. 5, pp. 529-557.
- Wang, W.T. and Lai, Y.J. (2014), "Examining the adoption of KMS in organizations from an integrated perspective of technology", individual, and organization", *Computers in Human Behavior*, Vol. 38 No. 1, pp. 55-67.
- Wang, W.T. and Wang, C.C. (2009), "An empirical study of instructor adoption of web-based learning systems", *Computers and Education*, Vol. 53 No. 3, pp. 761-774.
- Wang, Y.S., Wu, M.C. and Wang, H.Y. (2009), "Investigating the determinants and age and gender differences in the acceptance of mobile learning", *British Journal of Educational Technology*, Vol. 40 No. 1, pp. 92-118.
- WHO (2020), "Coronavirus disease (COVID-19) outbreak situation", available at: www.who.int/emergencies/diseases/novel-coronavirus-2019 (accessed 10 May 2020).
- Wingo, N.P., Ivankova, N.V. and Moss, J.A. (2017), "Faculty perceptions about teaching online: exploring the literature using the technology acceptance model as an organizing framework", *Online Learning*, Vol. 21 No. 1, pp. 15-35.
- Wu, P.F. (2011), "A mixed methods approach to technology acceptance research", *Journal of the Association for Information Systems*, Vol. 13 No. 3, pp. 172-187.
- Xiao, L. and Dasgupta, S. (2002), "Measurement of user satisfaction with web-based information systems: an empirical study", *AMCIS 2002 Proceedings*, p. 159.
- Zviran, M. and Erlich, Z. (2003), "Measuring is user satisfaction: review and implications", *Communications of the Association for Information Systems*, Vol. 12 No. 1, pp. 81-103.

Further reading

- Fraenkel, J.R., Wallen, N.E. and Hyun, H.H. (2011), *How to Design and Evaluate Research in Education*, McGraw-Hill Humanities/Social Sciences/Languages, New York, NY.

Corresponding author

Mahmoud H. Hussein can be contacted at: mahmoud.najafy@gmail.com