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Which Factors Affect Learner Satisfaction in Educational Hypermedia Systems? A Case Study of the Moodle System

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Abstract: Online learning represents the current form of distance education. However, it is a new trend for Arab nations and Iraq in particular. Moreover, previous literature has shown that not all learners are satisfied in this learning mode. The present study then aims to identify the predictors of learner satisfaction in online education. It proposes a Conceptual Model of Learner Satisfaction (CMLS) based on the findings of prior studies. A total of 70 learners voluntarily filled out a research survey at the end of an online course. Based on the Partial Least Square-Structural Equation Modelling (PLS-SEM) analysis, performance expectancy and course quality were significant predictors of learner satisfaction whereas system quality failed to identify a significant influence on this construct. Other factors integrated into the proposed framework showed an indirect effect on learner satisfaction. Overall, the proposed model explained 52.5% of the variance of this variable indicating a good fit. The implications of this study are discussed for further research.

Key words: Online learning, learner satisfaction, Iraq, conceptual model, framework, proposed model

INTRODUCTION

Over the past years, a growth body of research has been conducted to improve the delivery of online education. This learning method is the most recent form of e-Learning, even though it may include other delivery modes. Based on the development of learning technologies across the globe, many prestigious educational institutions have started delivering pure online modules, acknowledging the need for such courses to meet learner's preferences and needs. Online learning is a flexible method, since, it provides an opportunity for learners to study in their own pace. Another advantage of this learning mode is that learning contents and resources are available anytime and from anywhere. However, learners are still facing different challenges in online education. This may explain why more or less 90% of learners withdraw from their distance courses (Liyanagunawardena *et al*., 2014). A lack of learning interaction is one reason that can lead to low satisfaction (Cole *et al*., 2014). Furthermore, Bouhnik and Marcus (2006) point out that the absence of a 'learning atmosphere' and getting less detail in response to learners' questions are other reasons that may negatively affect learner satisfaction in distance education.

This study suggests a Conceptual Model of Learner Satisfaction (CMLS) in order to understand what can influence satisfaction of Iraqi learners in online learning settings. Iraq is still at an early stage in the uptake of Information and Communication Technologies (ICTs) in different life sectors and for e-Learning in particular. As it is the case in other developing countries, Iraq suffers from a lack of adequate ICTs infrastructure, low internet connectivity, unclear e-Learning plan and users have a low level of interest and motivation to adopt this learning technology in teaching and learning (Al-Azawei *et al*., 2016). Thus, it is important to investigate factors that can assist in predicting learner satisfaction in this learning context. The proposed model is comprised of dimensions that were suggested in the Technology Acceptance Model (TAM) and the Integrated Conceptual Model (ICM) proposed by Davis *et al*. (1989) and Sun *et al*. (2008), respectively. However, some new constructs and relationships were suggested in the present research. This adaptation was conducted in accordance with the objectives and the nature of this study.

In order to investigate the dimensions of the proposed framework, Moodle was installed to offer free online courses for Arabic learners. This Learning Management System (LMS) was adopted because it is one of the top Open source-Learning Management Systems (OS-LMSs) and 54,121 sites in 231 countries are registered as using Moodle to serve approximately 69,364,145 users as of November 2014. Other features that have led to the widespread use of Moodle are its adoption of the social constructivism learning theory, the richness

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of its functionalities, its flexibility, its low cost and ease of use (Cavus and Zabadi, 2014; Escobar-Rodriguez and Monge-Lozano, 2012). This study aims to answer two main questions:

- Can performance expectancy, course quality and system quality variables predict learner satisfaction in an online learning mode?
- Which factors can predict performance expectancy, course quality and system quality in online education?

Literature review: Evaluating variables that may affect perceived satisfaction can help in understanding how e-Learning experience can achieve its anticipated advantages. It is assumed that accounting such factors will contribute to an improvement of learning outcomes. This section discusses the findings of some selected studies that assessed learner's perceptions towards a new technology.

Davis (1986) proposed the Technology Acceptance Model (TAM) to predict and assess the tendency of users to accept technology. The main variables in this model are perceived usefulness and perceived ease of use which can influence user's attitudes toward using a technology. Perceived usefulness is defined as "the degree to which an individual believes that using a particular system would enhance his or her performance" whereas perceived ease of use means "the degree to which an individual believes that using a particular system would be free of physical and mental effort" (Davis, 1986). In recent versions of TAM, new terminologies were introduced to refer to perceived usefulness and perceived ease of use which are 'performance expectancy' and 'effort expectancy', respectively (Venkatesh *et al*., 2003). Figure 1 illustrates TAM.

Liaw (2008), also investigated the influence of many variables on learner satisfaction in an online mode. A total of 424 undergraduate students who used the blackboard system participated by filling out a research questionnaire. The results of stepwise multiple regressions showed that three independent variables influence learner satisfaction and these were 'perceived self-efficacy', 'multimedia instruction' and 'the quality of the e-Learning system'. However, there was no indication that 'interactive learning activities' were significant in any way. Based on the findings, a conceptual model was proposed. This model highlights the relationship between perceived satisfaction, perceived usefulness, effectiveness and behavioural intention of using e-Learning.

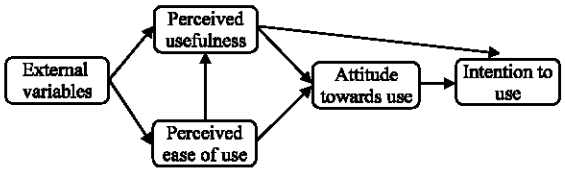

Fig. 1: The Technology Acceptance Model (TAM) (Davis *et al*., 1989)

Sun *et al*. (2008) reviewed many studies on learner satisfaction in order to integrate their proposed dimensions into one model. Consequently, a new framework called the Integrated Conceptual Model (ICM) was proposed. A total of 295 undergraduate students voluntarily participated in the study. Six dimensions were proposed in this model to include thirteen independent variables. The stepwise multiple regressions analysis revealed that seven factors had a critical impact on learner satisfaction. These factors were: learner's computer anxiety, the attitude of instructor toward e-Learning, course flexibility and quality, perceived usefulness and ease of use and assessment diversity. Figure 2 demonstrates the main dimensions in the ICM.

Cole *et al*. (2014) conducted a study over a period of three years to understand learner satisfaction in pure online and/or blended learning environments. The findings revealed that the key factor that may lead learners to adopting this educational technology is its 'convenient' for learners with different commitments and obligations. The lack of direct interaction, on the other hand, represents the main obstacle that may negatively influence learner satisfaction. Accordingly, it was recommended that instructors should apply different interaction methods in distance learning.

The current research represents an extension to the previous literature on learner satisfaction and fills a research gap in a region that rarely studied. It is based on the notion that understanding what can influence learner's perceptions in terms of satisfaction and what can lead to enhancing it in online education is a key aspect to inform the design of electronic instructions.

The proposed Conceptual Model of Learner Satisfaction (CMLS): The above discussed literature is evidently a useful starting point to construct the research framework in this study. However, the proposed research model is mainly based on TAM and ICM, even though it integrates other new variables and suggests new relationships. Accordingly, it reveals in more detail the specificities of these related factors. The following subsections present these constructs and their related hypothesis. Figure 3 depicts the proposed dimensions and hypothesis of the CMLS.

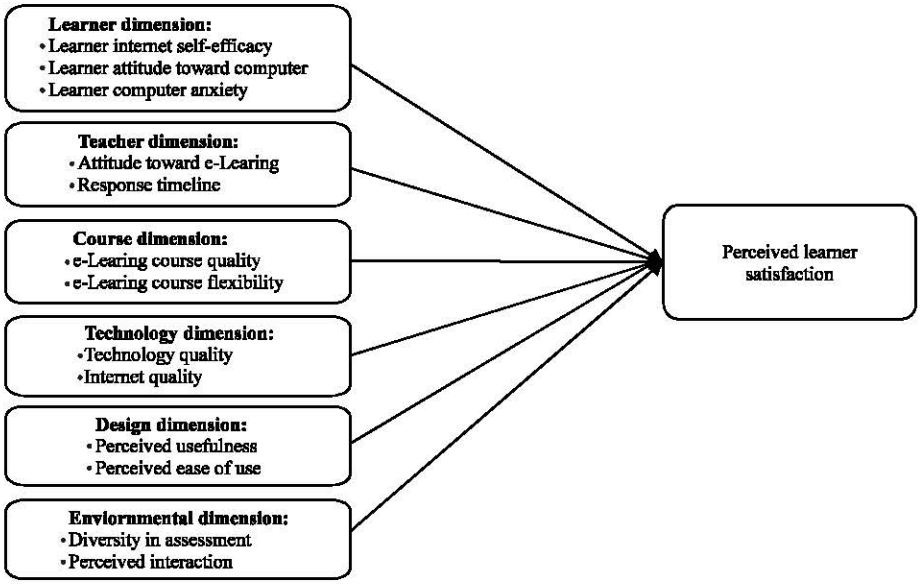

Fig. 2: The Integrated Conceptual Model (ICM) (Sun *et al*., 2008)

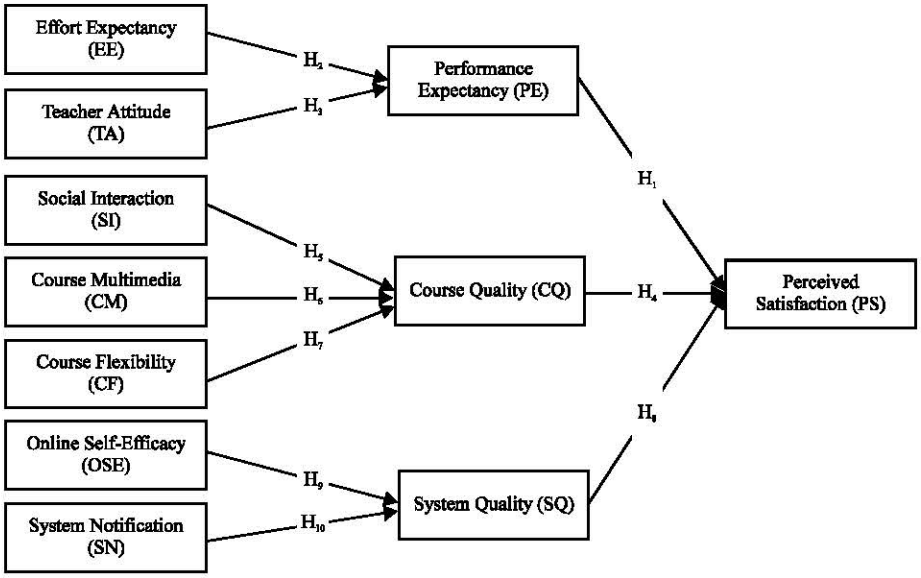

Fig. 3: The proposed Conceptual Model of Learner Satisfaction (CMLS)

Perceived Satisfaction (PS): Online learning settings constitute an important shift in how learners can take in new knowledge and information. This may mean that there is an indisputable need to understand factors that can affect learner satisfaction in online education. Perceived satisfaction is one of the major variables that can affect the success in distance or hybrid learning modes. According to Hong *et al*. (2016), learner satisfaction refers to "the pleasure or contentment that one feels after performing an assigned task or desired action". As such, the present research sought to shed some light on predictors of learner satisfaction in online learning.

Performance Expectancy (PE): Many models such as TAM (Davis *et al*., 1989), the Technology Acceptance Model 2 (TAM2) (Venkatesh and Davis, 2000) and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh *et al*., 2003) suggested that performance expectancy is a direct predictor of

technology acceptance. Other studies found that this factor has a direct influence on perceived satisfaction in e-Learning environments (Al-Azawei *et al*., 2016; Sun *et al*., 2008). The rationale behind this assumption is that when learners perceive technology usefulness, their satisfaction can be positively affected as well. Thus, we suggested that:

- H_1: Performance Expectancy (PE) has a direct and significant influence on Perceived Satisfaction (PS) in an online learning mode

Effort Expectancy (EE): Effort expectancy refers to the mental effort required to perform a specific learning task in online learning systems. It has been pointed out that the perception of technology usefulness is highly correlated with the expected effort to use it (Davis *et al*., 1989). This has also been supported in e-Learning contexts (Tarhini *et al*., 2015). Even though some studies assumed that effort expectancy can be a direct predictor of technology acceptance and/or user satisfaction, a recent review study indicates that this relationship is inconsistent among studies (Hwang *et al*., 2016). Thus, we assumed that effort expectancy is a direct predictor of performance expectancy only:

- H_2: Effort Expectancy (EE) has a direct and significant influence on performance Expectancy (PE) in an online learning mode

Teacher Attitude (TA): Teacher's characteristics can be accounted as one of the main factors that may affect online experience (Naaj *et al*., 2012). There is no doubt that characteristics of teachers can affect student performance and perceptions in traditional learning settings. However, the absence of a direct interaction between instructors and learners in online learning does not mean that this factor can be ignored. According to literature, a teacher's attitude toward e-Learning is an important factor that can positively affect user satisfaction (Sun *et al*., 2008; Piccoli *et al*., 2001). In this research, we supposed that teacher attitude could be a predictor of performance expectancy based on the notion that learners may further perceive the usefulness of a learning technology if their instructors have a high obligation and positive view about the technology:

- H_3: A Teacher's Attitude (TA) has a direct and significant influence on Performance Expectancy (PE) in an online learning mode

Course Quality (CQ): Designing an e-Course to a high standard and quality is another factor that can influence learner satisfaction (Piccoli *et al*., 2001). Well-designed online courses can assist in retaining the attention of learners towards the learning content and this in turn, could lead to better learning outcomes. According to Govindasamy (2001), e-Learning settings should be carefully designed to not undermine the application process. Additionally, Rienties and Toetenel (2016) concludes that an efficient e-Learning design can significantly affect learner satisfaction and learning outcomes. As such, it was assumed in the present research that:

- H_4: Course Quality (CQ) has a direct and significant influence on Perceived Satisfaction (PS) in an online learning mode

Three variables were proposed to predict this construct which are social interaction, multimedia instruction and course flexibility.

Social Interaction (SI): Interaction is an essential factor to succeed in online education (Bouhnik and Marcus, 2006). As discussed previously, one of the main shortcomings in online learning is the absence of an efficient interaction (Cole *et al*., 2014). According to the social constructivism learning theory, however, the interaction between learners and other colleagues or learners and teachers, plays a vital role in constructing learner knowledge. Wu *et al*. (2010) state that interaction is one of the primary factors that influences student satisfaction in a blended learning mode as efficient interaction enables learners to construct their own knowledge. Hence, this study integrates this factor into the proposed model.

- H_5: Social Interaction (SI) has a direct and significant influence on Course Quality (CQ) in an online learning mode

Course Multimedia (CM): According to Liaw (2008), using multimedia instructions enable learners to develop complex cognitive skills. Hence, this factor will be examined from a learner's point of view to reveal if there is a causal relationship between multimedia instructions and course quality. The justification for integrating multimedia instructions as a determinant of course quality is that learner's perceptions regarding the quality of online courses may be enhanced if they found that the

course design is rich with different types of multimedia instructions such as videos, graphs, texts and figures. Hence, it was proposed that:

- H_6: Course Multimedia (CM) has a direct and significant influence on Course Quality (CQ) in an online learning mode

Course Flexibility (CF): The other course dimension factor included in the proposed model is course flexibility. The course flexibility is defined as the "learners' perception of the efficiency and effects of adopting e-Learning in their working, learning and commuting hours" (Sun *et al*., 2008). The elimination of time and location constraints in online courses provides a flexible learning environment because learners can learn in their own time and pace. Such flexibility can enhance learner's perceptions regarding the course quality, especially for learners who have other commitments. Thus, the following hypothesis was assumed in this research:

- H_7: Course Flexibility (CF) has a direct and significant influence on Course Quality (CQ) in an online learning mode

System Quality (SQ): To examine if there is a causal relationship between features of e-Learning systems and user satisfaction, the viewpoint of learners about the technology quality is also integrated into the proposed framework. In keeping with the prior research, this factor was a predictor of learner satisfaction (Liaw, 2008). Based on such findings, this research proposed that:

- H_8: System Quality (SQ) has a direct and significant influence on Perceived Satisfaction (PS) in an online learning mode

However, it was suggested that learners can perceive system quality if they have high individual skills and more confident in using the technology. Furthermore, if the system includes different approaches to notify its users about all activities related to the online courses, learners can realise its quality. Accordingly, the online learning self-efficacy and system notification were suggested as direct predictors of system quality.

Online Learning Self-Efficacy (OLSE): A correlation between learning outcomes and learner satisfaction is revealed when considering individual learner differences and characteristics. The individual learner factor that was included in this research is online learning self-efficacy. The self-efficacy factor is incorporated because related research has shown that it has a strong influence on learner satisfaction (Johnson *et al*., 2008; Liaw, 2008; Sun *et al*., 2008). However, the present research assumed a new relationship between self-efficacy and perceived system quality as follows:

- H_9: A Learner's Self-Efficacy (OLSE) has a direct and significant influence on System Quality (SQ) in an online learning mode

System Notification (SN): Notification is one of the most important system's functions. Technologies that provide rich notification approaches can keep an effective communication between the course's instructors and participants. Learners should be up to date about all activities that the teacher may perform in a system to retain their attention and motivation. In line with this assumption, Atchariyachanvanich *et al*. (2014) found that system's notification can positively affect learner's willingness to adopt a learning technology. Accordingly, the following hypothesis was proposed:

- H_{10}: A System's Notification (SN) function has a direct and significant influence on System Quality (SQ) in an online learning mode

MATERIALS AND METHODS

Due to the sacristy of respective research in Iraq that focuses on online education and learner's perceptions in this learning environment, the present study was conducted. It aimed to identify the cause and effect relationships between different variables in a proposed research model. Hence, a survey research design was adopted. This approach is appropriate to investigate a research framework and understand the prediction ability of its factors in a natural environment (Leedy and Ormrod, 2010). Accordingly, a systematic research design was adopted to meet the goals of the study. This includes designing an online multimedia course, advertising the course to recruit the cohort, designing a research questionnaire to collect the data and finally, analysing the collected data and interpreting the research findings. The following subsections describe the followed research methodology.

Participants and context: Overall, 70 learners voluntarily filled out the research survey to represent the subjects of this study. The sample included 27 (38.6%) male and 43 (61.4%) female learners in which most of them ranged in age between 18 and 21 years old (N = 57, 81.4%). Moreover, 66 (94.3%) of the participants mentioned that they use the internet daily.

An online course was developed and delivered by the first researcher to introduce the main concepts of websites design for Iraqi learners. It included seven lectures where every lecture consisted of a serious of

short videos, written files (PDF format), figures and diagrams. The forum and wiki communication tools were also used in this course to keep the interaction between the learners and their instructor. All lectures were explained in the Arabic language because most Iraqi people have either a mild or moderate English skills.

Research instruments and data analysis: To collect the research data, a questionnaire was developed to identify the integrated dimensions into the proposed framework. This questionnaire encompassed two main parts. The first was dedicated to identifying demographic information of participants whereas the second was allocated to measure the research dimensions. This second part was adapted from the previous studies (Johnson *et al*., 2008; Liaw, 2008; Sun *et al*., 2008; Piccoli *et al*., 2001; Wu *et al*., 2010). It included 33 closed-ended questions identified by a 7-point Likert scale ranging from 1 for 'strongly disagree' to 7 for 'strongly agree'.

The collected data were analysed using SPSS (Statistical Package for the Social Sciences) Version 22 for Windows 7 to calculate Mean (M), frequency, Standard Deviation (SD) and Pearson's correlation. SmartPLS Software Version 3 for Windows 7 was adopted to investigate the proposed model. The partial Least Square-Structural Equation Modelling (PLS-SEM) technique was chosen to test the cause and effect relationship between the proposed model constructs and support or reject its identified hypothesis. According to Hair *et al*. (2016), many criteria underlie the strength of this method. First, it is suitable for a small dataset. Moreover, this technique does not assume a normal distribution for the research data. It is also unlike multiple regressions that require running the model many only. Finally, it is appropriate for complicated models that include several variables. The validity and reliability of the research questionnaire were also examined using this software.

RESULTS AND DISCUSSION

The findings of this research were computed in three stages. The first stage encompassed preliminary analysis to investigate data normality, multicollinearity assumption and correlation between variables. The second stage included validating the research questionnaire. Finally, the cause and effect associations between the model's factors and its proposed hypothesis were assessed in the last stage.

Preliminary analysis: Table 1 reports means and standard deviations of the model constructs. It is clear that the mean scores for all variables are greater than the midpoint of the scale (midpoint = 3.5). Furthermore, the values of skewness (SE = 0.287) and kurtosis (SE = 0.566) as indicators of data distribution show that the research data were normally distributed based on the assumption of Peat and Barton (2005) that if the values of both tests <+3 and >-3, this could be a good indication that the variables are normally distributed.

Additionally, the multicollinearity assumption was also checked. It occurs when two variables are highly associated. According to Pallant (2013), if values of the Variance Inflation Factor (VIF) are above 10, this means that the multicollinearity assumption is violated. Looking to the results in Table 1 can clearly indicate that this assumption was not violated because all values of VIF are <10. Thus, the overall characteristics of the research data are supported. Table 2 illustrates the analysis of the Pearson correlation coefficient. It shows that most variables are significantly correlated and the highest correlation is r = 0.782. This significant association between the research framework factors could further support the theoretical construction of the proposed model.

Instrument properties: Prior to investigating the cause and effect relationships between the model's constructs, the psychometric properties of the questionnaire were assessed first. Convergent and discriminant validity are the main measurement used to identify reliability and validity of a research survey. The questionnaire adopted in the present research has met all criteria suggested by Hair (2006).

Table 3 and 4 demonstrate the questionnaire's properties. The internal consistency reliability for all items

Table 1: Descriptive Statistics, data normality and multicollinearity analysis

Factors	Mean	SD	Skewness	Kurtosis	VIF
Online Learning Self-Efficacy (OLSE)	5.0800	1.126	-1.103	2.223	1.207
System Quality (SQ)	5.4476	1.047	-0.886	1.257	1.967
System Notification (SN)	5.6143	0.937	-0.981	2.558	1.207
Effort Expectancy (EE)	5.4476	1.000	-0.953	1.992	1.309
Performance Expectancy (PE)	6.0952	0.929	-1.589	4.314	1.716
Teacher Attitude (TA)	5.8643	1.176	-1.665	2.848	1.309
Course Multimedia (CM)	6.1000	1.102	-1.791	3.973	1.217
Course Flexibility (CF)	5.3238	1.057	-0.675	0.627	1.420
Course Quality (CQ)	5.5429	0.850	-1.230	2.574	1.570
Social Interaction (SI)	5.0500	1.063	-0.646	0.323	1.217
Perceived Satisfaction (PS)	5.8429	0.891	-1.270	2.597	-

Table 2: Factors correlation

Factors	CF	CM	CQ	EE	OLSE	PE	PS	SI	SN	SQ
CM	0.421**	1.000								
CQ	0.645***	0.280*	1.000							
EE	0.531***	0.422**	0.373**	1.000						
OLSE	0.516***	0.314*	0.471**	0.550**	1.000					
PE	0.578***	0.627***	0.490**	0.530**	0.499**	1.000				
PS	0.732***	0.523***	0.645***	0.435**	0.427**	0.593***	1.000			
SI	0.422**	0.201*	0.589***	0.320*	0.342*	0.323*	0.445**	1.000		
SN	0.491**	0.590***	0.496**	0.438**	0.415**	0.587**	0.479**	0.415**	1.000	
SQ	0.572***	0.389**	0.581**	0.442**	0.541***	0.627***	0.562***	0.512**	0.648***	1.000
TA	0.524***	0.564***	0.301*	0.486**	0.474**	0.782***	0.493**	0.330*	0.451**	0.443**

*p<0.05, **p<0.01, ***p<0.001

Table 3: Convergent validity of the questionnaire

Factors	Cronbach's α	Rho_A	CR	AVE
Course Flexibility (CF)	0.722	0.765	0.842	0.642
Course Multimedia (CM)	0.819	0.819	0.917	0.847
Course Quality (CQ)	0.744	0.745	0.886	0.796
Effort Expectancy (EE)	0.745	0.781	0.852	0.658
Online Learning Self-Efficacy (OLSE)	0.830	0.855	0.880	0.597
Performance Expectancy (PE)	0.832	0.837	0.899	0.748
Perceived Satisfaction (PS)	0.891	0.907	0.919	0.696
Social Interaction (SI)	0.665	0.675	0.856	0.748
System Notification (SN)	0.738	0.763	0.883	0.791
System Quality (SQ)	0.828	0.833	0.897	0.743
Teacher Attitude (TA)	0.809	0.824	0.912	0.839

Table 4: Discriminant validity of the questionnaire

Variables	CF	CM	CQ	EE	OLSE	PE	PS	SI	SN	SQ	TA
Course Flexibility (CF)	0.801										
Course Multimedia (CM)	0.421	0.920									
Course Quality (CQ)	0.645	0.280	0.892								
Effort Expectancy (EE)	0.531	0.422	0.373	0.811							
Online Learning Self-Efficacy (OLSE)	0.516	0.314	0.471	0.550	0.772						
Performance Expectancy (PE)	0.578	0.627	0.490	0.530	0.499	0.865					
Perceived Satisfaction (PS)	0.732	0.523	0.645	0.435	0.427	0.593	0.834				
Social Interaction (SI)	0.422	0.201	0.589	0.320	0.342	0.323	0.445	0.865			
System Notification (SN)	0.491	0.590	0.496	0.438	0.415	0.587	0.479	0.415	0.889		
System Quality (SQ)	0.572	0.389	0.581	0.442	0.541	0.627	0.562	0.512	0.648	0.862	
Teacher Attitude (TA)	0.524	0.564	0.301	0.486	0.474	0.782	0.493	0.330	0.451	0.443	0.916

Table 5: The cause and effect relationship between the model's constructs and hypothesis analysis

Hypothesis	β	p-values	t-values	Finding
H_1: Performance Expectancy (PE)→Perceived Satisfaction (PS)	0.309	0.001	3.197	Supported
H_2: Effort Expectancy (EE)→Performance Expectancy (PE)	0.196	0.033	2.139	Supported
H_3: Teacher Attitude (TA)→Performance Expectancy (PE)	0.686	<0.001	10.520	Supported
H_4: Course Quality (CQ)→Perceived Satisfaction (PS)	0.422	0.001	3.488	Supported
H_5: Social Interaction (SI)→Course Quality (CQ)	0.386	<0.001	3.565	Supported
H_6: Course Multimedia (CM)→Course Quality (CQ)	-0.001	0.993	0.009	Rejected
H_7: Course Flexibility (CF)→Course Quality (CQ)	0.483	<0.001	3.879	Supported
H_8: System Quality (SQ)→Perceived Satisfaction (PS)	0.123	0.252	1.147	Rejected
H_9: Online Learning Self-Efficacy (OLSE)→System Quality (SQ)	0.329	0.004	2.861	Supported
H_{10}: System Notification (SN)→System Quality (SQ)	0.511	<0.001	3.734	Supported

exceeded the threshold of 0.6, ranging from 0.665-0.891. Moreover, the Composite Reliability (CR) for all constructs is higher than 0.7 whereas the Average Variance Extracted (AVE) for the variables exceeded the threshold of 0.5. Thus, the convergent validity is confirmed.

Furthermore, discriminant validity is also established because the variance shared between each factor and its own items is greater than the variance shared between the factor and other variables as exhibited in Table 4. The outer loading of most items of the questionnaire is also higher than 0.7 (Fig. 4). Accordingly, the measurement used to collect the research data is a valid and reliable method to investigate the proposed research framework.

The model hypothesis: Table 5 and Fig. 4 depict the main findings of the proposed model and its hypothesis. Eight out of ten suggested hypothesis were supported. The findings reveal that Performance Expectancy (PE) (β_{PE_PS} = 0.309, p<0.01) and Course Quality (CQ)

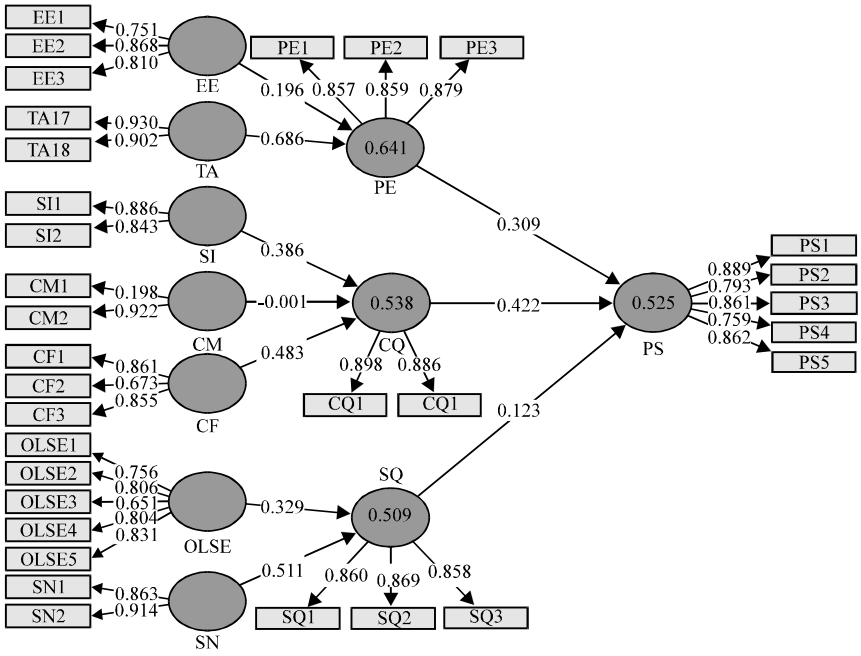

Fig. 4: Results of the research model

(β_{QC_PS} = 0.422, p<0.01) were significant predictors of learner satisfaction. System Quality (SQ) on the other hand, had a direct but insignificant influence on perceived satisfaction (β_{SQ_PS} = 0.123, p = 0.252). These three variables explained 52.5% of the variance of perceived satisfaction, supporting the proposed relationships in the research framework.

To predict Performance Expectancy (PE), both Effort Expectancy (EE) (β_{EE_PE} = 0.196, p = 0.03) and Teacher Attitude (TA) (β_{TA_PE} = 0.686, p<0.01) were significant determinants. These factors explained 64.1% of the variance of Performance Expectancy (PE). However, Teacher Attitude (TA) was the best predictor indicating that teachers should have a positive viewpoint to ensure perceiving e-Learning usefulness by its learners.

Regarding the predictors of Course Quality (CQ), two out of three variables were significant determinants of this construct. These are Social Interaction (SI) (β_{SI_CQ} = 0.386, p<0.01) and Course Flexibility (CF) (β_{CF_PE} = 0.483, p<0.01). On the other hand, Course Multimedia (CM) had an insignificant effect on course quality. Overall, these variables explained 53.8% of the variance of this construct.

Finally, the findings indicate that both Online Learning Self-Efficacy (OLSE) (β_{OLSE_SQ} = 0.329, p = 0.004) and System Notification (SN) (β_{SN_SQ} = 0.511, p<0.01) were significant determinants of system quality. Both factors explained a good fit of the variance of this variable where R^2 is 0.509 (Fig. 4).

This research was conducted to identify the main predictors of learner satisfaction in online learning. It also sought to evaluate perceptions of Iraqi learners towards this teaching technology, since, it is still a new experience for them. To achieve the research aims, a conceptual model of learner satisfaction was proposed in which it was based on the Technology Acceptance Model (TAM) (Davis *et al*., 1989) and the Integrated Conceptual Model (ICM) (Sun *et al*., 2008). The overall findings of this study are encouraging where the majority of the proposed hypothesis were retained, supporting the constructed research framework.

The results of examining the predictors of perceived satisfaction indicate that two variables, namely performance expectancy and course quality, had a significant direct impact on this construct. This means that learners will not be satisfied in online education if they have not perceived its positive effect on their learning outcomes or if online courses are designed in a poor quality. The influence of both constructs on learner satisfaction is consistent with the results by Sun *et al*. (2008). Thus, hypothesis H_1 and H_4 were retained. On the other hand, system quality was an insignificant determinant of perceived satisfaction, rejecting hypothesis H_8 and supporting the findings of Sun *et al*. (2008). However, such results are inconsistent with the research performed by Liaw (2008) where it was found that system quality was a predictive factor of perceived satisfaction. The good explanation of performance

expectancy and course quality for perceived satisfaction suggest that educational institutions should pay further attention to enhance learner's perceptions regarding the usefulness of e-Learning. It also means that the online and hybrid courses should be designed in an interactive way to engage all learners regardless of their individual characteristics and preferences. Ignoring any of these variables could negatively affect learner satisfaction and this in turn, may lead to withdrawing from online courses.

The results of testing the determinants of performance expectancy reveal that both effort expectancy and teacher attitude were significant determinants of this factor, supporting Hypothesis H_2 and H_3. Such findings mean that learners will not perceive e-Learning usefulness if the use of this technology requires high mental effort. In keeping with other studies, effort expectancy was a strong predictor of performance expectancy (Tarhini *et al*., 2015). Hence, educational institutions should consider the usability of e-Learning technologies to ensure that learners will continue to use them. Teacher attitude toward e-Learning was the most influential factor on e-Learning usefulness, even more than effort expectancy. This may confirm that negative teacher's attitudes towards online education can lead to reducing perceived e-Learning usefulness. As a result, it is highly recommended that instructors who are selected to teach online should be highly motivated towards the use of this technology in their teaching process. They should also be aware of the potential advantages of applying the technology and its positive impacts on learning outcomes. This finding corroborates the results of Piccoli *et al*. (2001) and Sun *et al*. (2008) which reveal the importance of motivating instructors to adopt online learning as a learning tool.

Pertaining to the predictors of course quality, two out of three variables were found to determine this factor, namely social interaction and course flexibility. Hence, Hypothesis H_5 and H_7 were confirmed whereas course multimedia was a weak predictor of course quality, rejecting hypothesis H_6. The findings suggest that the absence of efficient and direct interaction represents the main failing in online learning. Therefore, students will not realise the quality of online courses when there is a lack in interaction methods. Accordingly, it is essential that teachers need to activate the available communication tools in LMSs such as chat forum and wiki to tackle this issue. In this course, all these tools were used to support the interaction between the instructor and learners. Cole *et al*. (2014) also identified the significant role of social interaction on learner's perceptions in online and hybrid education. The positive influence of course flexibility may indicate that the accessibility to learning materials and other learning activities should not be restricted by a specific time or place to give learners the opportunity to learn at their own pace.

Although, system quality had an insignificant influence on perceived satisfaction, online learning self-efficacy and systems notification were predictors of this variable, supporting Hypothesis H_9 and H_{10}. Unskilled users in a particular technology can negatively impact on their perceptions regarding its quality. As such, it is necessary to conduct training programs to improve learner's self-confidence in performing e-Learning tasks. This may be further recommended for learners in developing countries due to the late introducing of such technologies in their life sectors. Furthermore, notifying learners about all upcoming activities can enhance their perceptions about system's quality. This may be because learners can recognise how the use of learning technology can retain their attention towards the course content and activities, especially in a case that learners have different life commitments. Such findings are in agreement with the study performed by Atchariyachanvanich *et al*. (2014) which indicated that system notification can improve learner's willingness to adopt cloud computing.

This research adds many contributions in comparison to the earlier literature. First, it represents one of the first attempts in evaluating online learning in the Iraqi context. Thus, it bridges a research gap in this learning environment. Moreover, the theoretical base of this study depends on two well-known technology use frameworks. However, it proposes new factors and relationships between different variables in the constructed model where the empirical findings have supported such assumptions. Third, this research highlights several recommendations that should be considered in online education to improve this experience, particularly in developing countries, since, it is a new experience in such nations.

CONCLUSION

This study has investigated the effect of performance expectancy, course quality and e-Learning system quality on learner satisfaction in an online learning setting. It has also highlighted the effect of effort expectancy and teacher attitude on online learning usefulness, the influence of social interaction as well as multimedia instructions and course flexibility on perceived course quality and finally, the impact of self-efficacy and system notification on perceived system quality. Generally, it has supported the findings of the previous studies. However,

it has identified new associations between different variables that have not been examined in earlier literature, to the best of the researchers knowledge. Finally, this study filled a research gap regarding the level of satisfaction of Iraqi learners in online learning due to the absence of such research.

RECOMMENDATIONS

The proposed model achieved a good fit in explaining learner satisfaction. Overall, it has identified many aspects that should be considered in the design of online instructions to ensure the successfulness of this learning experience. However, further research can be conducted to include a larger sample and integrate qualitative and quantitative methods together to obtain a more in-depth understanding of different factors that may lead to enhancing learner's experience in online education.

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