

Mobile learning for teacher professional development: An empirical assessment of an extended technology acceptance model

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ABSTRACT: This study explores how mobile learning (m-learning) can serve as a valuable resource for the professional development of Iraqi English as a Foreign Language (EFL) teachers in higher education during the COVID-19 pandemic. Utilizing an extended Technology Acceptance Model (TAM), the research investigates the model's fit, structural relationships between variables, and potential moderating effects of gender and academic rank. Findings revealed that Iraqi EFL teachers generally demonstrated positive attitudes toward m-learning adoption, with identified challenges in self-efficacy and ease of use. Gender analysis indicated that females exhibited higher ease of use, self-efficacy, enjoyment, and positive attitudes and intentions toward m-learning adoption. Higher-ranked teachers perceived m-learning as more useful. The extended TAM displayed a good fit to empirical data, revealing significant positive relationships between variables. Gender did not moderate these relationships, but academic rank played a substantial role. The findings guide strategies for targeted professional development, addressing technical support concerns, and designing engaging experiences to facilitate successful m-learning integration in higher education, considering the unique needs and challenges of Iraqi EFL teachers.

Keywords: professional development, Iraqi EFL teachers, mobile learning, technology acceptance model, higher education

Aprendizaje móvil para el desarrollo profesional docente: una evaluación empírica de un modelo ampliado de aceptación de la tecnología

RESUMEN: Este estudio explora cómo el aprendizaje móvil (m-learning) puede servir como un recurso valioso para el desarrollo profesional de docentes de inglés como lengua extranjera (EFL) en la educación superior en Irak durante la pandemia de COVID-19. Utilizando un Modelo de Aceptación de Tecnología (TAM) ampliado, la investigación examina la idoneidad del modelo, las relaciones estructurales entre variables y los posibles efectos moderadores de género y rango académico. Los hallazgos revelaron que, en general, los docentes de EFL en Irak mostraron actitudes positivas hacia la adopción del m-learning, identificando desafíos en la autoeficacia y la facilidad de uso. El análisis de género indicó que las mujeres mostraron una mayor facilidad de uso, autoeficacia, disfrute, y actitudes e

intenciones positivas hacia la adopción del m-learning. Los docentes de mayor rango percibieron el m-learning como más útil. El TAM ampliado mostró una buena adaptación a los datos empíricos, revelando relaciones positivas significativas entre las variables. El género no moderó estas relaciones, pero el rango académico desempeñó un papel sustancial. Los hallazgos orientan estrategias para el desarrollo profesional dirigido, abordando preocupaciones de soporte técnico y diseñando experiencias atractivas para facilitar la exitosa integración del m-learning en la educación superior, teniendo en cuenta las necesidades y desafíos únicos de los docentes de EFL en Irak.

Palabras clave: desarrollo profesional, profesores de EFL en Irak, aprendizaje móvil, modelo de aceptación de la tecnología, educación superior

1. INTRODUCTION

The term ‘professional development’ has been employed in diverse contexts and conceptual frameworks (Hartono, 2016; Hidayat *et al.*, 2023; Johnson, 2019; Le Huong, 2023; Lo, 2020). As posited by Guskey (2000), teacher professional development encompasses a spectrum of procedures, steps, and activities designed to augment their professional knowledge, skills, and perspectives. This dynamic process has proven exceptionally effective in empowering educators to navigate evolving standards, embrace innovative teaching methodologies, harness educational technologies, and adapt to the ever-shifting educational landscape (Derakhshan, 2020; Lawless & Pellegrino, 2007). Within this contemporary landscape, the spotlight is increasingly turning toward educational technology, including mobile learning (m-learning) as a focal point for teacher professional development, offering accessible and flexible avenues for educators (Shchedrina *et al.*, 2020). However, despite the recognized value of mobile technologies in advancing teacher professional development, concerns persist regarding the pedagogically effective integration of technology into education. To establish m-learning as a mainstream pedagogical component in education, it is crucial to gather more empirical evidence that examines the factors influencing teachers' acceptance and adoption of m-learning, among others (Buabeng-Andoh, 2021; Laifa *et al.*, 2023). This, in turn, can inform customized professional development initiatives, offering effective strategies, guidelines, and robust support mechanisms for teachers.

The acceptance and adoption of m-learning for professional development have not been limited to specific disciplines but have permeated various fields, including language teaching and learning (Mashhadi *et al.*, 2023). Language teachers mostly acknowledge the potential of mobile and wireless technologies in meeting the diverse educational needs of language learners, emphasizing the importance of providing “continuity or spontaneity of access and interaction across different contexts of use” (Kukulska-Hulme & Shield, 2008, p. 273). As a result, there has been a growing interest in harnessing professional development programs that specifically target technology use, particularly within the realm of language education (Mashhadi *et al.*, 2023). Such initiatives have the potential to contribute significantly to the widespread integration of m-learning in higher education (Buabeng-Andoh, 2021). More recently, the outbreak of the COVID-19 pandemic presented unprecedented challenges to the educational sector, necessitating the rapid adoption of remote and online learning modalities (UNESCO, 2020). In this context, m-learning emerged as a viable option for delivering educational content and engaging students remotely (Li, 2022; Monjezi *et al.*, 2021).

In light of the increasing global focus on m-learning adoption, this study investigated the perceptions and adoption of m-learning for professional development among Iraqi English as a Foreign Language (EFL) teachers in higher education during the COVID-19 pandemic. This aimed to enhance their skills in professional development, enabling them to adapt their instruction to the diverse learning needs of their students. The research employed an extended Technology Acceptance Model (TAM) developed by Qashou (2021) to assess the model's fit with empirical data, explore the structural relationships between model variables, and investigate the potential moderating effects of gender and academic rank. Understanding the relationships between factors affecting the adoption of m-learning among Iraqi EFL teachers in the context of COVID-19 can shed light on the effectiveness and challenges of m-learning, contributing to the broader knowledge base on m-learning for teacher professional development programs in higher education. In pursuit of the research objectives, the following research questions were formulated

1. How do Iraqi EFL teachers perceive m-learning adoption for professional development based on variations in gender and academic rank?
2. To what extent do the empirical data collected from Iraqi EFL teachers fit the conceptual model?
3. What are the structural relationships among the different constituent variables of the conceptual model?
4. Do gender and academic rank moderate the structural relationships within the conceptual model?

2. LITERATURE REVIEW

2.1. Language Teachers' Perceptions of M-Learning for Professional Development in Higher Education

Teacher attitude (AT) towards m-learning plays a crucial role in facilitating its adoption in higher education institutions (Al-Emran *et al.*, 2016; Luo, 2019). Several studies have already investigated the acceptance and readiness of language teachers for m-learning adoption in higher education, shedding light on influencing factors, benefits, challenges, and implementation implications for teacher professional development. Huang (2017) focused on college English teachers in China, highlighting the significant influence of factors such as perceived usefulness (PU), perceived ease of use (PEOU), and technological infrastructure on m-learning acceptance and adoption. Chen's (2017) study further supported these findings by demonstrating positive perceptions of EFL teachers towards m-learning influenced by factors including PU, PEOU, and personal innovativeness, while they expressed concerns about potential distractions and negative effects in the classroom.

In line with these studies, Chkotua and Bingol (2018) found that EFL teachers in a private university generally held positive perceptions of mobile language learning, emphasizing increased engagement as a benefit. However, they also expressed concerns about distractions, lack of technical support, and the need for professional training. Similarly, Alzubi (2019) explored EFL university teachers' perceptions of using smartphones in language learning,

uncovering positive aspects regarding increased learner engagement and perceived mobility value (PMV) of m-learning but raising concerns about distractions, unequal device access, and the importance of implementing proper pedagogical strategies. Examining the ATs of EFL teachers at a Vietnamese university, Van Vo and Thuy Vo (2020) discovered positive ATs towards m-learning, acknowledging benefits such as enhanced motivation and perceived enjoyment (PE). Nonetheless, they also highlighted challenges related to limited access to technology, insufficient training, and concerns about classroom management. Similarly, Dağdelen and Demiröz (2022) explored EFL instructors' perspectives on m-learning in higher education, recognizing the benefits of increased engagement, autonomy, and mobility while identifying challenges including technical issues, limited institutional support, and concerns about distractions and misuse of mobile devices.

Collectively, these studies reveal the overall positive perceptions of language teachers towards m-learning in higher education, recognizing its potential benefits in terms of learner autonomy, engagement, and enjoyment. However, external factors related to facilities, institutional support, distractions, and classroom management as well as internal, teacher-related factors such as lack of perceived self-efficacy (PSE) in using m-learning need to be addressed through improved infrastructure, tailored professional development programs, and suitable pedagogical strategies to fully leverage the potential of m-learning in language education.

2.2. M-learning Adoption in Higher Education in the Arab World

Despite variations in focus, research conducted on m-learning in Arab countries provides valuable insights into the potential impact of this educational approach in higher education settings for teacher professional development. The literature consistently demonstrates that m-learning has the potential to enhance student engagement, foster flexible learning environments, and facilitate personalized educational experiences (Al-Emran & Shaalan, 2017; Alsswey *et al.*, 2020; Mashhadi *et al.*, 2022). Both students and teachers recognize the motivational aspects of m-learning, which can lead to improved learning outcomes and collaborative learning among students (Eppard *et al.*, 2019). Furthermore, m-learning is seen as a means to address educational challenges and bridge the digital divide in Arab countries by providing greater access to educational resources and opportunities for innovation (Al-Emran & Shaalan, 2017).

However, the studies also reveal several challenges that must be addressed for the effective implementation of m-learning. A common challenge is the limited technological infrastructure, including issues related to connectivity and device compatibility (Alsswey *et al.*, 2020). Lack of teachers' PSE, insufficient training, and technical support were also identified as barriers to the successful adoption of m-learning (Ishtaiwa *et al.*, 2015). Moreover, concerns about distractions, misuse, and unequal access to resources highlight the need for customized professional development programs and support mechanisms for m-learning adoption in higher education (Alsswey *et al.*, 2020). By leveraging the advantages of m-learning, such as learner mobility, increased engagement and personalized learning experiences, and addressing challenges through infrastructure development, faculty training, and policy support, Arab higher education institutions can harness the power of technology to enhance teaching and learning experiences (Eppard *et al.*, 2019).

The reviewed literature on m-learning adoption in higher education in the Arab world holds significant relevance to the context of Iraqi EFL teachers, especially in the challenging landscape of the COVID-19 pandemic. The study's focus on investigating the perceptions and adoption of m-learning for professional development among Iraqi EFL teachers during the COVID-19 pandemic is particularly timely. The pandemic has accelerated the need for innovative and flexible teaching approaches, making the insights from the broader Arab world highly applicable to the Iraqi higher education system. By utilizing an extended Technology Acceptance Model (TAM) developed by Qashou (2021), this study aims to bridge the gap between theoretical frameworks and empirical data specific to Iraqi EFL teachers. The investigation into the model's fit to the local context, exploration of structural relationships, and consideration of potential moderating effects of gender and academic rank contribute to the customization of strategies for successful m-learning adoption in Iraq. The findings from this study not only contribute to the academic discourse but also offer practical implications for educational policymakers, administrators, and instructors in Iraq. The insights gained can inform the development of targeted interventions, training programs, and policy adjustments to enhance the adoption of m-learning strategies among Iraqi EFL teachers. Leveraging the advantages of m-learning while addressing the identified challenges can empower Iraqi higher education institutions to harness technology effectively, thereby enhancing teaching and learning experiences in the face of unprecedented global challenges.

2.3. The Conceptual Framework: The Extended TAM

Various theoretical models in the literature have been developed to explore the key factors influencing the acceptance and adoption of new technologies. Notable models include the TAM, the Unified Theory of Acceptance and Use of Technology (UTAUT), the Innovation Diffusion Theory (IDT), the Theory of Reasoned Action (TRA), and the Theory of Planned Behavior (TPB) (Al-Emran & Teo, 2020). Among these models, TAM has garnered the most empirical validation and has demonstrated its utility in explaining technology acceptance and adoption across different contexts (Mendoza *et al.*, 2017; Tao *et al.*, 2022). Initially proposed by Davis (1989) and based on the TRA (Fishbein & Ajzen, 1975), TAM aims to predict and explain users' adoption of specific technological items. It posits that the primary factors influencing user acceptance of technology are PEOU and PU. PEOU directly affects PU and users' AT, while PU directly influences users' AT and their Behavioral Intention (BI) to use the technology. TAM has been expanded in numerous studies by incorporating external factors.

In this particular study, the TAM (Qashou, 2021) extended by external factors such as mobility, self-efficacy, and enjoyment was adopted to examine the relationships among various factors influencing the acceptance of m-learning for professional development among Iraqi EFL teachers in higher education. Furthermore, this study focused on investigating the potential moderating effects of gender and academic rank on the relationships between the variables of the extended TAM for Iraqi EFL teachers in higher education. The constituent variables of the extended TAM (as illustrated in Fig. 1) and the research hypotheses pertaining to the acceptance of m-learning are presented below.

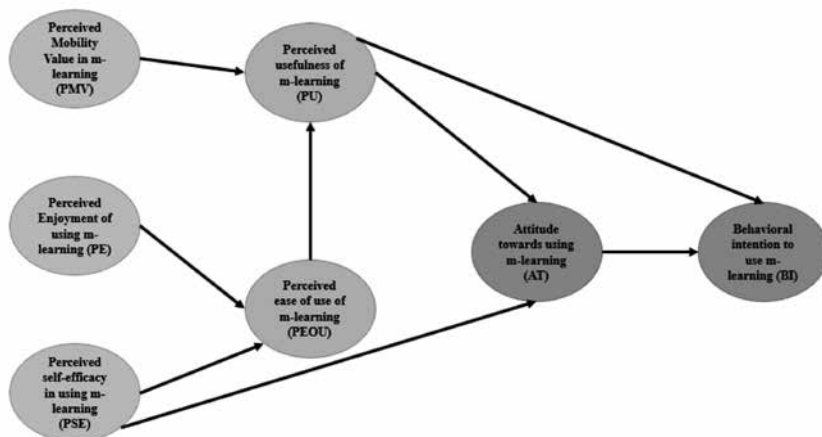


Figure 1. *The research conceptual model (Qashou, 2021)*

2.3.1. PEOU

PEOU refers to the degree to which individuals perceive a particular system as effortless to use (Davis, 1989). In the context of this study, PEOU refers to the ease with which Iraqi EFL teachers perceive m-learning as a viable tool for language teaching in higher education. According to the TAM, users are more likely to perceive a technology as beneficial if they perceive it to be easy to use, assuming all other factors are equal. Additionally, when teachers perceive m-learning as relatively uncomplicated and user-friendly, they are more likely to develop a positive AT towards it. Previous studies have demonstrated the positive impact of PEOU on PU and AT in the acceptance and adoption of various technologies (e.g., Almaiah & Alismaiel, 2019). However, the specific impact of PEOU on PU and AT in the TAM extended with external factors such as mobility, self-efficacy, and enjoyment has not yet been examined among Iraqi EFL teachers in higher education. Therefore, the following hypotheses are proposed:

- H1. PEOU positively influences PU of m-learning adoption.
- H2. PEOU positively influences AT towards m-learning adoption.

2.3.2. PU

PU refers to the extent to which individuals believe that adopting new technology will enhance their work performance (Davis, 1989). In the context of this study, PU pertains to the extent to which Iraqi EFL teachers perceive m-learning as a useful tool for improving their language teaching in higher education. Previous research has consistently revealed that PU significantly influences users' AT and BI towards technological tools (Tao *et al.*, 2022; Wu & Chen, 2017). Thus, it is assumed that if teachers perceive m-learning as useful, they will exhibit a positive AT towards its adoption. Furthermore, it is hypothesized that teachers who perceive m-learning as useful are more likely to have a higher intention to use it (i.e.,

BI). Therefore, the following hypotheses are posited to examine the impact of PU on AT and BI in the adoption of m-learning among Iraqi EFL teachers in higher education:

H3. PU positively influences AT towards m-learning adoption.

H4. PU positively influences BI to adopt m-learning.

2.3.3. AT

AT towards the use of a specific technology is a crucial predictor of user adoption (i.e., BI) (Huang *et al.*, 2007). Several studies have found that users' AT towards m-learning is the most influential factor in shaping their BI to use it (e.g., Al-Emran *et al.*, 2020). Similarly, this study posits that Iraqi EFL teachers' AT plays a significant role in determining their BI to use m-learning in higher education. Therefore, the following hypothesis is proposed:

H5. AT towards m-learning adoption positively influences BI among Iraqi EFL teachers in higher education.

2.3.4. PSE

PSE refers to an individual's confidence in performing a specific task or job. Building on the extended TAM, it is postulated that PSE significantly influences PEOU. Therefore, individuals with high self-efficacy in using m-learning perceive m-learning applications as easy to use (Al-Emran *et al.*, 2020). Additionally, it is argued that individuals with a high level of expertise and qualifications in a specific field are likely to have a positive AT towards performing related tasks. Based on the above discussions, the following hypotheses are suggested:

H6. PSE positively influences PEOU of m-learning adoption.

H7. PSE positively influences AT towards m-learning adoption.

2.3.5. PMV

PMV emphasizes the importance of continuous access and interaction across different contexts and at any time and location (Kukulska-Hulme & Shield, 2008; Kukulska-Hulme & Traxler, 2005). The extended TAM posits that PU of technology is significantly influenced by its mobility feature. Huang *et al.* (2007) also suggest that the perception of mobility contributes to the recognition of m-learning usefulness. The following hypothesis is thus proposed regarding EFL teachers' acceptance of m-learning in Iraqi higher education:

H8. PMV positively influences PU of m-learning adoption.

2.3.6. PE

PE refers to the extent to which using technology is perceived as enjoyable in and of itself, regardless of anticipated performance outcomes. Numerous studies on m-learning

acceptance support the proposed impact of PE on PEOU (Senaratne *et al.*, 2019; Huang *et al.*, 2007). Similarly, Huang *et al.* (2007) maintain that users perceive enjoyable new technologies as less difficult to use (i.e., PEOU). The following hypothesis is thus proposed:

H9. PE positively influences PEOU in m-learning adoption.

3. METHODOLOGY

3.1. Participants

The study included a total of 97 Iraqi EFL teachers, consisting of 65 males and 32 females. The participants were selected using purposive convenience sampling, which aimed to include individuals who were readily accessible and willing to participate in the study. The sample was drawn from four public universities in Iraq: the University of Thi-Qar, the University of Misan, the University of Al-Qadisiyah, and the University of Wasit. All participants owned at least one mobile wireless device, which they used for English teaching purposes during the data collection phase. To ensure voluntary participation and clarity regarding the research procedures, informed consent forms were obtained from all participants.

3.2. Instrumentation

This descriptive correlational study utilized a quantitative approach, employing a self-administered online questionnaire (Qashou, 2021, Appendix A) to examine the acceptance and adoption of m-learning among Iraqi EFL teachers in higher education during the COVID-19 pandemic. The questionnaire consisted of two sections. Section A collected participants' demographic information, including gender and academic rank. Section B utilized a closed-questions method in the form of 28 five-point Likert scale focusing on seven constructs of extended TAM including PEOU, PU, PSE, PMV, PE, AT, and BI ($\alpha = 0.939$). To ensure the reliability of the instrument for the context of this study, a pilot study was conducted with 37 Iraqi EFL instructors from the same population ($\alpha = 0.891$). Content and face validity were established through expert consultation with specialists in educational technology and applied linguistics from the University of Thi-Qar and Shahid Chamran University of Ahvaz.

3.3. Data collection and analysis

Due to university closures during the pandemic, the questionnaire was administered using Google Forms. Participants were instructed to read the statements related to the constructs of the extended TAM and select responses that best reflected their perceptions of m-learning. The response categories provided were as follows: 5 = Strongly Agree (SA), 4 = Agree (A), 3 = Neutral (N), 2 = Disagree (D), 1 = Strongly Disagree (SD). The data garnered from the questionnaire underwent analysis employing descriptive statistics, including means and standard deviations. Two independent samples t-tests were conducted to discern any

disparities in participants' perceptions regarding m-learning adoption in higher education, contingent upon their gender and academic ranks. The estimation of model parameters was conducted utilizing an iterative maximum likelihood estimation method through structural equations modelling (SEM) environment in LISREL 8.8 software. The overall model fit was assessed using goodness-of-fit statistics, including the chi-square statistic and other fit indices with lower sensitivity to sample size. These indices were classified into three pivotal categories for assessing structural model fit: absolute fit indices, incremental fit indices, and parsimony fit indices. Following the scrutiny of model fit indices, the convergent validity of the model was gauged by examining the extracted average variance (AVE) and composite reliability (CR). To attain satisfactory validity, the AVE value was required to equal or exceed the threshold of 0.5 (Wang & Li, 2012). The structural reliability of the model was evaluated using the CR index, with values surpassing the threshold of 0.70 for each factor deemed desirable, indicative of robust reliability and internal consistency within each factor.

4. RESULTS

To address the first research question regarding the perceptions of Iraqi EFL teachers about m-learning adoption for professional development, descriptive statistics, including means and standard deviations, were used to describe the participants' responses to the questionnaire items related to the variables of the conceptual model (see Table 1).

Table 1. *Descriptive statistics for the variables of the conceptual model*

VARIABLE	NUMBER OF ITEMS	MEAN	SD
PEOU of m-learning	4	9.54	0.21
PU of m-learning	4	12.43	0.89
PSE in using m-learning	4	10.81	0.15
PE of using m-learning	4	11.05	0.15
PMV in m-learning	4	11.89	0.32
AT towards using m-learning	4	15.32	1.12
BI to use m-learning	4	13.83	1.25

Based on the findings, the participants expressed the highest mean score in their AT towards using m-learning, while the second-highest mean score was observed in their BI to use m-learning. PU of m-learning received the third-highest mean score, and PMV also obtained a relatively high mean score. However, the mean scores for PE of using m-learning, PSE in using m-learning, and PEOU of m-learning were comparatively lower than the previously mentioned variables.

An independent samples t-test was conducted to compare the mean scores of male and female Iraqi EFL teachers in terms of their perceptions about m-learning adoption in higher education, and the results are presented in Table 2.

Table 2. *Effect of gender on the participants' perceptions about m-learning adoption*

VARIABLE	GENDER	MEAN	SD	T-VALUE	DF
PEOU of m-learning	Male	9.77	0.24	6.31	96
	Female	10.63	0.65		
PU of m-learning	Male	11.96	1.91	0.88	96
	Female	12.90	1.88		
PSE in using m-learning	Male	9.97	0.23	5.12	96
	Female	11.65	0.61		
PMV in m-learning	Male	9.64	1.12	0.87	96
	Female	9.44	1.01		
PE of using m-learning	Male	10.87	0.61	5.92	96
	Female	11.23	0.77		
AT towards using m-learning	Male	14.52	0.33	4.22	96
	Female	16.12	0.21		
BI to use m-learning	Male	13.09	0.66	5.87	96
	Female	14.57	0.78		

According to Table 2, the overall mean difference between male and female participants was found to be significant ($p < 0.01$), suggesting that there are gender-based disparities in the perceptions of m-learning adoption among Iraqi EFL teachers. This finding highlights the importance of considering gender as a factor when examining ATs and beliefs towards technology integration in higher education.

Similarly, an independent samples t-test was performed to compare participants' perceptions about m-learning adoption in higher education based on their academic ranks.

Table 3. *Effect of academic rank on the participants' perceptions about m-learning adoption*

VARIABLE	ACADEMIC RANK	MEAN	SD	T-VALUE	DF
PEOU of m-learning	Instructor and below	10.45	0.14	0.33	96
	Assistant professor and above	9.95	0.61		
PU of m-learning	Instructor and below	11.25	0.91	3.21 (96)	96
	Assistant professor and above	13.61	0.68		
PSE in using m-learning	Instructor and below	11.17	0.29	0.72 (96)	96
	Assistant professor and above	10.45	0.71		
PMV in m-learning	Instructor and below	9.66	1.12	0.17 (96)	96
	Assistant professor and above	9.42	1.01		
PE of using m-learning	Instructor and below	10.86	0.81	0.62 (96)	96
	Assistant professor and above	11.24	0.87		
AT towards using m-learning	Instructor and below	15.02	0.43	0.72 (96)	96
	Assistant professor and above	15.62	0.31		
BI to use m-learning	Instructor and below	13.67	0.69	0.47 (96)	96
	Assistant professor and above	13.99	0.71		

The t-test results showed that there was a significant difference between the academic rank groups of ‘assistant professor and above’ and ‘instructor and below’ in their PU of m-learning ($p < 0.01$). However, no significant differences were found between the two groups in the variables of PEOU, PSE, PMV, PE, AT, and BI to use m-learning.

Regarding the second research question, the fit of the conceptual model to the empirical data collected from the Iraqi EFL teachers was assessed using SEM in LISREL 8.8 software. The structural model of the extended TAM used in this study is depicted in Figure 2.

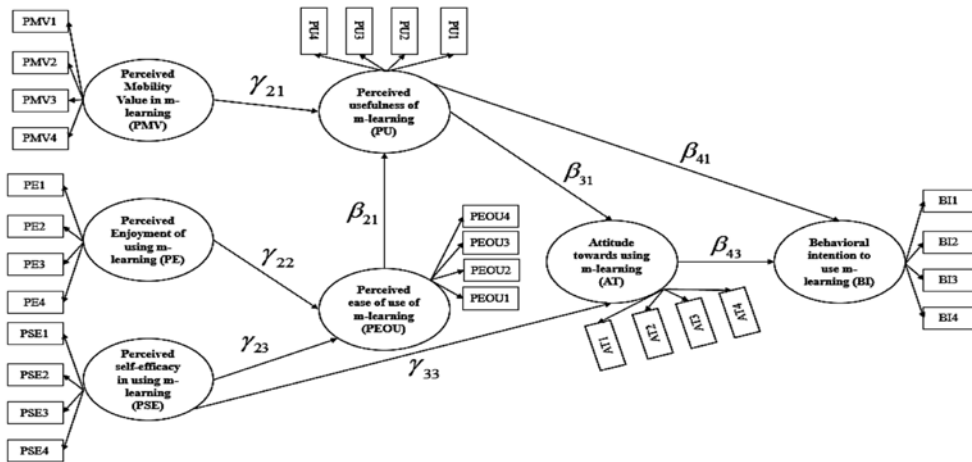


Figure 2. Structural model of the extended TAM

The overall fit of the model was evaluated using chi-square statistics and other fit indices that are less affected by sample size. It is argued that small values of the chi-square index and large p-values indicate a good fit of the model (Kline & Little, 2016; Mulaik, 2010). However, other fit indices such as the Adjusted Goodness of Fit Index (AGFI), Root Mean Square Residual (RMR), Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Normed Chi-square, Parsimony Normed Fit Index (PNFI), and Root Mean Square Error of Approximation (RMSEA) were also examined in this research to account for the sensitivity of the chi-square to sample size. The fit indices for the conceptual model are presented in Table 4.

Table 4. *Fit indices for the conceptual model*

FIT INDICES	WHOLE SAMPLE	MALE	FEMALE	INSTRUCTOR & BELOW	ASSISTANT PROFESSOR & ABOVE
Chi-square	321.45(0.14)	231.16(0.65)	163.64(0.21)	145.49(0.43)	3286.94(0.00)
AGFI	0.935	0.928	0.964	0.917	0.937
RMR	0.068	0.062	0.071	0.0704	0.065
CFI	0.928	0.966	0.923	0.971	0.916
TLI	0.958	0.971	0.959	0.965	0.954
Normed Chi-square	0.89 (0.25)	0.45(0.78)	0.86(0.54)	0.97(0.55)	0.79(0.77)
PNFI	0.621	0.519	0.528	0.682	0.603
RMSEA	0.044	0.039	0.041	0.055	0.047

Based on Table 4, the chi-square values were not significant ($p < 0.01$) for each subgroup and the whole sample, which suggests that there were no significant differences between the model and the observed data. However, it is important to note that the chi-square statistic is highly sensitive to sample size, and therefore, it is more informative to consider other fit indices that are less influenced by sample size. Based on the recommendations of Kline and Little (2016) and Mulaik (2010), the desired values for other fit indices were as follows: AGFI > 0.9, RMR < 0.08, CFI > 0.9, TLI > 0.95, PNFI > 0.5, and RMSEA < 0.08. Accordingly, the extended TAM proved its efficacy in grasping the crucial variables and connections that played a significant role in the acceptance of m-learning among Iraqi EFL teachers, as it aligned seamlessly with the empirical data. The AVE was, in turn, evaluated to determine convergent validity of the model. Additionally, the CR index was used to measure structural reliability of the model. Table 5 presents the AVE and CR values, indicating good validity and reliability of the proposed model in explaining the structural relationships between its variables.

Table 5. *The AVE and CR values for the model*

FACTOR	AVE	CR
PEOU	0.57	0.76
PU	0.53	0.81
PSE	0.58	0.74
PMV	0.59	0.72
PE	0.56	0.73
AT	0.52	0.75
BI	0.55	0.78

The results reported in Table 5 show that the AVE values range from 0.52 to 0.59 for the factors of PEOU, PU, PSE, PMV, PE, AT, and BI. These values exceed the threshold of 0.5, indicating that each factor captures a substantial amount of shared variance among its indicators, thereby demonstrating convergent validity. The CR values range from 0.72

to 0.81 for the factors of PEOU, PU, PSE, PMV, PE, AT, and BI. These values exceed the threshold of 0.7, indicating good reliability and internal consistency within each factor.

To address the third research question, path coefficients were calculated to examine the structural relationships between the variables in the conceptual model. The results are presented in Table 6.

Table 6. *Path coefficients of model for the whole sample*

PATHS	PATH COEFFICIENT	SEE	T-VALUE
PMV→PU	+ 0.81	0.04	3.55
PE→PEOU	+0.69	0.03	5.21
PSE→PEOU	+0.74	0.05	4.65
PSE→AT	+0.78	0.05	5.01
PU→AT	+0.89	0.06	6.03
PU→BI	+0.86	0.04	5.43
AT→BI	+0.91	0.03	6.09
PEOU→PU	+0.65	0.05	4.34

The path coefficients indicate the strength and direction of the relationships between variables in the model. In this study, all path coefficients reported in Table 6 are significant ($p < 0.01$), suggesting strong empirical evidence for the existence of positive relationships between the constructs of the model in line with the research hypotheses. It is important to note that the path coefficients were standardized, allowing for meaningful comparisons between coefficients in different paths. The largest path coefficient in the model was associated with the relationship between AT and BI (AT→BI), with a coefficient value of +0.91. On the other hand, the smallest path coefficient was observed in the relationship between PEOU and PU (PEOU→PU), with a coefficient value of +0.65.

In line with the fourth research question, the potential moderating effects of gender and academic rank on the structural relationships of the variables were explored. The path coefficients for males and females are shown in Table 7.

Table 7. *Path coefficients of the model based on gender*

PATHS	VALUES IN MALES	VALUES IN FEMALES	T-VALUE DIFFERENCE
PMV→PU	+ 0.79	+ 0.75	0.57
PE→PEOU	+0.58	+0.54	0.65
PSE→PEOU	+0.70	+0.71	0.43
PSE→AT	+0.73	+0.75	0.47
PU→AT	+0.81	+0.85	0.81
PU→BI	+0.80	+0.83	0.33
AT→BI	+0.89	+0.82	0.45
PEOU→PU	+0.60	+0.64	0.76

The results in Table 7 show that the path coefficients for the structural relationships in the conceptual model did not show significant differences between males and females. The t-values associated with the path coefficients for males and females were not significant ($p < 0.01$), indicating that the differences observed in the path coefficients between the genders were not statistically significant. Therefore, the structural relationships within the model remain consistent across gender groups.

Similarly, the path coefficients were calculated to examine the potential moderating effects of academic rank on the structural relationships of the variables in the model (see Table 8).

Table 8. Path coefficients of the model based on academic rank

PATHS	VALUES IN INSTRUCTOR AND BELOW	VALUES IN ASSISTANT AND BELOW	T-VALUE DIFFERENCE
PMV→PU	+ 0.56	+ 0.69	2.37
PE→PEOU	+0.54	+0.78	1.69
PSE→PEOU	+0.63	+0.82	1.73
PSE→AT	+0.64	+0.79	1.49
PU→AT	+0.55	+0.71	2.71
PU→BI	+0.72	+0.89	1.53
AT→BI	+0.69	+0.83	2.15
PEOU→PU	+0.61	+0.74	1.46

The results presented in Table 8 indicate that the structural relationships between variables in the conceptual model differed significantly based on the academic ranks of the participants. The path coefficients showed significant differences between teachers with the academic rank of ‘assistant professor and above’ and those with the rank of ‘instructor and below’. This suggests that academic rank moderated the relationships among the variables in the model.

5. DISCUSSION

The findings revealed that the participants exhibited the highest mean score in their AT towards m-learning. This suggests that Iraqi EFL teachers generally held positive AT towards integrating m-learning into their teaching practices. This positive AT could indicate a willingness to explore and utilize (i.e., BI) mobile technologies for educational and professional development purposes. The second highest mean score was observed in BI to use m-learning, indicating that the participants expressed a strong inclination to engage in m-learning activities. This finding aligns with the positive AT reported earlier, suggesting that Iraqi EFL teachers are not only open to m-learning but also intend to incorporate it into their instructional practices. PU of m-learning received the third-highest mean score, showing that Iraqi EFL teachers perceive m-learning as useful and valuable for their teaching and students' learning experiences. This perception of usefulness suggests that teachers recognize the potential of mobile technologies in enhancing educational outcomes. This finding aligns with previous research in the field of language teaching, highlighting the potential benefits of m-learning for professional development, such as increased learner engagement, motivation,

autonomy, and access to learning resources ubiquitously (Kukulska-Hulme & Traxler, 2005; Van Vo & Thuy Vo, 2020).

PMV obtained a relatively high mean score as well, suggesting that the participants acknowledged the advantages of m-learning in terms of providing flexibility and mobility. This perception of mobility value highlights the convenience and accessibility offered by mobile devices and platforms for instructional purposes. The mean scores for PE of using m-learning, PSE in using m-learning, and PEOU of m-learning were lower than the previously mentioned variables. This could indicate that while Iraqi EFL teachers recognize the benefits and value of m-learning for professional development purposes, they may face challenges related to their confidence in using mobile technologies and their perceived ease of integrating them into their teaching practices. This finding is consistent with previous studies that have identified concerns and challenges related to m-learning implementation (Alzubi, 2019; Chkotua & Bingol, 2018; Dağdeler & Demiröz, 2022).

Significant gender-based disparities existed in the perceptions of m-learning adoption among Iraqi EFL teachers in higher education. Female Iraqi EFL teachers generally perceived m-learning as easier to use, had higher confidence in their ability to use it effectively, found more enjoyment in using it, and held more positive ATs and intentions towards m-learning adoption for professional development in higher education. These findings align with previous research (e.g., Al-Hunaiyyan *et al.*, 2017) that highlighted significant gender discrepancies in teachers' AT towards m-learning. However, it is essential to note that our results diverge from the conclusions drawn by Alghamdi (2022) and Alnujaidi (2021), both of whom reported no significant difference in EFL teachers' perceptions of m-learning based on their gender. The observed gender differences may be attributed to a combination of factors such as societal expectations, personal preferences, prior experience and exposure to technology, potential variations in teaching approaches, and the perceived relevance of m-learning to their teaching context.

Additionally, the results revealed a notable contrast in the participants' perceptions regarding m-learning adoption concerning their academic ranks. This suggests that when it comes to the PU of m-learning, there is a distinction between the higher academic rank group and the lower rank group. Teachers in the higher academic rank group perceived m-learning as more useful in the context of higher education compared to the lower rank group. This difference could be attributed to the varied experiences, knowledge, and responsibilities associated with different academic ranks. Higher-ranked teachers might have more exposure to research, professional development opportunities, and teaching practices that incorporate technology, leading to a stronger perception of the usefulness of m-learning. Additionally, they might have received more institutional support and resources, such as professional training and access to technical infrastructure, which could enhance their perception of the usefulness of m-learning.

By aligning well with the empirical data, the extended TAM demonstrated its effectiveness in capturing the key variables and relationships involved in the acceptance of m-learning among Iraqi EFL teachers. The indicators within each factor contributed to capturing the underlying constructs accurately, and the factors exhibited consistent and reliable measurement properties. This suggests that the model effectively explains the structural relationships between the variables and provides a valid and reliable framework for understanding the

perceptions of m-learning adoption for professional development among Iraqi EFL teachers in higher education.

The findings regarding the path coefficients of the structural relationships between the variables in the conceptual model indicated that all path coefficients were significant. This provides robust empirical evidence supporting the existence of positive relationships between the model's constructs, aligning with the research hypotheses. Notably, the standardized path coefficients highlighted that the most substantial path coefficient in the model was linked to the relationship between AT and BI (AT→BI). This indicates a strong positive relationship between a positive AT towards using m-learning and the intention to actually use it (BI) for professional development in the future. This finding suggests that a favorable AT towards m-learning is a significant predictor of the intention to adopt and integrate m-learning in higher education.

6. CONCLUSION AND IMPLICATIONS

This study provided valuable insights into the perceptions and adoption of m-learning for professional development among Iraqi EFL teachers in higher education. The participants generally displayed positive perceptions towards m-learning adoption, recognizing its usefulness and expressing a positive AT towards its integration into their teaching practices. The extended TAM demonstrated a good fit to the data, indicating its effectiveness in explaining the factors influencing m-learning adoption. The results also revealed significant positive relationships between variables in the model, emphasizing the importance of factors such as PMV, PE, PSE, PU, AT, and BI in shaping the acceptance and adoption of m-learning. These results highlight the need to focus on enhancing these factors to promote the successful integration of m-learning in higher education. Furthermore, while gender did not moderate the relationships, academic rank was found to have a significant impact on the structural relationships in the model. This suggests that academic rank should be considered when designing interventions and strategies to promote m-learning for professional development among EFL teachers, as their perceptions and acceptance may vary based on their academic ranks.

The findings have important implications for the adoption of m-learning for professional development among Iraqi EFL teachers in higher education. The positive perceptions and AT towards m-learning indicate an openness and willingness to embrace these technologies. This presents an opportunity for institutions and policymakers to provide targeted professional development programs that enhance teachers' knowledge and skills in using m-learning effectively. By addressing concerns related to technical support and infrastructure, institutions can create a supportive environment that encourages teachers to integrate m-learning into their teaching practices. Institutions can promote the adoption of m-learning by designing engaging and interactive experiences that make use of m-learning tools and resources. Additionally, providing professional development opportunities that enhance teachers' self-efficacy in using m-learning will increase their confidence and motivation to integrate these technologies into their teaching practices. The moderating role of academic rank suggests the need for tailored support and professional training. Institutions should consider the unique needs and perspectives of teachers at different academic ranks when designing initiatives to promote m-learning adoption. Providing differentiated support, resources, and training opportunities based on academic rank will help facilitate the successful integration of m-learning.

7. LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

While this study provides valuable insights into the perceptions and adoption of m-learning for professional development in higher education, it is important to consider that the generalizability of the findings may be limited due to the specific sample of Iraqi EFL teachers used in the study. The cultural, institutional, and technological factors present in Iraq may differ from other educational contexts, impacting the generalizability of the results. Moreover, the study focused on the perceptions and adoption of m-learning during the COVID-19 pandemic, which may have influenced participants' perspectives and behaviors. The rapid transition to remote teaching and the unique circumstances of the pandemic may have shaped participants' ATs and experiences with m-learning. Therefore, the findings may not fully capture participants' long-term perspectives or their experiences in non-pandemic contexts. Further investigations can explore the factors influencing m-learning adoption in different educational contexts and populations. Research can also delve into the impact of variables such as teaching experience, technological proficiency, and cultural factors on the acceptance and adoption of m-learning. Understanding these factors in more depth will contribute to a better understanding of the m-learning adoption process and inform strategies for customized teacher professional development initiatives in future.

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9. APPENDIX

Appendix A

M-learning Questionnaire

Instructions: Kindly read the following statements and select the response that aligns most closely with your perceptions about m-learning acceptance and adoption for professional development in higher education. In section B, please provide your answers to the 28 items utilizing the provided response categories:

5 = Strongly Agree (SA), 4 = Agree (A), 3 = Neutral (N), 2 = Disagree (D), 1= Strongly Disagree (SD).

Section A: Demographic information

VARIABLES	OPTIONS	YOUR ANSWER
Gender	Male	
	Female	
Academic Rank	Assistant Instructor	
	Instructor	
	Assistant Professor	
	Associate Professor	
	Professor	

Section B: Questionnaire items

No.	ITEMS	SD 1	D 2	N 3	A 4	SA 5
Perceived ease of use of m-learning (PEOU)						
1	M-leaning is flexible and easy to use.					
2	Learning to operate m-learning system does not require much effort.					
3	My interaction with m-learning system would be clear and understandable.					
4	It is easy to access information using m-learning system.					
Perceived usefulness of m-learning (PU)						
1	M-leaning enables me to accomplish learning tasks more quickly.					
2	M-learning would improve my learning performance.					
3	Using m-learning would save me much time.					
4	M-learning increases my productivity in learning environment.					
Perceived self-efficacy in using m-learning (PSE)						
1	I would be more inclined to use m-learning application if I had seen someone else using it before trying it myself.					
2	I have the necessary skills for m-learning.					
3	I would be more inclined to use m-learning application if it had a built-in help facility for assistance.					
4	I have confidence in complementally using computer and mobile devices for m-learning.					
Perceived Mobility Value in m-learning (PMV)						
1	It is easy to access M-learning anywhere at any time.					
2	Mobility is an outstanding advantage of m-learning.					
3	Mobility makes it possible to get the real-time data.					
4	I know that mobile devices are the mediums for m-learning.					
Perceived Enjoyment of using m-learning (PE)						
1	I believe that using M-learning will be interesting to me					
2	I believe that M-learning will stimulate my curiosity					
3	I believe the use of M-learning will fit well with the way I like to study					
4	I believe that using M-learning to solve problems will be appealing to me.					
Attitude towards using m-learning (AT)						
1	I would like to use M-learning.					
2	Mobile technology can help me to exchange the course-material with my friends.					
3	I hope to apply mobile devices in various learning activities.					
4	In my opinion, it would be very desirable to use m-learning.					
Behavioral intention to use m-learning (BI)						
1	I intend to use m-learning when it becomes available.					
2	If I were asked to express my opinion of m-learning, I intend to say something favorable.					
3	I would like to recommend the services of m-learning to others.					
4	I prefer m-learning system over other mediums of learning.					

Thank you for your participation