ASEAN Journal of Educational Research and Technology

Journal homepage: https://ejournal.bumipublikasinusantara.id/index.php/ajert

Factor Affecting the Acceptance of Online Learning by Primary School Teachers During the Covid -19 Pandemic: A Structural Study Using the unified theory of acceptance and use of technology (UTAUT) Model

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ABSTRACT

The present study has sought to provide a structural model of the relationships between the influencing factors in the acceptance of e-learning by teachers during the Covid-19 pandemic, based on the unified theory of acceptance and use of technology (UTAUT) model. The research method was descriptive and correlational. The statistical population of this research involved all primary school teachers in Isfahan, Iran, from which 250 primary teachers were randomly selected as samples using Morgan's table. The tool used included a researcher-made questionnaire based on the technology acceptance and application model. The findings were analyzed using PLS statistical software. As the results showed, the UTAUT model of the factors affecting teachers' acceptance of e-learning during the Covid-19 pandemic has a good fit. Therefore, performance expectancy, effort expectancy, social influence, hedonic motivation, price value, and facilitating conditions had a direct and significant effect on teachers' behavioral intention to use E-learning. It was also observed that user intention has a mediating role in the relationship between the mentioned variables and teachers' use of online education. Therefore, it can be stated that the findings confirm the theoretical foundations of the UTAUT model.

ARTICLE INFO

Article History:
Submitted/Received 22 May 2023
First revised 02 Jun 2023
Accepted 08 Aug 2023
First available online 13 Aug 2023
Publication Date 01 Dec 2023

Keyword:
Covid-19,
E-learning,
Primary school teachers,
Structural model,
UTAUT2 model.

1. INTRODUCTION

Education is one of the most basic components of human life in today's advanced world, as it plays a significant role in the growth and improvement of individual life and the social life of people. Education in every society has a direct and significant effect on the development of society from various social, economic, cultural, and mental health aspects. Therefore, it can be said that the progress of society is largely consistent with the progress of education (Franky & Chiappe, 2018). It is worth mentioning that primary school age is the most sensitive and important period of every person's life or, to put it differently, the golden period of a person's growth, so that the smallest problem and challenge in the primary school education system affects all components, especially teachers and students.

The World Health Organization declared "Covid-19" as a global public health emergency on January 30, 2020, as well as a pandemic on March 11, 2020. Undoubtedly, Covid-19 has had a direct and serious impact on students, educators, and educational organizations around the world, as it has also affected other areas of human life (Mailizar Almanthari *et al*., 2020). This epidemic caused universities and schools around the world to announce the closure of their face-to-face educational activities so that students can participate in measures related to social distancing (Toquero, 2020). Additionally, Covid-19 has forced academia and educational professionals to rethink the traditional approaches to learning and begin to consider distance learning as a viable solution to fill the study gap in a three- to four-month academic term to reduce the risk of viral infection among students before pursuing their normal activities (Kaur, 2020).

Online learning is a subset of distance learning, and learning through mobile phones (mobile learning) is a subset of electronic learning. Mobile learning is a precise and new concept, which is closely related to electronic learning. Thus, mobile learning is a special type of electronic learning with special features and capabilities such as bandwidth and other network technological features. E-learning through mobile devices increases learners' ability to access information and communicate and provides an opportunity to change current learning strategies and gives students a very flexible way to manage their learning experience and activities (Al-Hunaiyyan *et al*., 2018). Although E-learning is an inseparable part of the learning process in the present and in the future, its acceptance by individuals, students, and teachers is essential for the successful implementation of education. The adoption and continuous use of a product, service, or idea is called acceptance. The purposes of designing a technology (i.e., improving and facilitating related activities and saving time) are met when users use that technology. Therefore, the acceptance of a technology depends on its use and the continuation and repetition of this use on the part of the users.

Companies' decision to use an innovation depends on customer demand. Moreover, the acceptance and use of innovation by society lead to the profitable exploitation of that innovation (Park, 2011). Therefore, accepting technologies in an era where technology is not a complementary option but a practical necessity is extremely important. Investing in new technologies depends on the adoption of information technology systems. One of the basic factors in the success of technology is its desired outputs and results for the organization. The effectiveness of technology has a positive relationship with its acceptance; therefore, if users refuse to accept a certain technology, the desired goals regarding that technology will not be achieved. In this regard, various models of technology acceptance have been presented, and a unified theory of acceptance and use of technology (UTAUT) has been used in this research.

One of the most important models for technology acceptance is the UTAUT (Venkatesh *et al*., 2003). The UTAUT model has been designed based on eight models: the technology

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p- ISSN: 2828-4887 e- ISSN: 2828-4860

acceptance model related to information and communication technology; a combination of the technology acceptance model and the theory of planned behavior; the theory of reasoned action; social cognitive theory; the motivational model; innovation diffusion theory; the model of PC utilization, and the theory of planned behavior. In the initial version of this model (UTAUT1), there were four factors: effort expectancy, performance expectancy, social influence, and facilitating conditions. However, in 2012, they proposed a new version of this model (UTAUT2) with the following factors: Performance expectancy (PE), Effort expectancy (EE), Social influence (SI), Hedonic motivation (HM), Price value (PV), Habit (HT), and Facilitating conditions (FC) (Venkatesh *et al*., 2003).

Based on the aforementioned, during the outbreak of the Covid-19 virus, online education is not an option, but a necessity. In this regard, mobile learning is an innovative method whose implementation in the education process can lead to efficiency in the teaching-learning process. It seems that with the development of technology and new approaches, learner-centered education, defining the role of the teacher as a guide, and lifelong learning will be realized. Although e-learning as an effective system is now available to educational administrators, especially teachers and trainers, to transform teaching-learning methods and achieve educational goals, this is only one side of the coin. The teachers' acceptance of this type of education is also important because the implementation of a new educational system in Iran depends to a large extent on the teachers' acceptance of that system. Therefore, in the first step, teachers must have a positive attitude towards this style of education and accept the new educational system as an efficient and effective system. In these conditions, students can effectively deal with this type of education and the efficiency of the system increases. Therefore, considering the challenges of online education during the outbreak of Covid-19 and the importance of accepting this type of education by primary school teachers, the main goal of this research is to investigate the factors affecting the acceptance of online education – as a learning system during the Covid-19 pandemic – by elementary school teachers, based on the UTAUT (see **Figure 1**).

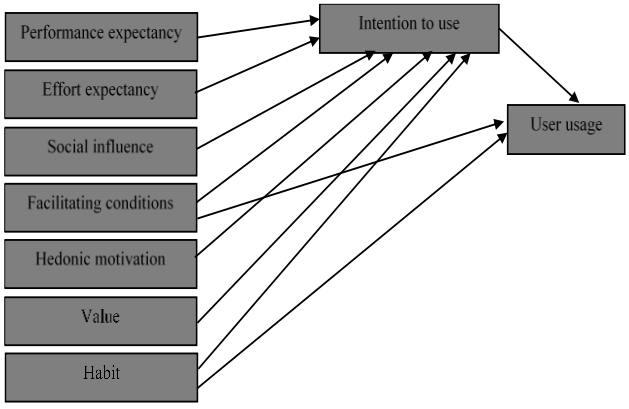

Figure 1. Conceptual model of relationships between variables under study.

2. LITERATURE REVIEW

Several articles can be concluded in the following:

(i) Iqbal and Qureshi (2012) in their research regarding the acceptance of mobile learning in developing countries showed that in the UTAUT, the variables: ease of use, perceived usefulness, facilitating conditions, social influence, and perceived playfulness significantly affect the behavioral intention.

(ii) Abu-Al-Aish and Love (2013) in their research regarding factors influencing students' acceptance of m-Learning in higher education showed that prior experience with

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mobile phones moderates the effects of social influence, effort expectancy, and personal innovativeness of university students on their behavioral intention to use mobile learning.

(iii) Kang *et al*. (2015) in their study regarding the investigation of Korean college students' intention to accept online education in the UTAUT Model showed that performance expectancy, social influence, facilitating conditions, motivation, and habit significantly affect Korean college students' behavioral intention to use mobile phones. The research model has about 45% of the variance of behavioral intention.

(iv) Kraljic and Pestek (2016) conducted a study regarding the application of the UTAUT2 model in exploring the impact of the quality of technology on mobile internet. It showed that older users are more sensitive to using mobile Internet. Moreover, the research indicated that gender does not have a significant impact on the relationship between the quality of technology and the use of mobile Internet. The effect of the quality of technology on the use of mobile Internet is higher for more experienced users. This research showed that the adapted UTAUT2 model extended with quality of technology can be employed to investigate the adoption of mobile Internet in a country in transition.

(v) Masrek and Samadi (2017) in their study regarding determinants of mobile learning adoption in higher education settings showed that performance expectancy, effort expectancy, social factors, facilitating conditions, and self-management of learning are the determining factors in the intention to adopt mobile learning.

(vi) In a study regarding measuring the technology acceptance level of teachers using UTAUT, Koral Gümüsoglu and Akay (2017) showed that the participants' overall technology acceptance level in the variables performance expectancy, effort expectancy, attitude towards technology, social influence, facilitating conditions, self-efficacy, and anxiety is average.

(vii) Ouedraogo (2017) in a study regarding the model of information and communication technology (ICT) acceptance and use for teaching staff showed that performance expectancy of ICT (expected utility and expected results) has a positive impact on the ICT acceptance by teachers. The educational use of ICT is positively influenced by ICT acceptance and Internet experience. Besides, facilitating conditions have a negative impact on these purposes. The teachers' Internet experience exerts a positive and significant direct effect on their specific utilization of ICT.

(viii) Aswani *et al*. (2018) in a study regarding the adoption of public WiFi using UTAUT2 showed that there is a relationship between trust, individual characteristics, hedonic motivation, and social influence to determine behavioral goals. In addition, a relatively weak relationship was found by examining the behavioral intention as a mediator in the adoption of public Wi-Fi.

(ix) Halili and Sulaiman (2019) in a study regarding factors influencing rural students' acceptance of using ICT for educational purposes showed that facilitating conditions, social influence, performance expectancy, and effort expectancy have a significant effect on the acceptance and behavioral intention to use ICT for educational purposes.

(x) Persada *et al*. (2019) in a study regarding understanding Generation Z behavior on D-learning showed that performance expectancy, effort expectancy, and social influence are positively and significantly correlated with behavioral intention, and the facilitating condition has the highest effect on Generation Z (the Internet Generation)'s behavioral intention.

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(xi) Nawaz and Mohamed (2020) in their research regarding the acceptance of mobile learning by higher education institutions in Sri Lanka concluded that performance expectancy, effort expectancy, habit, facilitating conditions, and hedonic motivation had an effect on Sri Lankan students' behavioral intention to use mobile learning, and these factors were moderated by demographic characteristics such as gender and age.

(xii) Biswas *et al*. (2020) in their research regarding students' perception of mobile learning during covid-19 in Bangladesh concluded that most students have a positive attitude towards mobile learning and that mobile learning is a good solution for students to continue their studies during the Covid-19.

(xiii) Wangdi *et al*. (2023) in their research regarding factors influencing teachers' intention to use technology concluded that there was no evidence of a direct influence from TPACK and Facilitating Conditions on behavioral intention, though there was a significant effect of TPACK and Facilitating Conditions on teachers' BI when mediated through Perceived usefulness and Perceived ease of use.

(xiv) Haneefa (2023) in their research regarding the use of online flipped classrooms during Covid-19 by gifted students concluded the effects of four variables as Performance expectancy, Effort expectancy, social influence, and Facilitating conditions on students' intentions to use Online Flipped Classrooms. BI correlates positively with performance expectancy, effort expectancy, social influence, and facilitating conditions. 76.0% of the total variance in behavioral intention to use of those who participated in the study is accounted for by the combination of performance expectancy, effort expectancy, and social influence. The behavioural intention was positively impacted by performance expectancy, effort expectancy, social influence, and facilitating conditions.

(xv) Staddon (2023) in their research regarding Exploring higher education students' perspectives on factors affecting the use, attitudes, and confidence with learning technologies concluded that found there are many key factors underlying the participants' attitudes and confidence with technology. Students strongly considered the purpose and convenience of technology before choosing whether to accept or reject it. Other factors included familiarity with particular technologies, and the use of an emerging universal iconic language, a new finding from this study. In addition, this study contributes five key recommendations surrounding competence, design, and ownership which should be considered when educators are contemplating the use of technology in their higher education classrooms, whether online or face-to-face.

3. METHODS

The research method in the present study is a descriptive correlational design. The statistical population of this research involves all the primary school teachers in Isfahan, from which 250 people were randomly selected as samples using Morgan's table. The research tool was a researcher-made questionnaire based on the UTAUT model, which was designed with 34 questions to measure the variables of performance expectancy, effort expectancy, facilitating conditions, social influence, price value, habit, individual characteristics, behavioral intention, and hedonic motivation.

To check the content validity of the questionnaire, the opinions of educational technology experts and six provincial model teachers were used, and finally, the content validity was confirmed. To determine the reliability of the questionnaire, before the main stage of data collection, 30 questionnaires were randomly distributed among the research population (other than the samples) and the Cronbach's alpha value was estimated. The validity of the questionnaire was calculated using the pls software package. Based on this output, it is clear

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that the value of alpha for all constructs is higher than 0.5, which indicates the validity of the questionnaire and the appropriate and similar perception of the respondents about the content of the variables related to each construct. The structural equation model was used to analyze the data using PLS software.

4. RESULTS AND DISCUSSION

In this section, first, the direct and indirect effects of the research variables on each other are reported based on the experimental model of the research. According to **Table 1**, in the research model, the direct effect of performance expectancy, effort expectancy, social influence, hedonic motivation, value, facilitating conditions, and habit on teachers' intention to use is confirmed.

Table 1. Estimated coefficients of direct effects of model variables on teachers' intention to use.

Path	Path coefficient	t statistic	Significance level	Result
Performance expectancy	0.142	2.100	0.036	confirmed
Effort expectancy	0.255	2.458	0.014	confirmed
Social influence	0.157	2.516	0.012	confirmed
Facilitating conditions	0.140	3.086	0.002	confirmed
Hedonic motivation	0.131	2.154	0.032	confirmed
Value	0.194	2.076	0.038	confirmed
Habit	0.011	0.421	0.674	rejected
Facilitating conditions	0.296	3.933	0.000	confirmed
Habit	0.142	2.470	0.014	confirmed
Intention to use	0.644	5.454	0.000	confirmed

Results of **Table 2** indicate that performance expectancy, effort expectancy, positive effect of social influence, hedonic motivation, and use value mediated by user intention have a positive and direct effect on teachers' use of technology. In the initial experimental model, it was found that one of the predicted paths was not significant, and therefore it was removed from the conceptual model of the research. After the required modifications were applied, the modified model was tested.

Table 2. Estimated coefficients of indirect effects of model variables on technology use with the mediating role of intention to use.

Path	Path coefficient	t statistic	Significance level	Result
Performance Expectancy -> User Intention -> User Usage	0.091	1.990	0.047	confirmed
Effort Expectancy -> User Intention -> User Usage	0.164	2.086	0.037	confirmed
Social Influence -> User Intention -> User Usage	0.101	2.260	2.024	confirmed
Facilitating Conditions -> User Intention -> User Usage	0.090	2.311	0.021	confirmed
Hedonic motivation -> User Intention -> User Usage	0.084	2.005	0.045	confirmed
Value -> User Intention -> User Usage	0.125	1.971	0.049	confirmed
Habit -> User Intention -> User Usage	0.007	0.397	0.692	rejected

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p- ISSN: 2828-4887 e- ISSN: 2828-4860

As is seen in **Figure 2**, in the confirmed model, the *t* statistic for all paths is greater than 1.96, which indicates that all paths of the experimental model are confirmed. Four methods have been used to examine the fit of the research measurement models based on Smart-PLS software: 1) measurement model evaluation, 2) structural model evaluation, 3) general model test, and 4) model fit indices. As is seen in **Table 3**, considering that the convergent validity of observable variables in both examined models is higher than 0.5, it can be said that the validity of the model is confirmed in terms of convergent validity.

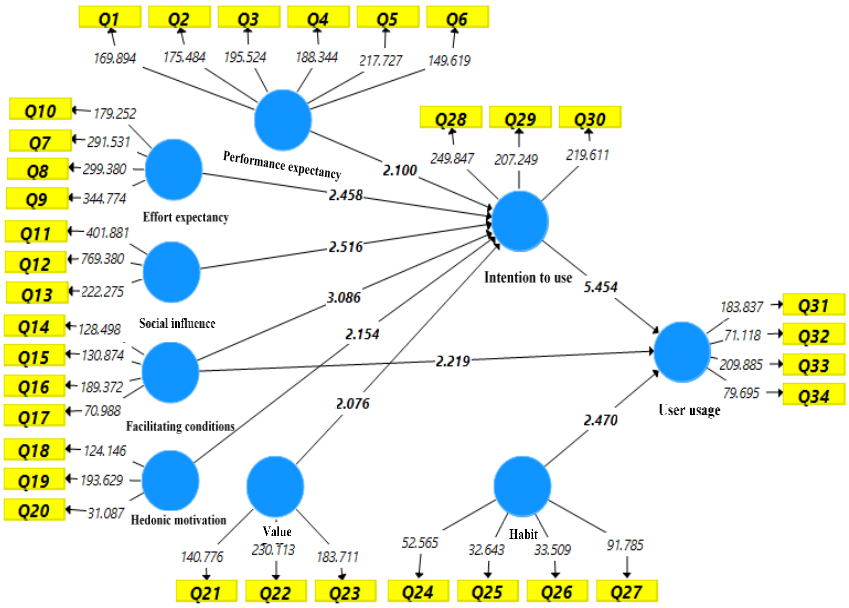

Figure 2. Confirmed empirical model of the factors affecting the acceptance of online education by teachers in the mode of standard estimation.

Table 3. Convergent validity of research variables.

Teachers' model		Latent variables
Variable status	**Convergent validity**	
acceptable	0.961	value
acceptable	0.944	User usage
acceptable	0.978	Effort expectancy
acceptable	0.965	Performance expectancy
acceptable	0.936	Facilitating conditions
acceptable	0.856	Habit
acceptable	0.971	Intention to use
acceptable	0.899	Hedonic motivation
acceptable		Social influence
AVE > 0.50		**Acceptable limit**

The results of the divergent validity test in **Table 4** show that the square root of the average variance extracted (AVE) of the research variables according to the teachers' model is higher than the correlation value between them in other houses; therefore, the divergent validity of the teachers' model is acceptable.

According to **Table 5**, since Cronbach's alpha and combined reliability of variables in both measurement models are higher than 0.7, it can be stated that the reliability of the research measurement models is confirmed. Structural model test In this research, the coefficient of determination (R^2) and Stone-Geisser's predictive relevance (Q^2) were used to test the structural model.

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Table 4 .Divergent validity of teachers' model according to Fronell-Larcker criterion.

	1	2	3	4	5	6	7	8	9
1. Value	0.980								
2. User usage	0.920	0.971							
3. Effort expectancy	0.946	0.961	0.989						
4. Performance expectancy	0.938	0.947	0.966	0.982					
5. facilitating conditions	0.909	0.926	0.936	0.908	0.968				
6. Habit	0.833	0.843	0.817	0.834	0.785	0.925			
7. Intention to use	0.964	0.957	0.978	0.969	0.946	0.839	0.985		
8. Hedonic motivation	0.928	0.928	0.939	0.936	0.907	0.823	0.955	0.948	
9. Social influence	0.932	0.917	0.939	0.947	0.911	0.825	0.960	0.917	0.993

Table 5. Reliability of research variables.

Combined reliability	Cronbach's alpha	Components
0.886	0.879	Value
0.885	0.880	User usage
0.894	0.892	Effort Expectancy
0.894	0.893	performance expectancy
0.883	0.877	Facilitating conditions
0.859	0.844	habit
0.890	0.885	intention to use
0.864	0.844	Hedonic motivation
0.895	0.893	Social influence
(CR> 0.7)	**(Alpha> 0.7)**	Acceptable limit

According to **Table 6**, the fit indices of the structural model show that the coefficient of determination (R2) and the Q2 index in both measurement models is greater than the acceptable value. Therefore, it can be said that the structural models of the research are acceptable according to the two mentioned indicators.

To examine the fit of the overall model, which controls the two parts of the measurement model and the structure, the GoF criterion was used. This standard value (GoF) was 0.898 for teachers, which indicates a strong and acceptable overall fit for the measurement model, considering the three values of 0.01, 0.25, and 0.36 as weak, medium, and strong values of GoF. Therefore, based on the results of **Table 7**, it can be concluded that the model has a good fit and the overall structure of the tested relationships is confirmed through the obtained data. The path coefficients between research variables based on the final fitted structural model in the present study are reported in **Figure 3**. The significance of these coefficients has been reported and confirmed based on the T-test in the previous tables.

Table 6. Results of R^2 and Q^2 for endogenous latent variables.

Predictive relevance (Q^2)	Coefficient of determination (R^2)	Endogenous latent variable
0.717	0.836	User's use
0.798	0.893	User intention
Q2 > 0.02 = Weak	R^2 > 0.19	Acceptable limit
Q2 > 0.15 = moderate		
Q2 > 0.35 = good		

Table 7. Fit indices of the structural model.

NFI	Chi-Square	d-G	d-ULS	SRMR
0.916	437.184	0.199	0.150	0.038

DOI:
p- ISSN: 2828-4887 e- ISSN: 2828-4860

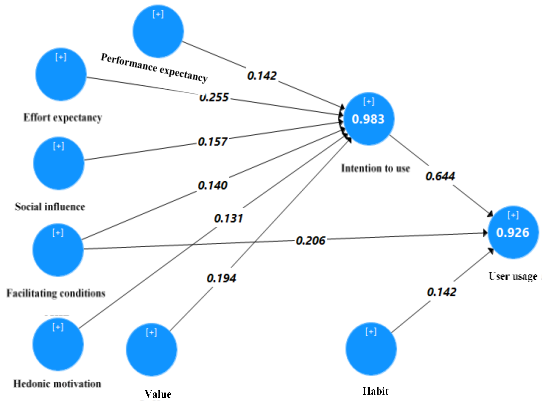

Figure 3. Confirmed empirical model for testing structural relationships between research variables based on the UTAUT2 model.

The main purpose of this research was to investigate the factors influencing the acceptance of online education during the Covid-19 in primary schools of Isfahan, Iran, using the UTAUT. According to the results obtained from the model, the direct effect of performance expectancy and effort expectancy on teachers' intention to use was confirmed. The reason for the direct effect of performance expectancy on teachers' intention to use might be that when teachers are confident that using a system will help them achieve their educational goals, they are more willing to accept that system. Therefore, the higher the performance expectancy, the higher the user intention. Regarding effort expectancy, it should be mentioned that the higher the degree of simplicity of the online education system, the more teachers and students are willing to use that system, because, in Iran's education system, traditional education has suddenly turned into virtual education, and according to the circumstances, the easier the mobile learning system is, the more willing users are to accept it. In addition, the findings indicate the positive effect of social influence and facilitating conditions on teachers' intention to use. Although no research similar to the current research was found, the findings are somewhat consistent with the results of Nawaz and Mohamed (2020), Aswani *et al*. (2014), Koral Gümüsoglu and Akay (2017), Masrek and Samadi (2017), Kang et al. (2015), Abu-Al-Aish and Love (2013), and Iqbal and Qureshi (2012). As regards the impact of social influence on teachers, their family's views on accepting online education and its various aspects such as using personal mobile phones in the profession, allocating more time for students' learning, etc., are also important, since the more positive the views of friends and family are towards this teaching-learning style, the more willing the teachers are to accept it. Regarding the direct effect of facilitating conditions on teachers' intention to use, when there are appropriate technical and organizational infrastructures to support teachers in using technology, the acceptance and use of that system or technology will increase. Therefore, in Iran's educational system, if mobile phone programs and platforms are stronger and have more support, users will pay more attention to those programs and platforms. The findings also indicate the positive effect of hedonic motivation and value on teachers' intention to use online education, which is somewhat consistent with the results of Nawaz and Mohamed (2020), Arain *et al*. (2019), Kang *et al*. (2015), Faizi and Vahedi (2021). In explaining the direct effect of hedonic motivation on user intention, it should be mentioned that due to the evolution of Iran's educational system – from a classical to an online system – and the newness of this evolution, there is a significant possibility of making the learning system attractive and interesting for its audience; therefore, for some users, using new and innovative facilities can be an exciting and fun experience, and this factor itself is considered an important component in the adoption of online education. Regarding the effect of habit

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p- ISSN: 2828-4887 e- ISSN: 2828-4860

on teachers' use of online education systems, since teachers use mobile phones for general purposes in addition to their professional needs, and considering the physical and mental problems resulting from excessive use of mobile phones, teachers have to manage their use of mobile phones. Therefore, the direct effect of facilitating conditions, habit, and user intention on the use of online education by students and teachers was confirmed. In other words, in the presented model, the effect of facilitating conditions, habit, and user intention on user usage was positive and direct. Although no research similar to the current research was found, the findings are in line with the results of Masrek and Samadi (2017). Regarding the direct effect of user intention on user usage, it can be mentioned that when users intend to accept an online system, they use that system in practice, and therefore user intention is the same as user usage. About the direct effect of facilitating conditions on teachers' use of online education, it should be stated that with the increase of technical and organizational infrastructure suitable to support teachers' use of an educational system or technology, the use of that system or technology increases. Therefore, in Iran's educational system, if mobile programs and platforms are further strengthened and supported, users will pay more attention to those programs and platforms. Besides, in explaining the effect of habit on teachers' use of online education, it can be said that when users are inclined to the automatic conduction of activities in an online education system, the use of online systems will increase.

The findings also indicate that performance expectancy and effort expectancy due to user intention have a positive and direct effect on teachers' use of technology, which is in line with the results of Masrek and Samadi (2017) and Kang *et al*. (2015). In explaining the indirect effect of performance expectancy and effort expectancy through user intention on teachers' use of online systems, it should be stated that user intention generally affects user use, because it is practically impossible to apply a technology unless the users intend to accept that technology. Furthermore, when teachers are confident that using a system will help them achieve their educational goals, they are more willing to accept that system. Therefore, the higher the performance expectancy, the higher the user intention. Regarding effort expectancy, it should be noted that the higher the degree of simplicity of an online education system, the more teachers and students are inclined to use that system, since in Iran's education system, traditional education has suddenly turned into virtual education, and based on the circumstances, the easier the mobile learning system is, the more willing the users are to accept it.

The study also shows the positive effect of social influence and facilitating conditions on teachers' intention to use online education, which is consistent with the results of Kang *et al*. (2015) and Masrek and Samadi (2017). In explaining the effect of social influence and facilitating conditions through user intention on teachers' use of online education, it can be said that user intention is assumed as the degree to which users consciously decide to conduct or not to conduct certain behavior in the future. Therefore, it can be inferred that the user's intention to use online education is the same as the decision to use this type of education system. The positive attitude of close people such as family and friends to the use of technology, the existence of support for users, and the strengthening of technical infrastructure can be effective factors in adopting online education systems. Although no research similar to the current research was found, the findings are in line with the results of Kang *et al*. (2015). In explaining the positive effect of hedonic motivation on teachers' use of technology, it should be stated that when the online education system and generally the technology are attractive and somewhat entertaining for users, they decide to use this type of education more, which leads to practical use. On the other hand, the newness of this type of technology in the educational system of Iran makes it more attractive. In explaining the

DOI:
p- ISSN: 2828-4887 e- ISSN: 2828-4860

positive effect of price value on teachers' use of online education through user intention, it can be said that although the cost of online education in Iran is not low, it seems that students' learning and teachers' teaching are more important, and accordingly the costs of purchasing educational equipment, repairing and upgrading equipment and buying internet are also accepted. Therefore, from the users' perspective, the benefits of using the online education system are more than its monetary costs.

5. CONCLUSION

Based on the UTAUT model, the current study aimed to create a structural model of the linkages between the influencing elements in teachers' acceptance of e-learning during the Covid-19 pandemic. Utilizing statistical tools, PLS was used to examine the results. The elements influencing teachers' acceptance of e-learning during the Covid-19 pandemic are well captured by the UTAUT2 model. Teachers' behavioral intention to use E-learning was directly and significantly impacted by performance expectancy, effort expectancy, social influence, hedonic incentive, price value, and facilitating factors. The association between the aforementioned variables and teachers' usage of online learning is mediated by user intention. The results thus support the UTAUT2 model's theoretical underpinnings.

6. ACKNOWLEDGMENT

The author thanks and appreciates the officials of the education department and all the primary school teachers who cooperated in this research.

7. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. The authors confirmed that the paper was free of plagiarism.

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DOI:
p- ISSN: 2828-4887 e- ISSN: 2828-4860