VIETNAM JOURNAL OF EDUCATION, 2023
Volume 7, Issue 3, 338-346
https://doi.org/10.52296/vje.2023.319

ORIGINAL ARTICLE

Factors Affecting Lecturers' Intention to use Simulation Technology Applications in Teaching Activities at the Tertiary Level

Thao Nhu Dang[+]**,**
Cam Ai Tran

Nguyen Tat Thanh University, Vietnam
[+]*Corresponding author ● Email: dnthao@ntt.edu.vn*

Article history
Received: 13 Augusts, 2023
Accepted: 06 December, 2023
Published: 28 December, 2023

Keywords
Simulation, technology application, teaching activities

ABSTRACT
This paper aims to examine the impact of different factors on lecturers' behavior related to the intention to use simulation technology applications in teaching activities in the context of the 4.0 industrial revolution in all fields around the world. The research employs a mixed-method approach, comprising qualitative in-depth interviews and group discussions, followed by a quantitative survey using SPSS-V.22 to assess the impact of lecturers' intention-related factors on use of simulation applications in teaching activities. Based on the analysis results, the study identifies the factors that promote the intention to use simulation applications in teaching activities. The practical implications of this research are significant, as the findings provide valuable insights to curriculum developers, educators, administrators, policymakers, and developers of simulations in school instruction. Enhancing the intention to use simulation applications can contribute to improving the quality of teaching and training. This study adds to the current body of knowledge by offering a new perspective on the use of simulation applications in teaching activities.

1. INTRODUCTION

Information technology has rapidly transformed many aspects of education, including the way we learn (Yildiz, 2021). Technology has become an integral component of modern science, especially in the field of education, and can be classified into five main categories: symbolization, data collection, simulation, analysis - numbering and visualization (Gould & Tobochnick, 1996).

In the setting of application-focused universities, optimizing training quality based on practice is an important goal. In applied training, simulation is a recommended method. In applied training programs, lecturers not only impart theoretical knowledge but also provide practical situations to develop students' competencies throughout the learning process. Therefore, the role of lecturers in the effective integration of simulations in teaching is important. However, many lecturers are not willing to use this applied technology in their teaching activities due to various reasons. This study focuses on (1) What is the current situation of using simulation technology applications in teaching at universities? (2) To what extent do the factors influence the intention to apply simulation technology in teaching at universities? (3) What is the solution to promote the intention to use simulation technology in university teaching activities? Research on the impact of factors influencing lecturers' behavior on the intention to use simulation technology in teaching activities in Vietnam is still very limited. This research will provide the theoretical contributions and implications for university policymakers to pay more attention to the application of technology in teaching activities.

2. LITERATURE REVIEW

In an evaluation of the effectiveness of digital simulation applications in teaching, the authors conducted an experiment at a medical university in China (Deng et al., 2018). They compared the effectiveness of using a digital simulation application with traditional teaching methods with lectures and still images. The research results show that the use of digitized simulation applications improved teaching effectiveness regarding imparting knowledge about the major human anatomy. The students in the group using the digitized simulation app said they had a better learning experience and were able to easily visualize and understand complex aspects of the human body. At the same time, they also demonstrated greater confidence in applying this knowledge in practice.

The research group of Sarı et al., (2020) conducted a study at a high school in Turkey, which showed that STEM education had a significant positive impact on the development of science processing skills and the students' STEM awareness. The students engaging in visual simulation-based learning were able to enhance scientific inquiry and assessment as well as explore and identify STEM-related issues more effectively compared with those in the control group.

Reymus et al., (2020) evaluated the usefulness of virtual reality technology in teaching root canal surgery to dental students. It is shown that the use of virtual reality technology is potentially an effective tool in teaching root canal anatomy to dental students. The combination of virtual reality technology and traditional teaching can provide students with an interactive and engaging learning environment that enhances their training experience in the field of dentistry.

Intention to use technology has become increasingly important in shaping learning and teaching in the digital age. Recent research has demonstrated that intention to use technology is a behavior that reflects users' wants and intentions to use technology in the future (Venkatesh et al., 2016). This is defined by the perceived ease of use and usefulness of the technology (Amin et al., 2019). In the field of education, lecturers play an important role in promoting the use of technology to enhance teaching and learning. Confidence in the ability to use technology is an important factor in lecturers' intention to use technology (Joo et al., 2018; Tang et al., 2021).

Perceived Usefulness (PU) is the degree to which individuals believe that using a particular system will enhance their job performance (Davis, 1985). Granić and Marangunić (2019) conducted a systematic literature review to determine the importance of the TAM model by education domain, level of education, and implementation technology. The findings suggest that TAM is a leading scientific model and a reliable model for facilitating the evaluation of diverse technology implementations in educational contexts. Furthermore, the results indicate that perceived ease of use and perceived usefulness are the main predictors of individuals' technology adoption in all analyzed educational contexts.

Lecturer 1: "*Simulation applications can create a hypothetical environment, but very close to reality, helping students experience real situations in the field of finance and accounting. This helps students apply their knowledge to real-life problems and develop important skills*".

Lecturer 6: "*The simulation application allows students to practice information technology skills in an interactive way. Students can implement analysis, design, programming, and testing methods in a safe and supportive environment. This gives them more confidence to apply their knowledge to real projects and jobs*".

From that basis, the following hypothesis is proposed:

H1: Perceived usefulness has a positive influence on the intention to use technology.

Perceived ease of use (PEOU) is defined as "the degree to which a person believes that using a particular system will require no physical or mental effort" (David, 1989). Chigona and Chigona (2010) states that when lecturers lack the ability and skills to use technology, they will refuse to use it. When lecturers do not have the necessary skills, this knowledge deficit becomes a major barrier to the integration of technology into their teaching practice (Ertmer et al., 2012).

Lecturer 4: "*Simulation applications often integrate new technologies such as artificial intelligence, virtual reality, and online resources to create interactive and engaging learning experiences. This keeps students interested and at the same time honing their skills in using technology in hotel management, which is important in today's fast-paced technology world*".

Lecturer 10: "*Simulation applications should provide detailed and clear instructions for use so that lecturers and students can easily familiarize themselves with and take advantage of the application's features. Instructions need to be presented in a specific way, including illustrations, video tutorials, or supporting documents to support the learning process and use the simulation effectively*".

For TAMs, perceived ease of use affects perceived usefulness and at the same time affects the lecturers' intention to use technology. From that basis, the following hypothesis is proposed:

H2: Perceived ease of use has a positive influence on the intention to use technology.

Social influence (SI) is the degree to which an individual finds that those who are important to them think a new information system should be used (Venkatesh et al., 2003). In the educational environment, Nanayakkara et al. (2005) demonstrated that friends, colleagues, educational administrators, and organizational policies have a close relationship with the decision-making process of lecturers in terms of accepting the use of technology applications in teaching. Social influence as a direct determinant of behavioral intention is shown as a subjective norm of TRA (Hill et al., 1977) and TAM (Davis, 1989); TAM2 (Venkatesh & Davis, 2000).

Lecturer 4: "*I have received suggestions and encouragement from colleagues, friends, and teachers about using simulation applications in teaching activities. They think this is a great idea to make the learning process more enjoyable and engaging for students*".

Lecturer 8: "*Some of my lecturers and superiors have encouraged me to apply simulation applications in teaching. They find that using this technology enhances teaching effectiveness, develops students' skills, and prepares them for future careers*".

From that basis, the following hypothesis is proposed:

H3: Social influence has a positive influence on the intention to use technology.

Perceived enjoyment (PE) is defined as the degree to which the activity using a particular system is considered enjoyable in its own right, in addition to any performance consequences caused by the use of the system (Venkatesh, 2000). The study by Bower et al., (2020) and Hu et al., (2020) highlight that perceived enjoyment is the main drive influencing faculty attitudes toward technology use and, ultimately, faculty intention to use technology.

Lecturer 3: "*Simulation apps can integrate games and challenge elements to make the learning process more enjoyable. Students can participate in financial games, solve puzzles, and complete tasks to develop financial management and decision-making skills. The fun of these games and challenges often stimulates student engagement and excitement*".

Lecturer 9: "*Simulation applications can create interactive and competitive activities among students. For example, students can participate in virtual stock trading competitions, race for the top scores, or compare results with other students. This interaction and competition not only fosters participation but also encourages students to put in more effort and sharpen their financial skills*".

From that basis, the following hypothesis is proposed:

H4: Perceived enjoyment has a positive influence on the intention to use technology.

Davis's TAM model in 1989 has been applied by many researchers in many fields, especially in the education sector, including both Vietnamese authors (Le, 2022) and international researchers such as (Mailizar & Maulina, 2021; Mugo et al., 2017, Waheed & Jam, 2010; Silva, 2015). This original model is proposed with 4 independent variables: Perceived Usefulness, Perceived ease of use, Social influence, Perceived enjoyment, and 1 dependent variable: Intention to use technology.

Based on the technology acceptance model, previous studies, and qualitative results found, the authors propose the following research model:

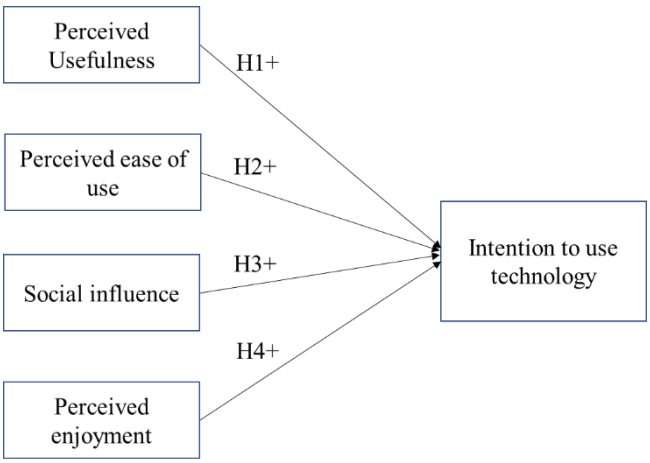

Figure 1. Research model

3. MATERIALS AND METHODS

The research study was implemented in both inductive and deductive directions. The qualitative research was conducted in the form of in-depth interviews with 17 lecturers and group discussions with 12 other lecturers. This stage revealed 4 factors that are believed to have an impact on the intention to use simulation applications in activities, including Perceived usefulness, Perceived ease of use, Social influence, and Perceived enjoyment.

The steps to carry out quantitative research using the SPSS - V.20 tool are described as follows: Firstly, a survey was employed to collect data from lecturers in 4 private universities in Vietnam within the age range of 25 - 40 who had used simulation applications in their university teaching activities. The survey questionnaire consists of three main sections, (1) Introduction including information about the research study and some screening questions; (2) Intention to use technology in teaching activities (3) Socio-demographic items.

On the basis of the scales measuring attributes of the intention to use technology suggested by Davis et al., (1989), Venkatesh and Davis (2000), Mohsen (2008), and Hill et al. (1977), the authors developed 23 items to measure six attributes of the intention to use technology. These attributes included Perceived usefulness, Perceived ease of use, Social influence, and Perceived enjoyment. All the items were rated based on a 5-point Likert scale anchored at 1 for "strongly disagree" and 5 for "strongly agree". Prior to the data collection phase, the survey questionnaire was piloted using interviews at 4 universities.

The empirical evidence collected from lecturers in Vietnam evaluates the attributes of the intention to use technology in teaching activities. Exploratory Factor Analysis (EFA) is employed to examine the latent factors that may be influencing observed variables in a dataset. It is a statistical technique used to help researchers explore the structure of a dataset and understand how variables are related to each other.

Convenience sampling was used, and participation was on a voluntary basis. The questionnaires were administered to the respondents during several meetings of lecturers and faculties of the 4 universities. The researchers attended each meeting and explained the data collection process and also obtained consent from the respondents. They remained in the meeting rooms to collect the completed questionnaires. The final effective sample included 262 respondents, 39% of whom (101 lecturers) were female and 61% (161 lecturers) male. The majority of the respondents were undergraduate lecturers.

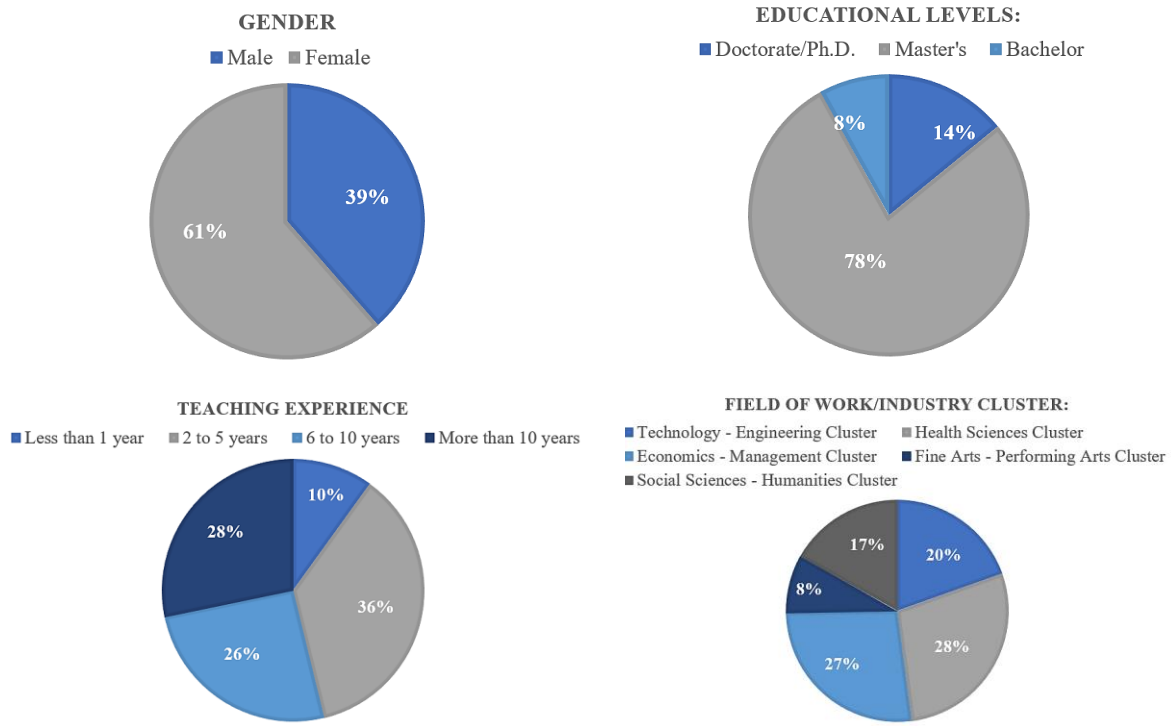

Figure 2. Respondents' demographic information

The proportions of specific seniority is as follows: 10% less than 1 year, 36% from 2-5 years, 26% from 6-10 years, 28% more than 10 years. Considering their training qualifications, the proportion of lecturers with Doctoral degrees is 14%, Master's 78%, and Bachelor's 8%. These figures somehow indicate the diversity in interest and intention to use technology applications in teaching activities in different fields of work, also the potential and common integration of simulation applications to improve the teaching and learning process.

4. RESULTS AND DISCUSSION

The Cronbach's Alpha coefficient is supposed to be 0.6 or higher to confirm the reliability of the scale. As a result, the data is regarded as being suitable for factor analysis. The results of data analysis in this study are illustrated in Table 1.

Table 1. Scale Reliability

Observed variables	Scale average if the variable type	Scale variance if the variable type	Total variable correlation	Cronbach's Alpha coefficient if the variable type
Intention to use technology (IU), Cronbach's Alpha = 0.888				
IU1	11.44	4.607	0.728	0.866
IU2	11.52	4.473	0.812	0.836
IU3	11.83	4.127	0.756	0.858
IU4	11.64	4.493	0.733	0.864
Perceived Usefulness (PU), Cronbach Alpha = 0.857				
PU1	11.87	3.587	0.777	0.785
PU2	11.85	3.749	0.756	0.795
PU3	11.95	3.952	0.786	0.789
PU4	12.19	4.222	0.518	0.895
Perceived ease of use (PEOU), Cronbach's Alpha = 0.902				
PEOU1	10.54	4.847	0.771	0.878
PEOU2	10.60	4.648	0.821	0.860
PEOU3	10.70	4.824	0.779	0.875
PEOU4	10.67	4.574	0.759	0.884
Social influence (SI), Cronbach's Alpha = 0.915				
SI1	21.93	17.684	0.803	0.898
SI2	21.99	17.119	0.830	0.894
SI3	21.84	17.389	0.774	0.899
SI4	21.97	17.390	0.666	0.911
SI5	22.00	16.969	0.758	0.901
SI6	21.83	17.024	0.771	0.899
SI7	21.78	18.048	0.615	0.916
Perceived enjoyment (PE), Cronbach's Alpha = 0.918				
PE1	11.70	4.495	0.844	0.882
PE2	11.80	4.443	0.860	0.876
PE3	11.82	4.669	0.762	0.910
PE4	11.60	4.853	0.782	0.903

Four factors with Eigenvalues exceeding 1.0 were generated by the 23 items which operationalized the attributes of the intention to use technology in teaching activities. The factor loadings of items were all above the recommended threshold of 0.3 (Hair et al., 2010). As shown in Table 1, α values ranged from a low of 0.857 to a high of 0.918, ensuring good internal consistency of reliability (Hair et al., 2010). Hence, the four factors and associated items were included in further descriptive analysis.

Table 2. Summary of exploratory factor analysis (EFA)

Parameters	Acceptance Criteria	EFA
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	> 0.5	0.851
Number of extracted factors		4 factors
Eigenvalues	> 1	1.231
Bartlett's Test of Sig.	< 0.05	0.000
Total Variance Explained	> 50%	75.847%
Number of variables removed		0

The results of the first EFA analysis show that at the stop-point with an Eigenvalue of 1.231 (>1), the data extracted from the 4 factors correspond to the 4 research concepts of the model, the total variance extracted from the extracted factors is 75.847% (>50%), which means that 75.847% of the variation of the 4 factors explained by the observed variable of the scale requires the value of these 4 observed factors >0.5). The 4 factors extracted respectively include: Perceived usefulness, Perceived ease of use, Social influence, and Perceived enjoyment.

Table 3. Rotated Component Matrix[a]

	Component			
	1	2	3	4
SI2	0.839			
SI1	0.832			
SI3	0.814			
SI5	0.774			
SI6	0.740			
SI4	0.733			
SI7	0.464			
PE3		0.866		
PE2		0.838		
PE1		0.801		
PE4		0.780		
PEOU2			0.874	
PEOU4			0.830	
PEOU3			0.778	
PEOU1			0.739	
PU3				0.831
PU1				0.830
PU2				0.784
PU4				.632

In this study, the authors use the values in the Standardized Coefficients column of Table 4 to write the regression equation as follows:

Intention to use technology = 0.516 Perceived Usefulness + 0.133 Perceived Ease Of Use + 0.014 Social influence + 0.228 Perceived enjoyment.

Table 4. Standardized Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics
		B	Std. Error	Beta			Tolerance
1	(Constant)	0.282	0.200		1.411	0.159	
	PU	0.554	0.058	0.516	9.596	0.000	0.573
	PEOU	0.129	0.051	0.133	2.542	0.012	0.603
	SI	0.014	0.054	0.014	0.254	0.800	0.566
	PE	0.223	0.052	0.228	4.303	0.000	0.588

Intention to use technology in education becomes an important factor when the variable Perceived Usefulness increases by 1 standard deviation unit, and the variable Intention to use technology increases by 0.516 standard deviation units.

Intention to use technology in education becomes an important factor when the variable Perceived ease of use (PEOU) increases by 1 standard deviation unit, and the variable Intention to use technology increases by 0.133 standard deviation units.

Intention to use technology in education becomes an important factor when the variable Social influence (SI) increases by 1 standard deviation unit, and the variable Intention to use technology increases by 0.014 standard deviation units.

Intention to use technology in education becomes an important factor when the variable Perceived enjoyment (PE) increases by 1 standard deviation unit, and the variable Intention to use technology increases by 0.228 standard deviation units.

According to the regression equation, the factor *Perceived Usefulness* has the strongest impact on the lecturer's *Intention to use technology with a beta* 0.516 at a significance of 95%. To explain these results, the authors have the discussion as follows:

The results of this study demonstrate that the proposed model fits the data well by successfully completing the 3 proposed goals, and confirming the 4 research hypotheses as being suitable for the current context. From the research results, the following factors: Perceived usefulness, Perceived ease of use, Perceived Enjoyment, Social influence have a direct influence on behavioral intention. It is shown that the model of using simulation applications is consistent with the theory of TAM (Davis, 1989), UTAUT (Venkatesh et al., 2003), and TRA (Theory of Reasoned Action) of Hill et al. (1977).

From the direct effects, it is clear that when lecturers perceive the use of simulation applications in teaching activities. The findings underscore that it is useful for lecturers to be well aware of using simulation applications in teaching activities. These findings serve as a reference to curriculum makers, educators, administrators, policymakers, and developers of simulations in school instruction.

This study has identified the factors that affect the intention to use simulation applications in teaching activities. Moreover, it is necessary to understand that the influence of these factors does not exist invariably between factors such as gender, teaching experience, majors and degrees. Recommendations for improvement from the different levels of management, school administration, and faculty will have a great influence on lecturers' intention to use technology in teaching activities. Therefore, the authors propose the following solutions:

A possible solution to improving lecturers' readiness and acceptance of simulation applications in teaching could lie in providing a training program that integrates simulation applications to demonstrate how effective a foundation of simulation applications can be in the teaching process. Research shows that the majority of lecturers realize the potential of using simulation applications in teaching activities to provide a better form of education than traditional teaching methods. However, schools need to more widely disseminate to lecturers information about the benefits that simulation applications offer in improving training quality, completing teaching tasks, increasing the quality of lectures, and at the same time making it more convenient to monitor and evaluate the learning outcomes of lecturers, etc.

The school needs to organize seminars, conferences, thematic sharing experiences focusing on simulation applications among the teaching staff in the same teaching field. This will help lecturers perceive the usefulness, fun,

and ease of using technology applications in teaching activities. In addition, there should be a technical support team and initial training to improve skills and knowledge about using applications for trainers.

During the teaching process, faculty superiors need to support and encourage lecturers and colleagues to actively increase the use of simulation applications in teaching activities. The school needs to equip all lecturers with sufficient knowledge and information about using simulation applications in teaching activities to enhance their own self-worth in the future.

Instructor awareness could easily be improved if simulation resources are readily available and accessible. Schools need to create favorable conditions by upgrading infrastructure, and actively contacting simulation application providers for lecturers to try simulation applications. If lecturers have early access to and experience simulation applications in teaching activities, it can help them realize the usefulness of using simulation applications in teaching activities as well as the ease of use, thereby improving the readiness of lecturers to use applications in teaching activities.

In addition, the school needs to play the role of a bridge between the lecturer and the supplier so that the lecturer can use a variety of applications easily, and the funding is from the school or the supplier.

Finally, the school administration-oriented training and application-oriented teaching with simulation applications should be acknowledged as an official teaching method deployed and supported by the school. The widespread dissemination of teaching with simulation applications will act as an alert to lecturers that the school is really serious about improving the quality of training, thereby having more positive effects on the use of simulation applications in teaching activities.

5. CONCLUSION

From the research results, the factors Perceived usefulness, Perceived ease of use, Social influence, and Perceived enjoyment proved to have a direct impact on behavioral intention to use simulated applications in university teaching. It is shown that when lecturers are well-informed about the use of simulation applications in teaching activities, it is useful. The findings serve as a useful reference to curriculum writers, educators, administrators, policymakers, and developers of simulations in school instruction.

Conflict of Interest: No potential conflict of interest relevant to this article was reported.

REFERENCES

Ali, A., Almari, H., Isaac, O., & Mohammed, F. (2019). Investigating the key factors influencing the use of online social networks in public sector context in the UAE. *International Journal of Innovation*, *7*(3), 392-411. https://doi.org/10.5585/iji.v7i3.347

Bower, M., DeWitt, D., & Lai, J. W. M. (2020). Reasons associated with preservice teachers' intention to use immersive virtual reality in education. *British Journal of Educational Technology*, *51*(6), 2215-2233. https://doi.org/10.1111/bjet.13009

Chigona, A., & Chigona, W. (2010). *An investigation of factors affecting the use of ICT for teaching in the Western cape schools*. 18th European Conference on Information Systems, ECIS. https://aisel.aisnet.org/ecis2010/61

Davis, F. D. (1985). *A technology acceptance model for empirically testing new end-user information systems: Theory and results*. Doctoral Dissertation, Massachusetts Institute of Technology.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *Management Information Systems Quarterly*, *13*(3), 319-340. https://doi.org/10.2307/249008

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer Technology: A comparison of two theoretical models. *Management Science*, *35*(8), 982-1003. https://doi.org/10.1287/mnsc.35.8.982

Deng, X., Zhou, G., Xiao, B., Zhao, Z., He, Y., & Chen, C. (2018). Effectiveness evaluation of digital virtual simulation application in teaching of gross anatomy. *Annals of Anatomy - Anatomischer Anzeiger*, *218*, 276-282. https://doi.org/10.1016/j.aanat.2018.02.014

Ertmer, P. A., Ottenbreit-Leftwich, A., Sadık, O., Şendurur, E., & Şendurur, P. (2012). Teacher beliefs and technology integration practices: A critical relationship. *Computers & Education*, *59*(2), 423-435. https://doi.org/10.1016/j.compedu.2012.02.001

Gould, H., & Tobochnick, J. (1996). *An introduction to computer simulation methods. Applications to physical systems* (2nd Edition). New York: Addison-Wesley Publishing Company.

Granić, A., & Marangunić, N. (2019). Technology acceptance model in educational context: A systematic literature review. *British Journal of Educational Technology*, *50*(5), 2572-2593. https://doi.org/10.1111/bjet.12864

Hair, J. F. (2010). Multivariate data analysis : a global perspective. In *Pearson eBooks*. https://ci.nii.ac.jp/ncid/BB03463866

Hill, R. J., Fishbein, M., & Ajzen, I. (1977). Belief, Attitude, Intention and Behavior: An Introduction to Theory and Research. *Contemporary Sociology*, *6*(2), 244. https://doi.org/10.2307/2065853

Hu, S., Laxman, K., & Lee, K. (2020). Exploring factors affecting academics' adoption of emerging mobile technologies-an extended UTAUT perspective. *Education and Information Technologies*, *25*, 4615-4635. https://doi.org/10.1007/s10639-020-10171-x

Joo, Y. J., Park, S., & Lim, E. (2018). Factors influencing preservice teachers' intention to use technology: TPACK, teacher self-efficacy, and technology acceptance model. *Educational Technology & Society*, *21*(3), 48-59. https://203.255.161.86/handle/2015.oak/245215

Le, T. H. L. (2022). Ứng dụng mô hình "Chấp nhận công nghệ" nghiên cứu ý định hành vi học trực tuyến của sinh viên Trường Đại học Đồng Nai trong bối cảnh đại dịch Covid-19 [Applying the "Technology Acceptance" model to study the online learning behavior intention of Dong Nai University students in the context of the Covid-19 pandemic]. *Vietnam Journal of Education*, *22*(3), 36-41.

Mailizar, M., Almanthari, A., & Maulina, S. (2021). Examining teachers' behavioral intention to use e-learning in teaching of mathematics: an Extended TAM model. *Contemporary Educational Technology*, *13*(2), ep298. https://doi.org/10.30935/cedtech/9709

Mugo, D. G., Njagi, K., Chemwei, B., & Motanya, J. O. (2017). The Technology Acceptance Model (TAM) and its Application to the Utilization of Mobile Learning Technologies. *British Journal of Mathematics & Computer Science*, *20*(4), 1-8. https://doi.org/10.9734/bjmcs/2017/29015

Nanayakkara, C., & Whiddett, R. J. (2005). A model of user acceptance of E-learning technologies: A case study of a polytechnic in New Zealand. *ISTA*, 180-190. https://cs.emis.de/LNI/Proceedings/Proceedings63/GI-Proceedings.63-13.pdf

Sarı, U., Duygu, E., Şen, Ö. F., & Kırındı, T. (2020). The effects of STEM education on scientific process skills and STEM awareness in simulation based inquiry learning environment. *Journal of Turkish Science Education*, *17*(3), 387-405. https://doi.org/10.36681/tused.2020.34

Silva, P. (2015). Davis' Technology Acceptance Model (TAM) (1989). In *Advances in knowledge acquisition, transfer and management book series* (pp. 205-219). https://doi.org/10.4018/978-1-4666-8156-9.ch013

Tang, K., Hsiao, C., Tu, Y., Hwang, G., & Wang, Y. (2021). Factors influencing university teachers' use of a mobile technology-enhanced teaching (MTT) platform. *Educational Technology Research and Development*, *69*(5), 2705-2728. https://doi.org/10.1007/s11423-021-10032-5

Venkatesh, V. (2000). Determinants of Perceived Ease of Use: Integrating Control, Intrinsic Motivation, and Emotion into the Technology Acceptance Model. *Information Systems Research*, *11*(4), 342-365. https://doi.org/10.1287/isre.11.4.342.11872

Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science*, *46*(2), 186-204. https://doi.org/10.1287/mnsc.46.2.186.11926

Venkatesh, V., Morris, M., Davis, G. B., & Davis, F. D. (2003). User acceptance of information Technology: toward a unified view. *Management Information Systems Quarterly*, *27*(3), 425. https://doi.org/10.2307/30036540

Venkatesh, V., Thong, J. Y., & Xu, X. (2012). Consumer Acceptance and use of Information technology: Extending the unified theory of acceptance and use of technology. *Management Information Systems Quarterly*, *36*(1), 157. https://doi.org/10.2307/41410412

Waheed, M., & Jam, F. A. (2010). Teacher's intention to accept online education: Extended TAM model. *Interdisciplinary Journal of Contemporary Research in Business*, *2*(5), 330-344.

Yildiz, Y. (2021). Teaching English as a Foreign Language to 4th Grade Students by Using Technology. *Canadian Journal of Language and Literature Studies*, *1*(2), 38-54. https://doi.org/10.53103/cjlls.v1i2.16