

*Original Research Article*

# An Assessment of University Students' Perception Towards the Adoption and Use of Mobile Learning Technologies for Learning

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Abstract

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Mobile learning technologies serve as a transformative tool in the educational sector which gives room for accessibility, flexibility and scalability. It also improves student learning outcomes. This study aims to review research on students' attitude and perception towards the adoption and implementation of mobile learning technologies using the Unified Theory and Acceptance and Use of Technology (UTAUT) model. From the studies, results showed that students' perception has a major impact on the adoption and use of mobile technologies. However, based on the various literature reviewed, students' perception is influenced by performance expectancy, effort expectancy (ease of use of the technology), social influence, perceived enjoyment and satisfaction. All these must be put into consideration before design and implementation for the effectiveness. Nevertheless, if all or some of these constructs were not incorporated in the development of mobile learning technology, obstructs the adoption and implementation of mobile learning.

**Keywords:** Effort expectancy, Mobile learning, Perceived enjoyment, Perception, Performance expectancy, Social influence, Technology

## INTRODUCTION

The major goal of education is to equip learners with the necessary skills and knowledge to tackle real world problems and provide solutions (Foster and Yaoyuneyong, 2016 pp. 42-56). To accomplish this, a variety of teaching techniques, including the classic methods of discussion, lecture, and project-based learning have been employed. Although the adoption of technology has brought great transformation to the educational system (Buabeng 2012). Due to the rapid advancement of technology in the twenty-first century, instructors' capacity to incorporate technology into various instructional techniques has become crucial (Varier *et al.*, 2017). One of its major advancements is the introduction of mobile learning which is playing a vital role in reshaping traditional teaching and learning methods (Osman *et al.*, 2010). This has given teaching and

learning a better platform for connections between the school and the outside world.

The term mobile learning, also known as M-learning, refers to the acquisition of knowledge in various settings, facilitated by personal electronic devices, through both social and content interactions (Crompton, 2013). It has also been described as the transformation of e-learning with more effective communication and personalized technology or effective platform for distance learning (Al-Emran *et al.*, 2019). Mobile learning can also be defined as the use of hand-small and portable wireless devices such as mobile phones, personal digital assistants (PDAs), smartphones, personal computers and small tablet PCs, to accomplish flexibility and interactivity (Bukhareav and Wisam Alther, 2017).

This research aims to review students' attitude and

perception towards the adoption and implementation of mobile learning technologies using the Unified Theory and Acceptance and Use of Technology (UTAUT). The main objectives of this paper are as follows: (i) to examine the factors influencing the adoption and use of mobile learning applications among students' (ii) to identify the factors affecting the adoption and use of mobile learning technologies, (iii) to identify students' perception on adoption of mobile learning technology using the UTAUT model.

Factors influencing the adoption and use of mobile learning applications among students includes the following:

- **Accessibility:** One of the major features of m-learning is its ability to deliver educational content in a mobile and easily accessible format. Learners can access learning materials, such as e-books, videos, and interactive quizzes, through mobile applications or websites. This allows them to learn at their own pace and convenience, both in the classroom or wherever they are. With mobile learning, teaching and learning is not restricted by time or location. This innovative approach enables individuals to engage in learning activities regardless of their location or context (Criollo-C *et al.*, 2021; Lam *et al.*, 2010).
- **Real Time Feedback:** Mobile learning has some real time feedback tools which allows learners to track their progress when they take quizzes or do assignments and identify areas that require improvement (Ozdamli and Cavus, 2011).
- **Interactivity among Learners and Instructors:** M-learning incorporates features like quizzes, videos and simulations to encourage active participation and improve the overall learning experience. This not only facilitates social interactions between learners and instructors but also cultivates a sense of community, enabling knowledge sharing and collaboration. (Crompton, 2013). Through mobile learning tools like discussion forums, messaging apps and video conferencing apps, learners can participate in online discussions, collaborate on group projects, and receive feedback from their peers and instructors. This gives room for the students to share ideas with their peers and teachers as well.
- **Personalization:** Mobile learning gives room for adaptation of technologies, by allowing personalised learning experience based on individual progress, preferences and performance. This feature improves learning outcomes by catering for individual needs (Mogase and Alexander, 2018).
- **Availability and Flexibility:** M-learning enables learners to access learning materials and resources anywhere (Zhang 2016).
- **Lifelong Learning:** Mobile learning can support informal and lifelong learning (Venugopal *et al.*, 2023). Learners can access a wide range of educational resources, including podcasts, online courses, and educational apps, which are readily available on their

mobile devices. This allows individuals to continue learning outside of formal educational settings and expand their knowledge and skills at their own convenience. Making mobile learning technology an essential tool for active learning (Shin and Kang 2015).

- **An assistive tool to support students with Learning Disabilities:** Mobile learning with assistive technologies can enhance students with learning disabilities for various needs like to convert text into speech and speech to text so that students can comprehend information and help with students exercises and assignments anywhere and at any time (Bukhareav and Wisam Alther, 2017).

- **Up to date Content:** mobile learning technologies provide learners with the ability to easily update their learning materials. With traditional learning methods, updating materials can be difficult and time consuming. However, with mobile learning technologies, learners can receive real-time updates and notifications about changes or additions to their learning materials. This ensures that learners always have access to the most up-to-date information, eliminating the need for outdated or irrelevant materials. (Pereirra and Rodrigues, 2013).

Mobile learning technology becomes evident through the significant number of students who are satisfied with the implementation of these innovative systems within their educational institutions as an essential component of their programs. The success or failure of such technology relies heavily on the acceptance of learners (Almaiah and Al Mulhelm 2018). However, despite the numerous benefits and features offered by mobile learning technologies, their adoption and acceptance among university students remain low, presenting a significant challenge. Here are some factors that contribute to this issue.

- ✓ **Inadequate or lack of proper training and support for both tutors and students:** some tutors and students are not adequately trained to effectively utilize these tools, and they might lack familiarity with the technology and its educational applications. This dearth of training and support can result in frustration and a hesitancy to embrace mobile learning technologies (Asabere 2013).

- ✓ **Security and privacy of students' data:** The security and privacy of students' data when utilizing mobile learning technologies have raised concerns (Pereirra and Rodrigues, 2013). It is of utmost importance to guarantee the security of personal information and learning materials to establish user trust and adhere to data protection regulations. Educational institutions have the responsibility to safeguard student data and ensure that the utilization of such technologies aligns with privacy laws and regulations (Crompton, 2013) and (Saikat *et al.*, 2021).

- ✓ **Content adaptation and quality:** It can be quite challenging to modify conventional learning materials to accommodate mobile screens. The content might require restructuring or redesigning to adapt to smaller screens,

while still ensuring that comprehension and engagement are not compromised.

✓ **Technical challenges:** The presence of viruses and bugs can cause technical issues on Mobile learning platforms. Additionally, compatibility issues with different devices and operating systems may arise as well as the seamless integration with existing learning management systems (Criollo-C *et al.*, 2021).

Review of Literature on students' perception on adoption of mobile learning technology using the UTAUT model.

The Unified Theory and Acceptance and Use of Technology (UTAUT) is a theoretical framework developed by Venkatesh *et al.* (2003). based on systematic review of different existing models to understand and predict individual acceptance and use of technologies (Venkatesh *et al.*, 2003). UTAUT model addresses the limitations of the TAM model by incorporating social factors and human behaviours (Hewavitharana *et al.*, 2021). The research findings indicate that while TAM and its extensions can only predict up to 40% of technology acceptance, UTAUT has a higher predictive power of 70% (Holden and Kash, 2010; Venkatesh *et al.*, 2003). UTAUT principles have been applied and extensively tested to predict factors affecting technology acceptance and adoption in various sectors (Oye *et al.*, 2014).

UTAUT model identifies four external variables that influence an individual's perception and intention to use a technology and their actual usage behaviour (Mansoori, 2017). These external variables provide a comprehensive framework for predicting users' behaviour and intention towards adopting and using new mobile learning technology. The variables are:

### Performance Expectancy

This is the extent to which students perceived how mobile technology can improve their learning experience (Anthony *et al.*, 2021). When users realize how mobile learning technology has helped to improve learning outcomes, they will most likely adopt and use the technology (Wang *et al.*, 2009). This shows that performance expectancy has a positive effect on students' adoption and use for mobile learning technologies (Abu-Al-Aish and Love, 2013; Ali *et al.*, 2016; Anthony *et al.*, 2021).

### Effort Expectancy

It shows how easy the students believe the system will be (Venkatesh and Morris, 2000). The user's perception on the level of simplicity of mobile learning technology can be determined by how easy it is to navigate within the interface or to operate the system (Chao, 2019). The

successful adoption and implementation of any technology depends majorly on its ease of use (Venkatesh *et al.*, 2003). In relation to this context, effort expectancy has a positive effect on students' adoption and implementation of new mobile learning technology (Abu-Al-Aish and Love, 2013; Wang *et al.*, 2009). However, many students may be inclined to resist changes by refusing to embrace new technology due to their familiarity with the old one (Almaiah and Al Mulhelm, 2018). This brings us to the third variable which is social influence.

### Social Influence

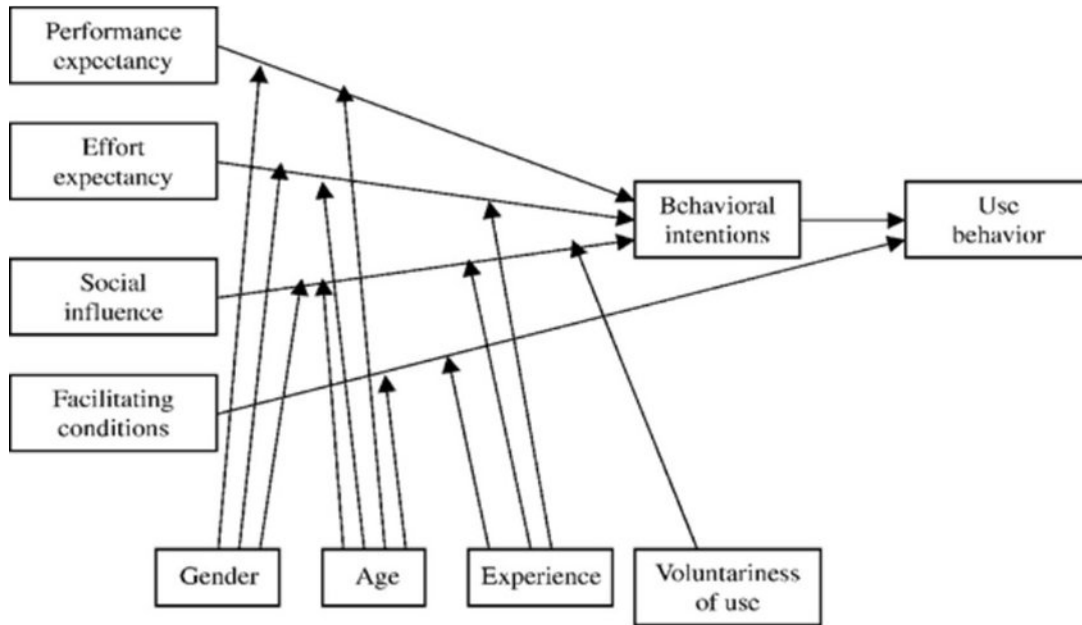
Social influence refers to the extent to which an individual perceives the beliefs of others regarding the significance of adopting new technology (Venkatesh and Morris, 2000). These beliefs can be shaped by peers, parents, tutors, society, religion, and similar factors. Social influence has positive impact on students' adoption and implementation of new mobile learning technologies (Alghazi *et al.*, 2021; Venkatesh and Morris, 2000; Yong, 2011). Although Joo *et al.* (2014) argued that social influence does not have positive effect on the adoption of mobile learning technologies. In contrast to Joo *et al.* (2014), superior influence has strong impacts in influencing the students in adopting new mobile learning technologies (Yong, 2011) and (Abu-Al-Aish and Love, 2013). Superior influence in this context refers to the lecturers and they can motivate the students to adopt new technologies. Most especially if the lecturers have vast knowledge in the technology (Abu-Al-Aish and Love, 2013).

### Facilitating Conditions

This is the extent to which students perceive that technical support and training can influence their adoption of mobile learning technology (Abbad, 2021). This includes infrastructure, technical support and training. Students' perception of the quality of online support services might be a key factor in influencing their intention to adopt mobile learning (Lee, 2010).

Performance expectancy, effort expectancy, social influence and facilitating conditions has a significant influence on students' attitude towards mobile learning acceptance and use (Venkatesh and Morris, 2000; Abbad 2021; Arain *et al.*, 2019).

Learners' attitudes towards the adoption of new mobile learning technology are because of collection of factors arising before, during and after a training section. The UTAUT model in a longitudinal study predicted that people would embrace new technologies at a variance of about 70% (Holden and Kash, 2010). It also considers the role of different variables, such as sex, age,



**Figure 1.** Diagrammatic representation of the UTAUT Model (Venkatesh *et al.*, 2003)

experience and voluntaries of use (Venkatesh *et al.*, 2012). These variables moderate the relationship between the UTAUT constructs (Cheng *et al.*, 2011).

However, some scholars suggested that extending the UTAUT model to investigate m-learning acceptance is significant, as highlighted by (Alasmari and Zhang, 2019; Kaliisa *et al.*, 2019; Elmasri and Tarhini, 2017). To address this need, several scholars have integrated new constructs into the UTAUT model (Chao 2019; Almaiah *et al.*, 2019; DeLone and McLean 2016). Chao (2019) added perceived enjoyment, self-efficacy, trust and perceived risk. as external factors. The result of the research shows that trust and self-efficacy influence users' behaviour in adoption of new technologies positively (Chao, 2019; Almaiah *et al.*, 2019) integrated seven external variables, his findings showed that the acceptance of mobile learning systems is primarily influenced by information quality, trust, and technological self-efficacy. Additionally, performance expectancy, effort expectancy, and facilitating conditions were found to have a significant positive impact on the adoption of mobile learning systems among students. Although, it was noted that social influence does not have an impact on the acceptance of new mobile learning technology. Instead, the research findings indicate that as trust levels increase, students exhibit a stronger tendency to embrace and make use of the mobile learning system (Almaiah *et al.*, 2019).

However, for students to trust the new technology, there must be perceived users' satisfaction, and this can influence learners' behaviour in adopting the new technology (DeLone and McLean 2016). The higher the

level of satisfaction, the higher the students' behavioral intention to adopt and use m-learning (Arain *et al.*, 2019). Perceived users' satisfaction can be measured by how the users enjoys using the technology (perceived enjoyment). Users can enjoy the technology when variables like perceived information quality, perceived system quality, perceived ubiquity, perceived facilitating conditions, perceived appearance quality are put in place on the system (Arain *et al.*, 2019). Perceived enjoyment has a significant effect on performance expectancy and effort expectancy of mobile learning (Chao, 2019).

## CONCLUSION

According to the results of this study, the main factors influencing students' decision to adopt mobile learning technology are performance expectancy, effort expectancy, social influence, facilitating conditions, perceived satisfaction, and perceived enjoyment. Therefore, developers of mobile learning technology should ensure that the systems possess qualities such as flexibility, accessibility, portability, and ubiquity. Additionally, the system should be user-friendly, allowing users to navigate easily. This can be achieved through clear and concise instructions, intuitive interfaces, and responsive design. Furthermore, designers may also consider incorporating gamification elements to enhance the enjoyment of using the system, which can motivate students to actively engage with the technology and improve their learning experience. Incorporating all these constructs into the development of mobile learning technology will result in a

powerful tool for online education. Moreover, it will foster students' acceptance and utilization of technology, consequently enhancing their academic achievements at the long run. This review gives room for further research in mobile learning on privacy and security issues associated with mobile learning, this includes students' data. There is also need for further research on the mobile technologies for people with learning disabilities like dyslexia, autism and the likes.

## REFERENCES

- Abbad M. M. M. (2021). Using the UTAUT model to understand students' usage of e-learning systems in developing countries. *Education and Information Technologies*, 26. <https://doi.org/10.1007/s10639-021-10573-5>
- Abu-Al-Aish A, Love S (2013). Factors influencing students' acceptance of m-learning: An investigation in higher education. *The International Review of Research in Open and Distributed Learning*, 14(5). <https://doi.org/10.19173/irrodl.v14i5.1631>
- Al Mansoori KA (2017). *Use of a Modified UTAUT Model to Investigate Emirati Citizens' Adoption of e-Government in Abu Dhabi* (Thesis). University of Wollongong in Dubai.
- Al-Emran M, Alkhoudary Y, Mezhuyev V, Al-Emran M (2019). Students and Educators Attitudes towards the use of M-Learning: Gender and Smartphone ownership Differences. In *www.learntechlib.org*. Retrieved from <https://www.learntechlib.org/p/207191>
- Alghazi SS, Kamsin A, Almaiah MA, Wong SY, Shuib L (2021). For Sustainable Application of Mobile Learning: An Extended UTAUT Model to Examine the Effect of Technical Factors on the Usage of Mobile Devices as a Learning Tool. *Sustainability*, 13(4), 1856. <https://doi.org/10.3390/su13041856>
- Ali R, Rafie M, Arshad M (2016). 109 *www.etasr.com* Ali and Arshad: Perspectives of Students' Behavior Towards Mobile Learning (M-learning) in Egypt... Perspectives of Students' Behavior Towards Mobile Learning (M-learning) in Egypt: An Extension of the UTAUT Model. *Technology and Applied Science Research*, 6(4), 1109–1114.
- Almaiah MA, Al Mulhem A (2018). Analysis of the essential factors affecting of intention to use of mobile learning applications: A comparison between universities adopters and non-adopters. *Education and Information Technologies*, 24(2), 1433–1468. <https://doi.org/10.1007/s10639-018-9840-1>
- Almaiah MA, Alamri MM, Al-Rahmi W (2019). Applying the UTAUT Model to Explain the Students' Acceptance of Mobile Learning System in Higher Education. *IEEE Access*, 7, 174673–174686. <https://doi.org/10.1109/access.2019.2957206>
- Anthony B, Kamaludin A, Romli A (2021). Predicting Academic Staffs Behaviour Intention and Actual Use of Blended Learning in Higher Education: Model Development and Validation. *Technology, Knowledge and Learning*. <https://doi.org/10.1007/s10758-021-09579-2>
- Asabere N (2013). Benefits and Challenges of Mobile Learning Implementation: Story of Developing Nations. *Int. J. Computer Applications*, 73(1).
- Buabeng-Andoh C (2012). Factors influencing teachers' adoption and integration of information and communication technology into teaching: A review of the literature. *Int. J. Edu. Develop. Using ICT*, 8(1). Retrieved from <https://www.learntechlib.org/p/188018>
- Bukharaev N, Wisam Altaher A (2017). Mobile Learning Education has Become More Accessible. *Ame.J. Comp. Sci. Info. Technol.* 05(02). <https://doi.org/10.21767/2349-3917.100005>
- Chao CM (2019). Factors Determining the Behavioral Intention to Use Mobile Learning: An Application and Extension of the UTAUT Model. *Frontiers in Psychology*, 10. <https://doi.org/10.3389/fpsyg.2019.01652>
- Cheng YS, Yu TF, Huang CF, Yu C, Yu CC (2011). The Comparison of Three Major Occupations for User Acceptance of Information Technology: Applying the UTAUT Model. *IBusiness*, 03(02), 147–158. <https://doi.org/10.4236/ib.2011.32021>
- Criollo-CS, Guerrero-Arias A, Jaramillo-Alcázar Á, Luján-Mora S (2021). Mobile Learning Technologies for Education: Benefits and Pending Issues. *Applied Sciences*, 11(9), 4111. <https://doi.org/10.3390/app11094111>
- Crompton H (2013). *Handbook of Mobile Learning* (Z. L. Berge and L. Muilenburg, Eds.). <https://doi.org/10.4324/9780203118764>
- DeLone WH, McLean ER (2016). Information Systems Success Measurement. *Foundations and Trends® in Information Systems*, 2(1), 1–116. <https://doi.org/10.1561/29000000005>
- El-Masri M, Tarhini A (2017). Factors affecting the adoption of e-learning systems in Qatar and USA: Extending the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2). *Educational Technology Research and Development*, 65(3), 743–763. <https://doi.org/10.1007/s11423-016-9508-8>
- Foster J, Yaoyuneyong G (2016). Teaching innovation: equipping students to overcome real-world challenges. *Higher Education Pedagogies*, 1(1), 42–56. <https://doi.org/10.1080/23752696.2015.1134195>
- Hewavitharana T, Nanayakkara S, Perera A, Perera P (2021). Modifying the Unified Theory of Acceptance and Use of Technology (UTAUT) Model for the Digital Transformation of the Construction Industry from the User Perspective. *Informatics*, 8(4), 81. <https://doi.org/10.3390/informatics8040081>
- Holden RJ, Karsh BT (2010). The Technology Acceptance Model: Its past and Its Future in Health Care. *J. Biomed. Informatics*, 43(1), 159–172. <https://doi.org/10.1016/j.jbi.2009.07.002>
- Joo YJ, Joung S, Shin EK, Lim E, Choi M (2014). Factors Influencing Actual Use of Mobile Learning Connected with E-Learning. *Computer Science and Information Technology ( CS and IT )*. <https://doi.org/10.5121/csit.2014.41116>
- Kaliisa R, Palmer E, Miller J (2017). Mobile learning in higher education: A comparative analysis of developed and developing country contexts. *Brit. J. Educ. Technol.* 50(2). <https://doi.org/10.1111/bjet.12583>
- Kallaya, J., Prasong, P., and Kittima, M. (2009). An Acceptance of Mobile Learning for Higher Education Students in Thailand. *Cmruir.cmru.ac.th*. Retrieved from <http://cmruir.cmru.ac.th/handle/123456789/416>
- Lam, J., Yau, J., and Cheung, S. K. S. (2010). A Review of Mobile Learning in the Mobile Age. *Hybrid Learning*, 6248(978-3-642-14657-2), 306–315. [https://doi.org/10.1007/978-3-642-14657-2\\_28](https://doi.org/10.1007/978-3-642-14657-2_28)
- Lee, J.-W. (2010). Online support service quality, online learning acceptance, and student satisfaction. *The Internet and Higher Education*, 13(4), 277–283. <https://doi.org/10.1016/j.iheduc.2010.08.002>
- Mogase, R. C., and Alexander, P. M. (2018). An Interactive Mobile Computing Model to Enhance Personalized learning for At-risk Students in South African Higher Learning.
- Osman, M., El-Hussein, M., and Cronje, J. (2010). International Forum of Educational Technology and Society Defining Mobile Learning in the Higher Education Landscape. *Source: Journal of Educational Technology and Society*, 13(3), 12–21. <https://doi.org/10.2307/jeductechsoci.13.3.12>
- Oye, N. D., A.Iahad, N., and Ab.Rahim, N. (2012). The history of UTAUT model and its impact on ICT acceptance and usage by

- academicians. *Education and Information Technologies*, 19(1), 251–270. <https://doi.org/10.1007/s10639-012-9189-9>
- Ozdamli, F., and Cavus, N. (2011). Basic elements and characteristics of mobile learning. *Procedia - Social and Behavioral Sciences*, 28, 937–942. <https://doi.org/10.1016/j.sbspro.2011.11.173>
- Ozturk, A. B., Bilgihan, A., Nusair, K., and Okumus, F. (2016). What keeps the mobile hotel booking users loyal? Investigating the roles of self-efficacy, compatibility, perceived ease of use, and perceived convenience. *International Journal of Information Management*, 36(6), 1350–1359. <https://doi.org/10.1016/j.ijinfomgt.2016.04.005>
- Pereira, O. R. E., and Rodrigues, J. J. P. C. (2013). Survey and analysis of current mobile learning applications and technologies. *ACM Computing Surveys*, 46(2), 1–35. <https://doi.org/10.1145/2543581.2543594>
- Saikat, S., Dhillon, J. S., Wan Ahmad, W. F., and Jamaluddin, R. A. (2021). A Systematic Review of the Benefits and Challenges of Mobile Learning during the COVID-19 Pandemic. *Education Sciences*, 11(9), 459. <https://doi.org/10.3390/educsci11090459>
- Shin, W. S., and Kang, M. (2015). The use of a mobile learning management system at an online university and its effect on learning satisfaction and achievement. *The International Review of Research in Open and Distributed Learning*, 16(3). <https://doi.org/10.19173/irrodl.v16i3.1984>
- Varier, D., Dumke, E. K., Abrams, L. M., Conklin, S. B., Barnes, J. S., and Hoover, N. R. (2017). Potential of one-to-one technologies in the classroom: teachers and students weigh in. *Educational Technology Research and Development*, 65(4), 967–992. <https://doi.org/10.1007/s11423-017-9509-2>
- Venkatesh, V., and Morris, M. G. (2000). Why Don't Men Ever Stop to Ask for Directions? Gender, Social Influence, and Their Role in Technology Acceptance and Usage Behavior. *MIS Quarterly*, 24(1), 115–139. <https://doi.org/10.2307/3250981>
- Venkatesh, V., Morris, M. G., Davis, G. B., and Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425–478. <https://doi.org/10.2307/30036540>
- Venkatesh, V., Thong, J. Y. L., and Xu, X. (2012). Consumer Acceptance and Use of Information Technology: Extending the Unified Theory of Acceptance and Use of Technology. *MIS Quarterly*, 36(1), 157–178. Retrieved from <https://www.jstor.org/stable/41410412>
- Venugopal, A., Madanan, M., Ali, A., Hamza, W., and Alredany, D. (2023). *The Integration of M-Learning in Learning Management System*. Retrieved from <https://resmilitaris.net/menu-script/index.php/resmilitaris/article/view/2708>
- Wang, Y.-S., Wu, M.-C., and Wang, H.-Y. (2009). Investigating the determinants and age and gender differences in the acceptance of mobile learning. *British Journal of Educational Technology*, 40(1), 92–118. <https://doi.org/10.1111/j.1467-8535.2007.00809.x>
- Yong, liu. (2011). *Solving the puzzle of mobile learning adoption* (Thesis; pp. 47–50). Retrieved from <https://urn.fi/URN:ISBN:978-952-12-2581-9>
- Zhang, S. (2016). Mobile English Learning: An Empirical Study on an APP, English Fun Dubbing. *International Journal of Emerging Technologies in Learning (IJET)*, 11(12), 4. <https://doi.org/10.3991/ijet.v11i12.6314>