

THE PERCEIVED EFFECTIVENESS OF USING MOBILE LEARNING AMONG UNIVERSITY STUDENTS

Cheong Tau Han¹, Siti Maisarah Binti Mohd Aziz¹, Joseph Boon Zik Hong¹, Loh Ser Lee², Nor Syazwani Mohd Rasid¹, Parmjit Singh¹

¹Faculty of Education, Universiti Teknologi MARA

²Fakulti Kejuruteraan Elektrik, University Teknikal Malaysia

Email: cheongtauhan@uitm.edu.my

DOI: 10.47750/pnr.2022.13.S10.039

Abstract

The inability to successfully employ mobile technology for online learning in order to preserve one's learning performance is becoming a big issue. This problem cannot be solved simply by creating more parks and boosting funding for development and administration. There is an urgent need for change, for a better understanding of mobile electronic gadgets' current and future responsibilities in satisfying the needs of modern urban living. As a result, building and controlling the aforementioned technology requires a strategic strategy in order to carry out its functions and tasks. The objective of this research is to investigate how university students assess the efficacy of mobile learning in terms of effort expectation, perceived pleasure, contentment, mobile self-efficacy, behavioural intention, and social aspects. It focuses on UiTM undergraduate students as a unified representation of university students in the context of online learning. This study is based on data obtained from an online survey questionnaire that polled students' perceived effectiveness of using mobile learning based on the six constructs of the UTAUT model. The data was analysed to determine and assess students' opinions of the efficacy of mobile learning, which may influence students' expected learning outcomes. According to the findings of the study, the perceived success of using mobile learning is related to expected learning outcomes. It is hoped that the research will help make mobile learning more useful for college students in the future.

Keywords: mobile learning, technology, perceived effectiveness.

1. INTRODUCTION

Recent breakthroughs in mobile telephony have revolutionised our way of life. Mobile technology is always evolving. Health, banking, and education require mobile devices [1-6]. According to Amirul, Ab. Fatah, and Amirul [7], COVID-19 has changed educational standards. E-learning is needed due to the epidemic. Education is evolving quickly, like everything else.

Heng and Sol [8] say the pandemic promotes digital transformation in all levels of schooling. Mobile learning is increasing popularity. E-learning and mobile learning arose as communication technology advanced. All e-learning solutions boost learning by using the internet and multimedia [9]. All learners must comprehend m-Learning to keep up with new educational methods and styles. Mobile learning uses PDAs, cell phones, audio players, and e-books, say Hamidi and Chavoshi [9]. Bidin and Abu Ziden [10] said the increased use of smartphones, tablets, and PDAs is a global phenomenon.

Effective learning requires mobile tactics and concepts. Direct mobile learning equips HR for the information age. Digital learning is shifting from remote learning to e-Learning and then to m-Learning due to wireless and mobile computer technology and getting more popular [10,11].

Mobile learning is when a student isn't in a fixed location or uses mobile technologies [12]. El-Sofany and El-Hagggar [13] define m-learning as e-learning on mobile devices. Most research defines m-Learning as acquiring knowledge, attitudes, and skills through mobile technology to influence behaviour [9]. Most mobile learning definitions elaborate. Mobile learning is essential internationally because it rapidly transforms education.

M-learning can improve all types of education, but higher education is a good fit due to college students' mobile devices [14]. In the early 2010s, colleges and universities used mobile wireless technology as a teaching and learning aid. Increasing demands require new skills. Due to 21st-century demands, higher education has shifted to M-learning [13]. Today's kids must develop

m-learning skills, which has improved their IT literacy. Chao [15] highlighted many m-Learning benefits for users, including a wealth of learning materials, quick access to knowledge, two-way engagement, and the removal of time and location-related constraints.

COVID-19 has disrupted traditional teaching and learning, forcing colleges to embrace online learning [7]. Changing learning mechanisms affect pandemic learning. According to Heng and Sol [8], students, instructors, administrators, and educational leaders had reservations about online learning. Learners must adapt to the current educational shift to achieve and succeed.

Educational consistency is difficult. Bidin and Abu Ziden said educational organisations must modernise teaching and learning approaches and policies to be successful and competitive [10]. Students must maintain their learning performance despite the pandemic as competition for jobs has grown. School closures complicate things. Malaysia's Minister of Higher Education has ordered the shutdown of all schools, kindergartens, and universities [16].

COVID-19's performance may improve with mobile learning. Most students are used to traditional classroom learning with professors, lecturers, and educators. Students often have trouble sharing educational materials with peers and teachers. COVID-19 ceased physical and educational activity [10]. Self-learning reduces students' face-to-face communication and access to intelligible materials. Mobile learning may help.

The primary goal of this research is to examine university students' perceived effectiveness of using mobile learning in education, and to determine students' expected performances in using mobile learning in education. Under perceived effectiveness include effort expectation, perceived enjoyment, satisfaction, mobile self-efficacy, behavioural intention, and social impacts.

Research Questions

- 1) What are university students' expected effort in using mobile learning in education?
- 2) What are university students' perceived enjoyment when using mobile learning in education?
- 3) What are university students' satisfaction in using mobile learning in education?
- 4) What are university students' mobile self-efficacy in using mobile learning in education?
- 5) What are university students' behavioral intention in using mobile learning in education?
- 6) What are university students' social influences in using mobile learning in education?
- 7) What are university students' expected performances in using mobile learning in education?

2. Literature Review

2.1 Unified Theory of Acceptance and Use of Technology (UTAUT)

This model hypothesis has been widely employed in early new technology adoption, acceptance, and use to explain human and educational development via technology. It underlines the need of studying a learner in numerous online learning contexts. The technology acceptance model (TAM) is a widely recognised framework in IT and ISs [15]. Despite this, some academics pointed out that TAM has a number of shortcomings. Since this theoretical model plays a crucial role in establishing effective technology acceptance, Davis expanded TAM to a unified model in 2003 for a more comprehensive view of system and technology acceptance.

The UTAUT has been used to anticipate system utilisation and make technology-adoption and technology-use decisions in several sectors, including interactive whiteboards, near-field communication, mobile health, home healthcare services, and ERP

software acceptance [15]. Since then, the model has received much interest in e-learning and technology in education because it provides a solid platform for analysing individual views of technology in education and examining the success of new technology applications [17]. Venkatesh et al. noted that UTAUT helps investigate technology adoption and use by combining multiple TAMs. This study used the UTAUT paradigm to analyse mobile learning adoption among college students.

Concerns about the initial UTAUT model's ability to explain why people use technology prompted its expansion. Many researches in related fields increase the number of external variables to predict IT acceptance. Self-efficacy, trust, perceived risk, enjoyment, and satisfaction are added to the UTAUT paradigm. Some of these variables fully match the original model [2,18,19] This study extends the UTAUT model to predict m-learning uptake by adding relevant characteristics.

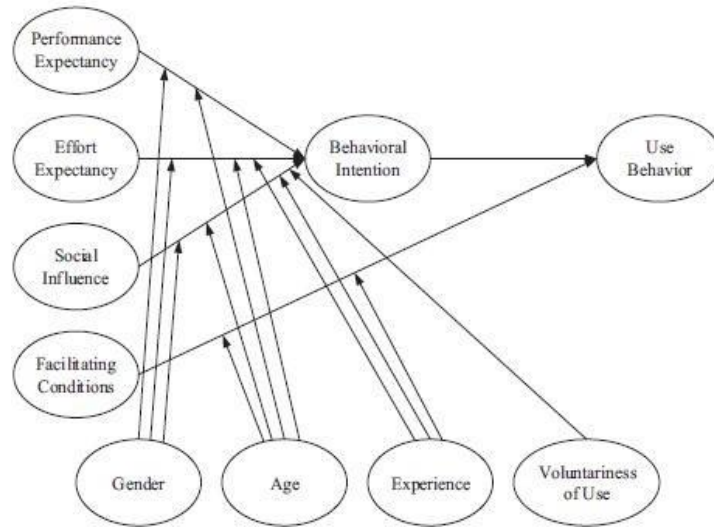


Figure 1 UTAUT Model (Venkatesh et al., 2003)

Figure 1 shows the six main components of the UTAUT model: performance expectation (PE), effort expectation (EE), social influence (SI), facilitating conditions (FC), behavioural intention (BI), and usage behaviour. PE, EE, SI, and FC are the four defining components of BI and usage behaviour, according to Venkatesh et al. Gender, age, experience, and voluntariness affect tech use. This theoretical unified model explains how students perceive mobile learning to be effective.

2.2 Mobile Learning

Previously, mobile learning was restricted to the use of mobile technologies; now, learner mobility is the focus [9]. This adaptability is what draws most mobile learning users globally. When discussing mobile learning, one of the most well-known is the mobile phone, which provides capabilities such as photography, video recording, GPS, Bluetooth, SMS, MMS, educational software, the Internet, and e-books [9].

Millions of disadvantaged customers in emerging countries could benefit from mobile phones. Anuj Kumar [20] found that cellphones offer rural children educational possibilities at more convenient times and locations than traditional institutions. These unique qualities provide unrestricted portability, which could improve educational technology. Digital natives, new millennium learners, the net generation, the gaming generation, and generation M exist because of ICT. Youth growing today is surrounded by technology and socially addicted to digital media to maintain socialisation in a media-based society[10].

Here, mobile learning is evolving. Digital learning, sometimes known as e-learning, refers to any method of delivering educational content over the internet. Academics, and scholars see mobile learning as a logical evolution of e-Learning that fills in the gaps. According to Mehdipour and Zerehkafi [21], m-Learning is sometimes considered a subset of the e-Learning domain, which is itself a subset of digital learning. Mobile learning among learners from various backgrounds accelerates over time with the newly discovered learning technique, particularly during COVID-19. Since this discovery, other studies on m-Learning have been conducted.

2.3 Perceived Effectiveness of Using M-Learning

According to most studies, m-Learning is critical to higher education since it allows students to learn anywhere, at any time [15]. This encompasses mobile learning implementation behavioural intentions, anticipated effort, reported pleasure and contentment with mobile devices, mobile self-efficacy, and social impacts on mobile learning usage. All the criteria mentioned point to mobile learning's overall success in light of its widespread adoption.

The efficacy of mobile learning may be influenced by users' effort expectations. This is significant since it is used in the stated theoretical model to reflect learners' m-Learning usability views. Because mobile learning is becoming more popular, most individuals may consider mobile devices to be convenient for learning. The accessibility, usability, intricacy, and usefulness of modern mobile technologies strengthen their opinions on usability. m-Learning technologies are lightweight and portable, giving learners freedom and flexibility in knowledge transfer. According to Bidin and Abu Ziden [13], these characteristics put students at ease because they are no longer restricted to the classroom with heavy backpacks.

User behaviour can be used to analyse the efficacy of mobile learning. In terms of the tool used in this study, mobile learning intentions may predict its efficacy today. Unknowingly, our actions urge us to do what we want, and the more a person desires something, the more significant it is. When someone wishes to use mobile devices for learning on a regular basis, they consider mobile learning to be useful and effective for their studies. This behavioural goal results in learner and instructor satisfaction and enjoyment of mobile learning.

Since the popularity of M-Learning in the early 2000s, the need to analyse mobile learning utilisation has expanded [24]. This indicates that individuals value mobile learning. Although digital learning and e-Learning were not widely employed in the past, some people still seek to use them. In education, mobile devices enable mobility, social interaction, context awareness, connection, and individualism [25]. Chao [15] discovered that emotional responses such as delight can influence learners' enjoyment of m-learning.

User self-efficacy is also critical. Beliefs in one's own knowledge and talents regarding the operation and features of mobile technology may have an impact on the effectiveness of mobile learning over time. According to Bandura [26], self-efficacy is linked not to a person's qualities but to how he or she uses them. Trusting one's abilities to complete learning tasks with mobile devices requires more self-esteem and self-confidence. As a result, self-efficacy in mobile technology is a significant aspect in m-Learning success. Those with low self-efficacy may regard utilising technology to learn as a nuisance, preventing them from adopting m-Learning [17].

Because technology in education is influenced by social rather than technical issues, social influences may have an impact on e-Learning acceptability [17]. Social influences refer to how a person's behaviour and attitude in everyday life are influenced by their social circles. A learner's perception, performance, and acceptability of mobile learning may be socially influenced by family, peers, and friends. Yoo, Han and Huang [28] disclosed on social influences impacting individual intention and acceptance to use technology, specifically in learning. According to Bandura's [27] social learning theory, social circles influence m-Learning learners' attitudes, beliefs, efficacy, and motivation. According to the study, social impacts are important for mobile learning.

2.4 Students' Expected Performances Using M-Learning

In this study, performance expectation is defined as the amount of benefit students will receive from m-Learning services. Students' knowledge and abilities in mobile learning may also be used to assess their technological literacy. Mobile learning is successful when learners believe mobile technology improves their learning performance, which is especially important during a pandemic. Mobile learning may suit students' study demands if it can complete learning tasks faster, simplify assignments, and increase learning chances.

Students' educational abilities and performance can be improved by altering performance expectations in m-Learning [17,29]. Because technology is a significant aid in education, m-Learning will help students attain higher levels of success. The benefits and practicality of mobile learning should help students succeed. According to Bharati and Srikanth [30], students' performance expectations influenced their desire to use mobile learning. Students must understand how they see themselves in order to be effective and productive when using mobile learning.

3. Research Methodology

This study utilised a quantitative method approach. Total of 210 pupils from Faculty of Education, Universiti Teknologi MARA were chosen to participate in this study. The online survey questionnaire items were adapted from the Unified Theory of Acceptance and Use of Technology (UTAUT) Model formulated by Venkatesh, Morris, Davis and Davis [31] to identify and quantify the perceived efficacy of mobile learning in education among university students. However, only six constructs from Chao [15] study were adopted into this study which are Performance Expectancy, Perceived Enjoyment, Effort Expectancy, Satisfaction, Mobile Self-Efficacy and Behavioral Intention. Aside from that, the quantitative approach is better for establishing whether perceived effectiveness affects students' projected learning performances because it involves deductive logic and reasoning where two or more variables are associated and becomes confirmatory research. A quantitative technique provides for speedier data collecting and a more generalised conclusion with a larger sample size.

4. Findings

Table 4.1 shows the mean (M) and standard deviation (SD) of effort expectancy of the students.

Table 4.1 The Perceived Effectiveness of Using Mobile Learning (Effort Expectancy) (N=210)

| Items | Mean | SD |
|---|-------|-------|
| Learning how to use mobile learning is easy for me. | 8.32* | 1.48 |
| My interaction with the mobile learning would be clear and understandable. | 7.98 | 1.772 |
| I find mobile learning easy to use | 8.16 | 1.692 |
| It is easy for me to become skillful at using mobile learning. | 7.98 | 1.621 |
| I would find it easy to get the mobile learning to do what I want it to do. | 8.21* | 1.566 |
| Overall | 8.13 | 1.510 |

Likert scale: 1 -10

1 – Extremely disagree

10- Extremely Agree

Based on Table 4.1, most respondents agreed that learning how to use mobile learning is easy for them (M=8.32, SD=1.48), and they would find it easy to get the mobile learning to do what they want it to do (M=8.21, SD=1.566), their interaction with the mobile learning would be clear and understandable (M=7.98, SD=1.772), they find mobile learning easy to use (M=8.16, SD=1.692), easy for them to become skillful at using mobile learning (M=7.98, SD=1.621).

Five items from the ready online questionnaire were used to gauge perceived enjoyment. Table 4.2 shows the mean (M) and standard deviation (SD) of perceived enjoyment of the students.

Table 4.2 The Perceived Effectiveness of Using Mobile Learning (Perceived Enjoyment) (N=210)

| Items | Mean | SD |
|---|-------|-------|
| I find using mobile learning enjoyable | 7.64* | 1.634 |
| The actual process of using the mobile learning is pleasant | 7.48 | 1.575 |
| I have fun using mobile learning | 7.55 | 1.663 |

| | | |
|--|-------|-------|
| The experience of using mobile learning is interesting | 7.63 | 0.542 |
| Mobile learning provides many enjoyable applications | 8.34* | 1.443 |
| Overall | 7.73 | 1.441 |

Likert scale: 1 -10

1 – Extremely disagree

10- Extremely Agree

Table 4.2 shows that the overall mean is 7.73. Most respondents agreed on mobile learning providing many enjoyable applications (M=8.34, SD=1.443) and find using mobile learning to be enjoyable (M=7.64, SD=1.634). They also agreed that the actual process of using the mobile learning is pleasant (M=7.48, SD=1.575), and they have fun using mobile learning (M=7.55, SD=1.663). Last but not least the experience of using mobile learning is interesting (M=7.63, SD=0.542). Based on Table 4.2, we can summarize that students' perceived enjoyment towards mobile learning is high.

Table 4.3 The Perceived Effectiveness of Using Mobile Learning (Satisfaction) (N=210)

| Items | Mean | SD |
|---|-------|-------|
| I was very content with mobile learning. | 7.39 | 1.484 |
| I was very pleased with mobile learning | 7.33 | 1.532 |
| I was satisfied with mobile learning efficiency | 7.62* | 1.657 |
| I felt delighted with mobile learning. | 7.29 | 1.533 |
| Overall, I was satisfied with mobile learning. | 7.70* | 1.554 |
| Overall | 7.466 | 1.455 |

Likert scale: 1 -10

1 – Extremely disagree

10- Extremely Agree

Based on Table 4.3, most respondents were very content with mobile learning (M=7.39, SD=1.484), were very pleased with mobile learning (M=7.33, SD=1.532), were satisfied with mobile learning efficiency (M=7.62, SD=1.657), felt delighted with mobile learning (M=7.29, SD=1.533), and were overall satisfied with mobile learning (M=7.70,SD=1.554).

Table 4.4 The Perceived Effectiveness of Using Mobile Learning (Mobile Self-Efficacy) (N=210)

| Items | Mean | SD |
|--|-------|-------|
| I am confident of using mobile learning even if there is no one around to show me how to do it | 7.81 | 1.534 |
| I am confident of using mobile learning even if I have never used it before | 7.68 | 1.649 |
| I am convinced that as time goes by, I will continue to become more capable of learning the content of the course using mobile learning. | 7.95* | 1.322 |

| | | |
|--|-------|-------|
| Even if I get distracted during learning, I am confident that I can continue to learn well. | 7.20 | 1.623 |
| I am convinced that I can develop creative ways to cope with the stress that may occur while using mobile learning | 7.13 | 1.571 |
| Overall I can succeed if I believe in myself when using mobile learning | 7.92* | 1.304 |
| Overall | 7.615 | 1.241 |

Likert scale: 1 -10

1 – Extremely disagree

10- Extremely Agree

Based on Table 4.4, most respondents were confident of using mobile learning even if there is no one around to show them how to do it (M=7.81, SD=1.534), were confident of using mobile learning even if they have never used it before (M=7.68, SD=1.649), were convinced that they will continue to become more capable of learning the content of the course using mobile learning as time goes by (M=7.95, SD=1.322), were confident that they can continue to learn well even when distracted during learning (M=7.20; SD=1.623), were convinced they can develop creative ways to cope with the stress that may occur while using mobile learning (M=7.13; SD=1.571) and can overall succeed if they believe in themselves when using mobile learning (M=7.92, SD=1.304).

Table 4.5 The Perceived Effectiveness of Using Mobile Learning (Behavioral Intention) (N=210)

| Items | Mean | SD |
|--|-------|-------|
| Assuming I had access to the mobile learning, I intend to use it. | 8.18 | 1.408 |
| Given that I had access to the mobile learning, I predict that I would use it. | 8.21* | 1.367 |
| I plan to use the mobile learning in the future. | 8.08 | 1.636 |
| In general, my peers have supported the use of mobile learning | 8.18 | 1.478 |
| Overall | 8.16 | 1.354 |

Based on Table 4.5, most respondents intended to use mobile learning assuming if they had access to it (M=8.18, SD=1.408), predicted that they would use mobile learning given they had access to it (M=8.21, SD=1.367), planned to use mobile learning in the future (M=8.08, SD=1.636) and generally have supportive peers on the use of mobile learning (M=8.18, SD=1.478).

Table 4.6 The Perceived Effectiveness of Using Mobile Learning (Social Influences)

| Items | Mean | SD |
|--|-------|-------|
| People I trust thought that I should have used the mobile learning method | 7.87 | 1.702 |
| My friends would think using mobile learning is a good idea | 7.94* | 1.758 |
| My lecturers encouraged me to use the mobile learning method | 7.9* | 1.588 |
| People who are important for me think that it is good for me to use mobile learning method | 7.9* | 1.622 |

| | | |
|---|------|-------|
| People who influenced my attitudes recommend the mobile learning method in learning | 7.84 | 1.701 |
| Overall | 7.89 | 1.544 |

Table 4.6, show the overall mean and standard deviation are 7.89 and 1.674 respectively. Most respondents viewed that their friends would think using mobile learning is a good idea (M=7.94; SD=1.758), viewed that their lecturers encouraged them to use the mobile learning method (M=7.90; SD=1.588), viewed that the people who are important for them think it is good for them to use mobile learning method (M=7.90; SD=1.622), viewed that the people they trust thought they should have used the mobile learning method (M=7.87; SD=1.702), , and viewed that the people who influenced their attitudes recommend the mobile learning method in learning (M=7.84; SD=1.701).

Table 4.7 Mean Perceived Effectiveness of Using Mobile Learning

| | N | Mean | SD |
|--|-----|------|-------|
| Perceived Effectiveness of Using Mobile Learning | 210 | 7.83 | 1.247 |

Table 4.8 Perceived Effectiveness of Using Mobile Learning

| | N | Mean | SD |
|----------------------|-----|-------|-------|
| Effort Expectancy | 210 | 8.13* | 1.510 |
| Perceived Enjoyment | 210 | 7.73 | 1.441 |
| Satisfaction | 210 | 7.46 | 1.455 |
| Mobile Self-Efficacy | 210 | 7.62 | 1.241 |
| Behavioral Intention | 210 | 8.16* | 1.354 |
| Social Influence | 210 | 7.89 | 1.544 |

The statistical result on the perceived effectiveness of using mobile learning in education among university students is presented in the above tables (refer Table 4.7 and 4.8). In this study, the perceived effectiveness of using mobile learning were categorized into six constructs which are Effort Expectancy, Perceived Enjoyment, Satisfaction, Mobile Self-Efficacy, Behavioral Intention and Social Influences. The students' responses are analyzed using mean and standard deviations.

In general, the mean and standard deviations of the perceived effectiveness of using mobile learning is 7.8313 and 1.247. Most of the students have a great behavioral intention in using mobile learning with the highest mean (M=8.16, SD=1.354). Majority of them also agreed that their perceived effectiveness on effort expectancy in mobile learning is easy, clear and understandable (M=8.1305, SD=1.510). They also have great circles of social influences during applying mobile learning (M=7.89, SD=1.544). The two least perceived effectiveness students portray are towards their mobile self-efficacy (M=7.62, SD=1.241) and satisfaction (M=7.46, SD=1.455) in using mobile learning. Hence, we could see that majority of the respondents leaned towards their behavioral intention compared to the others as the most influential constructs in portraying their effectiveness of using mobile learning for the education.

Table 4.9 Students' Expected Performances in Using Mobile Learning (Performance Expectancy) (N=210)

| Items | Mean | SD |
|---|-------|-------|
| Using the mobile learning would improve my learning performance. | 7.57 | 1.470 |
| Using mobile learning increases my chances of achieving learning that are important to me | 7.84* | 1.444 |
| Using the mobile learning would allow me to accomplish learning tasks more quickly | 7.81* | 1.549 |
| Using the mobile learning would enhance my effectiveness in learning | 7.31 | 1.546 |

| | | |
|--|------|-------|
| Mobile learning makes it easier to do my assignment. | 7.73 | 1.787 |
| In general, mobile learning fulfils my study requirement | 7.72 | 1.626 |
| Overall | 7.66 | 1.372 |

Based on Table 4.9, majority of the respondents agreed using mobile learning would improve their learning performance (M=7.57, Sd=1.470), agreed using mobile learning increases their chances of achieving learning that are important to them (M=7.84; SD=1.444), agreed using mobile learning would allow them to accomplish learning tasks more quickly (M=7.81; SD=1.549), agreed using mobile learning would enhance their effectiveness in learning (M=7.31,SD=1.546), agreed mobile learning makes it easier to do assignment (M=7.73,SD=1.787) and generally agreed mobile learning fulfils their study requirement (M=7.72,SD=1.626). We can summarized that the students' expected performance in using mobile leaning is high (M=7.66, SD=1.372).

5. Discussion

From study question 1 to 6, descriptive statistical analysis is utilised to examine university students' perceptions of mobile learning's success. Table 4.8 reveals that the computed mean and standard deviation for the six constructs used to measure the perceived efficacy of mobile learning in education among university students is high, 7.83 and 1.247, respectively. The majority of respondents believe mobile learning is effective, especially for students' behavioural intentions (refer Table 4.8). The findings coincide with Abdul Latip et al.[17], who found that the six constructs have the strongest connection with mobile learning efficacy.

Descriptive statistical analysis is used to determine university students' expected performance in using mobile learning in education for this research question. Referring to the second research aim, "To determine university students' expected performances in adopting mobile learning in education," Table 4.9 shows that the computed mean and standard deviation for the construct performance expectancy are quite high, at 7.66 and 1.3724, respectively. As a result of the findings, the majority of respondents demonstrated favourable learning outcomes while adopting mobile learning in their studies.

The outcomes of this study could be useful for connected parties to employ in the future because it discovered that most students viewed mobile learning to be effective for their education. Students make an effort to learn utilising mobile devices and experience fun and satisfaction from doing so. Furthermore, mobile learning has allowed them to improve their self efficacy in understanding the learning, making them wish to employ mobile learning in the future. Because of the global epidemic, most learning courses were delivered via mobile learning. To maintain the aesthetic value and originality of the output, mobile users must keep up with the needs of the current generation of pupils.

6. Funding

This research was funded by Grant Internal Education (GIE), Universiti Teknologi MARA, grant

number 600-TNCPI 5/3/DDF (EDUCATION) (008/2021)

REFERENCES

- [1] Drolia M, Papadakis S, Sifaki E, Kalogiannakis M. Mobile Learning Applications for Refugees: A Systematic Literature Review. *Education Sciences*. 2022; 12(2):96. <https://doi.org/10.3390/educsci12020096>
- [2] Alalwan, A. A., Dwivedi, Y. K., and Rana, N. P. (2017). Factors influencing adoption of mobile banking by jordanian bank customers: extending UTAUT2 with trust. *Int. J. Inf. Manage.* 37, 99–110. doi: 10.1016/j.ijinfomgt.2017.01.002
- [3] Briz-Ponce, L., Pereira, A., Carvalho, L., Juanes-Méndez, J. A., and García-Peñalvo, F. J. (2017). Learning with mobile technologies—students' behavior. *Comput. Hum. Behav.* 72, 612–620. doi: 10.1016/j.chb.2016.05.027
- [4] Hoque, R., and Sorwar, G. (2017). Understanding factors influencing the adoption of mHealth by the elderly: an extension of the UTAUT model. *Int.*

- [5] Nikou, S. A., and Economides, A. A. (2017). Mobile-based assessment: investigating the factors that influence behavioral intention to use. *Comput. Educ.* 109, 56–73. doi: 10.1016/j.compedu.2017.02.005
- [6] Crompton, H., and Burke, D. (2018). The use of mobile learning in higher education: a systematic review. *Comput. Educ.* 123, 53–64. doi: 10.1016/j.compedu.2018.04.007
- [7] Amirul, Ab Fatah & Amirul. (2020). Evaluating the Online Learning Effectiveness amid Covid- 19: A Preliminary Analysis. 2. 52-62.
- [8] Heng, Kimkong & Sol, Koemhong. (2020). Online learning during COVID-19: Key challenges and suggestions to enhance effectiveness, *Cambodian Education Forum*, <https://cefcambodia.com/2020/12/08/online-learning-during-covid-19-key-challenges-and-suggestions-to-enhance-effectiveness/>
- [9] Hamidi, H., & Chavoshi, A. (2018). Analysis of the essential factors for the adoption of mobile learning in higher education: A case study of students of the University of Technology. *Telematics and Informatics*, 35(4), 1053-1070.
- [10] Bidin, S., & Abu Ziden, A. (2013). Adoption and application of mobile learning in the education industry. *Procedia-social and behavioral sciences*, 90, 720-729.
- [11] Al-Hujran, Saudi in M-Learning Use to Intentions Behavioral Students' College Affecting Factors Administration, Business of Journal Jordan.
- [12] Mehdipour, Y., & Zerehkafi, H. (2013). Mobile learning for education: Benefits and challenges. *International Journal of Computational Engineering Research*, 3(6), 93-101.
- [13] El-Sofany, Hosam & El-Haggag, Nahla. (2020). The Effectiveness of Using Mobile Learning Techniques to Improve Learning Outcomes in Higher Education. *International Journal of Interactive Mobile Technologies (IJIM)*. 14. 4. 10.3991/ijim.v14i08.13125.
- [14] Ansari, Mohd & Tripathi, Aditya. (2017). An Investigation of Effectiveness of Mobile Learning Apps in Higher Education in India. 2. 33-41.
- [15] Chao, C. M. (2019). Factors determining the behavioral intention to use mobile learning: An application and extension of the UTAUT model. *Frontiers in psychology*, 10, 1652.
- [16] Shahzad, A., Hassan, R., Aremu, A. Y., Hussain, A. and Lodhi, R. N. (2020). Effects of COVID-19 in E-learning on higher education institution students: the group comparison between male and female. *Quality and Quantity*, 0123456789. <https://doi.org/10.1007/s11135-020-01028-z>
- [17] Abdul Latip, M. S., Noh, I., Tamrin, M., & Latip, S. N. N. A. (2020). Students' Acceptance for eLearning and the Effects of Self-efficacy in Malaysia. *International Journal of Academic Research in Business and Social Sciences*, 10(5), 658–674.
- [18] Kabra, G., Ramesh, A., Akhtar, P., and Dash, M. K. (2017). Understanding behavioural intention to use information technology: insights from humanitarian practitioners. *Telematics Inform.* 34, 1250–1261. doi: 10.1016/j.tele.2017.05.010
- [19] Khalilzadeh, J., Ozturk, A. B., and Bilgihan, A. (2017). Security-related factors in extended UTAUT model for NFC based mobile payment in the restaurant industry. *Comput. Hum. Behav.* 70, 460–474. doi: 10.1016/j.chb.2017.01.001
- [20] Anuj Kumar, Anuj Tewari, Geeta Shroff, Deepti Chittamuru, Matthew Kam & John Canny, An Exploratory Study of Unsupervised Mobile Learning in Rural India, CHI '10: Proceedings of the SIGCHI Conference on Human Factors in Computing Systems April 2010 Pages 743–752 <https://doi.org/10.1145/1753326.1753435>
- [21] Mehdipour, Y., & Zerehkafi, H. (2013). Mobile learning for education: Benefits and challenges. *International Journal of Computational Engineering Research*, 3(6), 93-101.
- [22] Al-Huiran, O. Al-Lozi, E & Al-Debei, M. M. (2014), Get Ready to Mobile Learning :Examining Factors Affecting College Students' Behavioural Intention to Use M-Learning in Saudi Arab, *Jordan Journal of Business Administration*.
- [25] Fetaji, B., Ebibi, M., & Fetaji, M. (2011). Assessing effectiveness in mobile learning by devising MLUAT (Mobile Learning Usability Attribute Testing) methodology. *International Journal of Computers and Communications*, 5(3), 178-187.
- [26] Bandura, A. (1986). *Social Foundations of Thought and Action: A Social Cognitive Theory*. Englewood Cliffs, NJ: Prentice-Hall.
- [27] Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84(2), 191–215. <https://doi.org/10.1037/0033-295X.84.2.191>
- [28] Sun Joo Yoo, Seung-hyun Han, Wenhao Huang (2012), The roles of intrinsic motivators and extrinsic motivators in promoting e-learning in the workplace: A case from South Korea, *Computers in Human Behavior*, Volume 28, Issue 3, Pages 942-950, <https://doi.org/10.1016/j.chb.2011.12.015>.
- [29] Salloum, S. A., Al-Emran, M., Shaalan, K., & Tarhini, A. (Accepted/In press). Factors affecting the E-learning acceptance: A case study from UAE. *Education and Information Technologies*. <https://doi.org/10.1007/s10639-018-9786-3>
- [30] Bharati and R. Srikanth (2018), Modified UTAUT2 model for m-learning among students in India, *International Journal of Learning and Change*, pp 5-20 <https://doi.org/10.1504/IJLC.2018.089532>
- [31] Venkatesh, V., Morris, M. G., Davis, G. B., and Davis, F. D. (2003). User acceptance of information technology: toward a unified view. *MIS Q.* 27,425–478.