

# The Adoption of Mobile Learning among University Students

Ashraf Ali<sup>1\*</sup>, Raja Muhammad Ishtiaq Khan<sup>2</sup>, Abdulrahman Akhund Al-Awadhi<sup>1</sup>

<sup>1</sup>Faculty of Computer Studies, Arab Open University, Kingdom of Bahrain

<sup>2</sup>Department of Common First Year, Al Zulfi, Majmaah University, Kingdom of Saudi Arabia

## Abstract

The purpose of this study is to evaluate learners' perceptions of using mobile devices for learning during COVID-19 in Saudi Arabia, with a particular focus on university students. Several educational institutions have set policies and procedures to adopt an e-learning environment by employing various potential methods for a smooth transition from classroom to online instruction to avoid disturbing the teaching and learning process. This study was conducted by implementing a survey method on 116 students to determine learners' perceptions of adopting mobile phones as a type of education. This survey found that the majority of university students have a favorable attitude toward m-learning. This study established that m-learning is exceptionally beneficial for remedying study gaps during this COVID-19 pandemic period. The findings will assist education decision-makers and educational establishments in incorporating m-learning technology throughout the system, in which social media could indeed significantly improve the teaching-learning activities. The results also suggest that M-learning may support learners in filling in study gaps during the COVID-19 disease outbreak timespan.

## Keywords:

*M-Learning, Adoption, Perception, Learning*

## 1. Introduction

The outbreak of COVID-19 has impacted both corporate and governmental institutions, especially educational institutions [1]. To avoid disrupting the teaching-learning process, numerous educational institutions have developed standards and procedures, implemented an e-learning environment, and explored viable approaches to facilitate uninterrupted classroom instruction to online instruction [2, 3]. Given the challenges of validating the authenticity of e-learning efforts, reservations about learners' career potential, and a loss in academic excellence, many institutions have opted to continue providing online learning through the use of digital platforms [4-6]. Some institutions have already implemented online or blended learning; however, online learning is still in its infancy in many developing countries [7, 8]. To this, M-learning can be operative to aid the educational process.

Today, mobile learning (m-learning) has become a standard mode of instruction for education, particularly higher education, due to its versatility, flexibility, and

usefulness. Students will not require an additional keyboard and mouse because the application is designed to be used on a mobile device. Over the last few decades, people have gradually started to feel more comfortable using touch-based gadgets like cell phones [9]. Even learners spend significant amounts of time on screens [10]. It is essential to find a way to introduce mobile applications to ensure all learners have access to free and compulsory education. These days, technology is regarded as part of our whole society. The use of electronic devices permeates the life of learners in schools [11]. Therefore, familiarity with digital technologies is essential to meet the technological changes in learning systems [12, 13]. Mobile phones and tablets have gained a certain amount of popularity among educational institutions today. These are frequently seen in education. In some developing countries, financial organizations like the World Bank and many others are making efforts to support education decision-makers to obtain tablets for classroom use, which will lead to improved results [14, 15].

Mobile technology is creating new ways of learning. Smartphones and tablets prevalence was at 66% and 20% in 2018. The world's population will have access to 71% of the internet via mobile devices by 2025 (GSMA 2019). The number of mobile phone users is increasing rapidly. Apps now outnumber browsers in phone devices, accounting for 90% of all mobile device time. Fig. 1 illustrates the user of mobile devices.

With the growing number of mobile users and the potential that mobile technologies afford, it is essential to explore the factors that influence the acceptance and usage of such technologies for educational purposes. Mobile technologies may allow instructors and learners to acquire and retain information more quickly because they are both confident and comfortable and encouraged to use them [17, 18]. M-learning is described as "learning that occurs whenever learners have access to knowledge and resources anywhere and at any time using handheld apps to accomplish relevant tasks in an educational context [19]. The development of mobile technology may lead to improved educational outcomes by making it possible for students and teachers to access resources and information via wireless communication technologies [20]. As digital phones can provide students with numerous benefits, such

as the accessibility of media, interactive learning content, the capacity for interactions with teachers, and learning at the time of need, a rapid expansion in mobile technology integration in education is strongly recommended [21]. It has been well established that considerable evidence has been found about the topic of m-learning acceptance or adoption [22, 23]. However, the further usage of m-learning during online learning has still not been studied extensively in an online learning environment which was the only choice for the whole world to continue the education process.

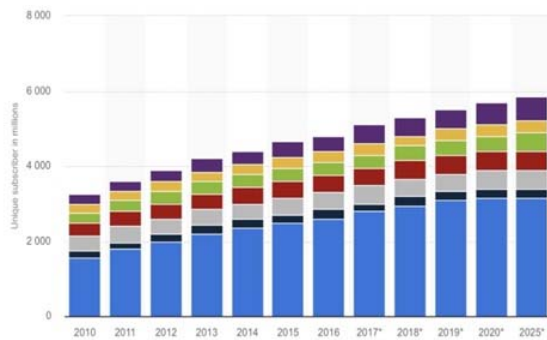


Fig. 1 Global mobile user: Source [16]

## 2. Literature Review

The m - learning current research has still not provided evidence to justify the long-term integration of mobile devices into education. This could be attributed to at least three different factors. To begin, the majority of m - learning research is conducted through short-term financed projects sponsored by a range of sources. This highlights concerns about the potential viability of such mobile ICT integration in teaching [24]) and the generalization of previous research. Sung, et al. [25], for instance, found that of the 110 investigations shown in the sample, more than 27.2 percent took place once per week, and only 8.3 percent lasted longer than six months.

Furthermore, our understanding of how students utilize their mobile devices for educational purposes is inadequate, especially in online learning circumstances. Nevertheless, certain efforts have been made to comprehend learners' usage of mobile devices for learning outside the classroom [26-28]. Moreover, the overall development of new technology, which was not planned for academic purposes, may affect the broader applicability of its incorporation into instruction due to possible technological barriers [29]. Ultimately, the findings of a proper review of experimental mobile studies in higher education Pimmer, et al. [30] demonstrate that most m - learning programs use an instructional strategy and are therefore non-transformative in character. Overall, despite substantial assessing learning

development in general [31], we presently understand too little about the issues involved in m - learning development and its distinguishing characteristics. Recent evidence showed that more extensive effective instructional improvements are required to fully leverage the instructional benefits available through the use of mobile devices [32].

Incorporating m-learning into the teaching-learning activities would provide this generation with a more valuable and natural method of learning [33]. Mobile devices could be the only accessible environment for accessing academic information [34]. This is why mobile learning systems enable users and marginalized individuals to access resources for learning [3]. Technological advancements have hastened the establishment of numerous applications, the most notable of which can be used to assist educators [35, 36]. As a result, educational institutions' rules, regulations, and approaches must shift perspective, creating opportunities for novel ways of active learning [37]. In combination with education systems, technology allows instructors to monitor and manage their pupils online and more successfully manage active learning. As a result, mobile technology in the classroom affects learning, as users are no longer restricted by the confines of the typical classroom [4].

Additionally, students can quickly retrieve educational materials via mobile devices from any location and at any time [38]. Educational approaches and learning outcomes have always been inextricably linked [39] since both affect the other. Pedagogical endeavors utilizing mobile learning have aided institutions in achieving particular learning objectives during the previous decade [40]. Also, most students are inspired to learn through their mobile devices [4]. M-learning is an invention that will undoubtedly evolve in response to new educational and technological developments. Many facets of educational resources can be readily understood if innovative teaching approaches are used [19]. Virtual environments that clearly explain how distinct learning variables interact in a scientific principle would undoubtedly increase student comprehension [32]. These dimensions of education correspond to the qualities and remote access devices. Mobile apps are a convenient technology that have the ability to assist in pursuing education [41].

The COVID-19 pandemic has created an opportunity for mobile learning, which learners benefit from [42]. However, it has a plethora of benefits and drawbacks. On the bright side, it has accelerated the development of the digital vision and brought it to realization. Without pandemic-induced compulsory stay-at-home education, it could take a long time to actualize. While the use of m-learning has proven advantageous in general, future design and implementation of m-learning for learners should take access to technology, health concerns, addiction, boredom, and learning outcomes into account. Rapid advancements in

wireless and communications technologies have allowed many learners in limited-income nations to obtain mobile phones with access to the internet and reap the benefits of m-learning to keep their learning programs during the outbreak. Cost reductions and enhancements to the functionality of mobile devices enable this framework affordable for students to use for educational purposes [43]. The COVID-19 spread and social distancing rules have compelled institutions to create and implement online learning management systems combined with mobile learning devices like WhatsApp and Moodle.

Mobile phones are now more affordable than desktop computers or laptops, making them ideal teaching and learning gadgets for learners [44]. Many network carriers have 5G connections, making m-learning attractive and accessible for university students. To assist students, learn outside the class, m-learning also strengthens learner interactions [45]. Students at advanced study levels can use mobile to obtain educational resources, give instructors feedback, and give real-time access to learning databases [19]. Both e-learning and remote learning include mobile learning. Using m-learning, educators may engage students within and without the classroom [21]. Typically, a smartphone is the most extensively utilized gadget for education [11, 23, 26]. Hamidi and Chavoshi [46] indicated that learners are early adopters of new learning technology. A survey of 100 students showed that students in Indonesia have a favorable impression of mobile technology in the classroom. According to research, mobile phones are the most preferred learning tool in higher education. It is believed that mobile learning will help revolutionize the provision of higher education. It is a unique tool in numerous educational contexts [47]. Conversely, university graduates are substantial mobile phone users, which helps to increase tertiary learning outcomes. Using mobile smartphone access enables people to foster their knowledge more while attending classes [8]. Thus, there is a perspective on students' perceptions of using mobile devices for education throughout this COVID-19 outbreak period at the university level in Saudi Arabia.

### 3. Methodology

The investigation is carried out using quantitative descriptive methods in conjunction with survey methodologies. The students that took part in this study came from a public university of KSA. All students at the university level were eligible to participate in this survey, regardless of their gender. The questionnaire that was constructed was based on previous research. The survey questions were adapted from [4, 48] previous research in their structure. After modifying the questionnaire's components, the questionnaire was sent to experts in the field of survey research design or the suitability of the usage to underpin the mobile phone adoption. The questionnaire

was divided into three sections. Basic information about students is gathered in Part 1, which is about the operating system of students' cell phones, the frequency with which they use the online services, the amount of time they spend on their mobile phones daily, and whether or not they use their mobile devices for educational purposes. The second part explores the attractiveness of social networks for learning and the frequency with which people utilize the most popular social media applications. When it comes to mobile learning and social media learning technologies, students' opinions and attitudes toward their usefulness during the COVID-19 pandemic are measured in the third section of the questionnaire. The third section's responses were on a five-point Likert scale from 'Strongly Disagree' (1) to 'Strongly Agree' (5). Minor adjustments were made to the questionnaire before it was finalized, based on the suggestions of the expert's advice. Rather than focusing solely on learners' perceptions, as has been the case in some earlier studies, this study investigates students' perceptions of m-learning during this pandemic era. This research also looks at social media applications in higher education in KSA, specifically through mobile learning. The questionnaire was distributed to all of the participants through WhatsApp and Blackboard announcements. Before analysing the data, the participants' responses were categorized, and reliability analysis was performed on the coded responses. The reliability of the questionnaire was 0.89 on Cronbach Alpha which is deemed highly reliable.

### 4. Data Analysis

The questionnaire developed in google forms was shared randomly among undergraduate university students through WhatsApp groups and BB platforms. A significant number of students took part in this online questionnaire. A total of 116 replies were considered valid and were used during the data analysis process. The quantitative analysis of the acquired data was carried out with the help of the SPSS software. This section contains the study's findings, which include background information about respondents and also university students, the system software of university students' smartphones, the frequency with which they use the internet, the amount of time they spend on their mobile phones daily, whether they use their smartphone for academic purposes or not, the inclination for social networks for learning, and the frequency with which university students use social media apps. Table 1 displays the results of the information relating to gender, age, and educational attainment level.

Table. 1: Background (N=116)

Gender	Percentage	
	Male	62.8
Female	38.2	
Age (year)	15-17	58.2
	18-20	32.6

	21-23	10.2
Education Level	CFY	100

Fig. 2-4 depict the participants' mobile phones, the frequency with which university students use the internet, the amount of time that university students spend on their mobile phones daily, and whether students use their mobile phones for educational purposes or not, respectively.

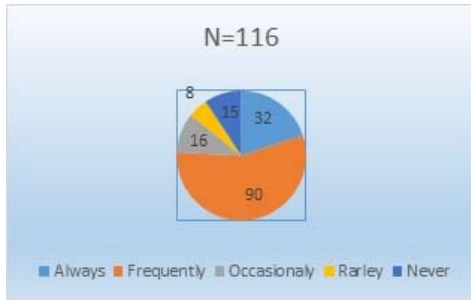


Fig. 2: Participant usage of the internet

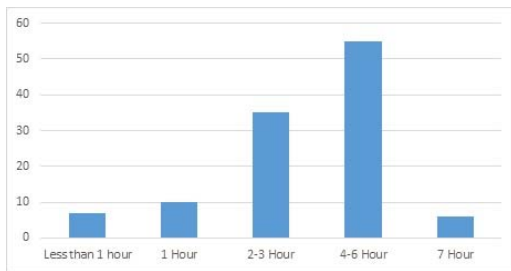


Fig. 3: Daily time spent on mobile

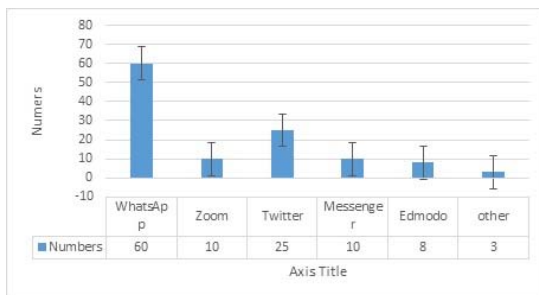


Fig. 4: Preference for Application

We investigated the learners' perceptions of M-M-Learning. To obtain the results, data were imported into SPSS and analyzed statistically. This descriptive statistical technique was used. Table 2 summarizes learners' perceptions about M-Learning adoption.

Table. 2: Learners' perceptions about M-Learning adoption

Items	SA	A	N	D	SD	M	SD
M-Learning helps learning greatly during situations like Covid-19	31%	23%	16%	16%	14%	3.2	1.6
M-Learning affords a great assistance in learning during Covid-19	26%	28%	5%	20%	11%	2.9	1.4
M-Learning is ubiquitous learning	40%	29%	6%	15%	10%	4.3	1.5
M-Learning will be essential for all learners for online education	30%	40%	5%	16%	9%	4.1	1.4
M-Learning facilitates in accomplishing Homework and assignments	36%	24%	9%	21%	10%	4.1	1.6
M-Learning will attain the place of formal classroom	20%	23%	20%	20%	17%	2.9	1.6
M-learning is a source of content delivery during Covid-19	25%	15%	10%	20%	30%	3.8	1.4
M-Learning assisted me to develop my self-learning	34%	26%	12%	15%	13%	4.7	1.6
M-Learning supports me to study without obligation at any place or time	35%	30%	6%	6%	23%	4.3	1.5
M-Learning fosters the interaction between teacher and learner	46%	28%	13%	13%	4%	4.7	1.4
M-Learning offers rapid transfer of information to students	40%	28%	12%	10%	20%	3.9	1.5
Internet speed generates problems	15%	5%	20%	40%	20%	2.1	1.5
I face acoustic and audio-visual problems	30%	25%	16%	15%	14%	3.9	1.4
Small screen size is one of the central issues of the M-learning	48%	32%	10%	4%	6%	4.9	1.8
M-learning is a source of rapid feed back	38%	40%	10%	8%	4%	4.9	1.7

Learners' perceptions were computed through SPSS. Table 1 indicates that the use of the M-Learning application was considered adequate. A vital proportion (n=31%) strongly agreed that M-Learning facilitates learning and (n=23%) agreed with this notion. At the same time, only a relatively small number of the learners (n=14%) consider this ineffective. The mean value (M =3) and SD (1.6) indicated that learners' perception was near to agree. This shows that the use of smartphones for using M-Learning activities can develop the learners' learning abilities.

Moreover, the use of Smartphones facilitates the learning process. The response to self-learning was noted as (n=34%) strongly agreed, a relatively large proportion (n=26%) agree with this aspect, in contrast (n=14%) disagreed in this regard, which is a relatively low proportion. The mean value (M= 4.7) and (SD 1.6) have also appeared quiet. This demonstrates that self-learning, which is an essential facet of learning, can also be attained effectively. Likewise, the quick delivery of the information for the students also appeared to be on the average value of the statistics. The learners' responses indicate that (n=38%) acknowledged M-learning as strongly agreed for feedback, which is followed by (n=40%) agree.

With the challenge aspect of the usage of the M-Learning learners' responses were also somehow not satisfactory. Most of the learners (n= 48%), which is a relatively higher proportion", indicated that screen creates problems; this is tailed by (n=32 %). This suggests that the learners' perceptions were influenced by factors that hinder mobile phone devices' usage. However, for internet problems, learners' remarks appeared that the internet is not a problem. In this regard, (n=40%) disagreed with this assertion.

## 5. Discussion

Nowadays, mobile devices play a significant role in students' daily lives, particularly for academic purposes [11]. The widespread usage of mobile phones among learners also paves the way for learners to change their interest to m-learning to complete their studies [37, 49], specifically in the case of an unforeseen emergency like the COVID-19 outbreak. Results illustrate the consistency with which university students use the internet, with more about a third. But it is a statement that students do not use mobile devices for their educational purposes despite having access to mobile devices and the internet. In recent decades, mobile devices have surpassed desktop computers in terms of easy accessibility to various social media platforms and the use of multiple social media apps. As a result, students benefit from improving by portable devices through interaction, involvement, and engagement, which allows them to instantly exchange any document or textbooks via these online platforms [46]. Numerous studies indicate an increased demand for academic applications among students due to their ability to aid in learning [31, 51]. Furthermore, social media platforms play a critical part in this situation. Additionally, the result indicates learners are using social media apps, which are helpful in situations like Covid-19.

The present findings indicate that M-Learning is excellent at delivering material to learners. The results of this investigation are comparable with [19]. The data found that students are enjoying the benefit so of m-learning, which appeared from their responses. Furthermore, the learners in this survey reported that some issues, such as

small screens, cause problems. However, there were some apparent disparities in the frequency of specific components of the learners' reactions.

Nevertheless, the findings of this study endorse [28], who investigated the factors affecting M-Learning learning. The findings indicated that learners' self-efficacy in utilizing m-Learning correlates with possible benefits associated with M-learning. The results suggested that learners had favorable opinions about the current study integration of M-Learning. The present study's findings corroborated Papadakis and Kalogiannakis [10], who indicated that certain aspects of mobile phone usage affected learners' views. The study's findings are not in line with the previous studies that found that internet speed is an issue in the implementation of m-learning. This assert country has attained the most developed internet service.

The findings of this study were not corroborated by the results of Alshammari, et al. [52], who investigated M-learning acceptability and self-efficacy. They argued that technological and institutional issues are some of the difficulties learners and teachers experience when using M-Learning. This demonstrates that integrating M-Learning can be advantageous when employed in a blended learning setting. The findings suggest that using M-Learning applications enhances self-learning, which is critical for developing natural learning processes.

The findings corroborated Alshehri and Cumming [21] study on the ease of use of M-learning. The results suggested that the learners endorsed the idea of using mobile phones for M-Learning. On the other hand, the current investigation has a favorable impact on the way M-M-Learning is used. The findings indicated that learners saw M-Learning via their mobile phones as beneficial. Similarly, the results are compatible with [15], who suggested that learners were willing to use M-learning.

Smartphones enhance m-learning utilization, and the findings indicate that learners are comfortable with the device's educational capabilities. Therefore, instructors and curriculum developers must develop the learning materials to optimize the benefit of Mobile application usage during the learning experience. Also, the outcomes of this research, like those of previous ones, emphasize the need to deliver knowledge in a user-friendly, relevant, accessible, and widely available [5].

## 6. Conclusion

Saudi Arabia's education sector has launched numerous attempts to integrate online learning into all levels of education, from primary to university [18]. A primary objective of this study is to ascertain students' perceptions of using mobile phones for education during COVID-19 in KSA, specifically in the context of university students. The study demonstrates that learners are pretty familiar with m-

learning. This helped them to resume their studies during the lockdown situations.

This inquiry aimed to examine male and female learners' use of mobile phones for learning. The data analysis revealed that the use of the M-learning application was deemed adequate. A sizable number (n=31%) strongly agreed that m-learning enhances learning, whereas a considerable number (n=23%) concurred. Even though a relatively small proportion of learners (n=14%) believe this is inefficient. Similarly, learners' material and information distribution appeared to be on par with the statistical average values. This asserts that M-learning can be helpful in the situations like Covid-19.

Furthermore, results suggest that mobile learning is an effective tool for this pandemic era. It enables students to study beyond the classroom or participate in the class from any location, enhance their engagement with their teacher, and bridge the protracted study gap pandemic created. Both policymakers and academic institutions should investigate the possibility of integrating mobile learning technologies across the educational sector, where digital networks could improve the teaching and learning process. Likewise, students have favorable attitudes about m-learning and a willingness to participate, which is significant for the adoption of m-learning in Saudi universities.

access their files anywhere, and be more environmentally friendly by using less energy and resources. A new, improved type of online education emerges when it incorporates innovative technology and training programs focused on cloud computing. This report will give you a theory-based look at the cloud architecture in the e-learning field [50,53], as well as the deployment models and their levels. To see how well LMSs can perform in a group distant learning scenario, during a pandemic. An experimental study employing the Blackboard Learn application (for creating online communities and virtual knowledge exchange) was conducted for interactive e-learning and putting together online course content. The investigation's goal was to engage 60 instructors to see how Blackboard's LMS fitted well in the classroom. During the inquiry, the main inherent benefits of Blackboard Learn in terms of the implementation of organizing and continuing to support the educational approach were highlighted. These included the ways to process educational content quickly, a simple system for organizing educational processes, efficient methods of assessing knowledge, and sound security and privacy system. In addition, the paper discussed the benefits of implementing cloud-based e-learning in universities. Based on the evidence, the study concludes that implementing cloud computing will yield positive effects on educational content and training: because cloud computing provides improved learning tools, educational concepts, and methodologies, students can now

obtain the most recent learning content, models, and tools to more effectively educate and train themselves.

## Reference

- [1] C. M. Toquero, "Challenges and opportunities for higher education amid the COVID-19 pandemic: The Philippine context," *Pedagogical Research*, vol. 5, 2020.
- [2] E. M. Onyema, N. C. Eucheria, F. A. Obafemi, S. Sen, F. G. Atonye, A. Sharma, et al., "Impact of Coronavirus pandemic on education," *Journal of Education and Practice*, vol. 11, pp. 108-121, 2020.
- [3] G. Basilaia and D. Kvavadze, "Transition to online education in schools during a SARS-CoV-2 coronavirus (COVID-19) pandemic in Georgia," *Pedagogical Research*, vol. 5, 2020.
- [4] A. AlKhunzain and R. Khan, "The Use of M-Learning: A Perspective of Learners' Perceptions on M-Blackboard Learn," 2021.
- [5] M. A. Almaiah, A. Al-Khasawneh, and A. Althunibat, "Exploring the critical challenges and factors influencing the E-learning system usage during COVID-19 pandemic," *Education and Information Technologies*, vol. 25, pp. 5261-5280, 2020.
- [6] G. Polydoros and N. Alasona, "Using E-Learning to Teach Science in Covid-19 Era at Primary Education Level," *Journal of Research and Opinion*, vol. 8, pp. 2964-2968, 2021.
- [7] R. M. I. Khan, N. Radzun, S. Farooqi, M. Shahbaz, and M. Khan, "Learners' Perceptions on WhatsApp Integration as a Learning Tool to Develop EFL Spoken Vocabulary," *International Journal of Language Education*, vol. 5, pp. 1-14, 2021.
- [8] R. M. I. Khan, N. R. M. Radzuan, M. Shahbaz, and A. H. Ibrahim, "EFL Instructors' Perceptions on the Integration and Implementation of MALL in EFL Classes," *International Journal of Language Education and Applied Linguistics*, pp. 39-50, 2018.
- [9] M. Shahbaz and R. M. I. Khan, "Use of mobile immersion in foreign language teaching to enhance target language vocabulary learning," *MIER Journal of Educational Studies Trends & Practices*, pp. 66-82, 2017.
- [10] S. Papadakis and M. Kalogiannakis, "Mobile educational applications for children: what educators and parents need to know," *International Journal of Mobile Learning and Organisation*, vol. 11, pp. 256-277, 2017.
- [11] R. Khan, N. Radzuan, A. Alkhunaizan, G. Mustafa, and I. Khan, "The efficacy of MALL instruction in business English learning," 2019.
- [12] S. S. Oyelere, V. Paliktoglou, and J. Suhonen, "M-learning in Nigerian higher education: an experimental study with Edmodo," *International Journal of Social Media and Interactive Learning Environments*, vol. 4, pp. 43-62, 2016.
- [13] R. M. I. Khan, G. Mustafa, and A. A. Awan, "Learners' Attitudes on the Infusion of Cooperative Learning in Education," *Orient Research Journal of Social Sciences*, vol. 5, pp. 164-175, 2020.
- [14] E. Hamhuis, C. Glas, and M. Meelissen, "Tablet assessment in primary education: Are there performance differences between TIMSS'paper-and-pencil test and tablet test among Dutch grade-four students?," *British journal of educational technology*, vol. 51, pp. 2340-2358, 2020.



- [15] K. Nikolopoulou, V. Gialamas, and K. Lavidas, "Acceptance of mobile phone by University students for their studies: An investigation applying UTAUT2 model," *Education and Information Technologies*, vol. 25, pp. 4139-4155, 2020.
- [16] GSMA, "The mobileeconomy report 2019," 2019.
- [17] Q. Ma, "A multi-case study of university students' language-learning experience mediated by mobile technologies: A socio-cultural perspective," *computer assisted language learning*, vol. 30, pp. 183-203, 2017.
- [18] R. M. I. Khan, T. Kumar, T. Supriyatno, and V. Nukapangu, "The phenomenon of Arabic-English translation of foreign language classes during the pandemic," *Ijaz Arabi Journal of Arabic Learning*, vol. 4, 2021.
- [19] J. Kacetyl and B. Klímová, "Use of smartphone applications in english language learning—A challenge for foreign language education," *Education Sciences*, vol. 9, p. 179, 2019.
- [20] D. France, R. Lee, J. Maclachlan, and S. R. McPhee, "Should you be using mobile technologies in teaching? Applying a pedagogical framework," *Journal of Geography in Higher Education*, vol. 45, pp. 221-237, 2021.
- [21] A. Alshehri and T. M. Cumming, "Mobile Technologies and Knowledge Management in Higher Education Institutions: Students' and Educators' Perspectives," *World Journal of Education*, vol. 10, pp. 12-22, 2020.
- [22] O. Viberg, B. Wasson, and A. Kukulska-Hulme, "Mobile-assisted language learning through learning analytics for self-regulated learning (MALLAS): A conceptual framework," *Australasian Journal of Educational Technology*, vol. 36, pp. 34-52, 2020.
- [23] A. Kukulska-Hulme, "Conclusions: A Lifelong Perspective on Mobile Language Learning," in *Mobile Assisted Language Learning Across Educational Contexts*, ed: Routledge, 2021, pp. 122-133.
- [24] H. Crompton and D. Burke, "The use of mobile learning in higher education: A systematic review," *Computers & Education*, vol. 123, pp. 53-64, 2018.
- [25] [Y.-T. Sung, K.-E. Chang, and T.-C. Liu, "The effects of integrating mobile devices with teaching and learning on students' learning performance: A meta-analysis and research synthesis," *Computers & Education*, vol. 94, pp. 252-275, 2016.
- [26] C. Lai and D. Zheng, "Self-directed use of mobile devices for language learning beyond the classroom," *ReCALL*, vol. 30, pp. 299-318, 2018.
- [27] S. Warni, T. A. Aziz, and D. Febriawan, "The use of technology in English as a foreign language learning outside the classroom: An insight into learner autonomy," *LLT Journal: A Journal on Language and Language Teaching*, vol. 21, pp. 148-156, 2018.
- [28] S. D. Mwapwele and S. Roodt, "The extent of usage of mobile devices for learning outside the classroom in a secondary school in Tanzania," in *CONF-IRM*, 2016, p. 15.
- [29] H. Crompton, "Moving toward a mobile learning landscape: presenting a mlearning integration framework," *Interactive Technology and Smart Education*, 2017.
- [30] C. Pimmer, M. Mateescu, and U. Gröbhiel, "Mobile and ubiquitous learning in higher education settings. A systematic review of empirical studies," *Computers in human behavior*, vol. 63, pp. 490-501, 2016.
- [31] A. Olumuyiwa, "Implementation of an Android Mobile Learning Application," *Itä-Suomen yliopisto*, 2018.
- [32] A. Qashou, "Influencing factors in M-learning adoption in higher education," *Education and information technologies*, vol. 26, pp. 1755-1785, 2021.
- [33] A. Miglani and A. K. Awadhiya, "Mobile learning: readiness and perceptions of teachers of Open Universities of Commonwealth Asia," *Journal of learning for development-JL4D*, vol. 4, pp. 58-71, 2017.
- [34] R. Nacheva, K. Vorobyeva, and M. Bakaev, "Evaluation and promotion of M-learning accessibility for smart education development," in *International Conference on Electronic Governance and Open Society: Challenges in Eurasia*, 2020, pp. 109-123.
- [35] G. M. MI and S. S. Meerasa, "Perceptions on M-Learning through WhatsApp application," *Journal of Education Technology in Health Sciences*, vol. 3, pp. 57-60, 2016.
- [36] R. M. I. Khan, T. Kumar, A. Benyo, S. F. Jahara, and M. M. F. Haidari, "The Reliability Analysis of Speaking Test in Computer-Assisted Language Learning (CALL) Environment," *Education Research International*, vol. 2022, 2022.
- [37] S. Criollo-C, S. Luján-Mora, and A. Jaramillo-Alcázar, "Advantages and disadvantages of M-learning in current education," in *2018 IEEE world engineering education conference (EDUNINE)*, 2018, pp. 1-6.
- [38] S. R. Quiroga, "Connectivity ubiquity and permanence in m-Learning."
- [39] O. W. Adejo, I. Ewuzie, A. Usoro, and T. Connolly, "E-Learning to m-learning: Framework for data protection and security in cloud infrastructure," *International Journal of Information Technology and Computer Science (IJITCS)*, vol. 10, pp. 1-9, 2018.
- [40] O. Córdor-Herrera, M. Bolaños-Pasquel, and C. Ramos-Galarza, "E-learning and M-learning Benefits in the Learning Process," in *International Conference on Applied Human Factors and Ergonomics*, 2021, pp. 331-336.
- [41] S. Shukla, "M-learning adoption of management students': A case of India," *Education and Information Technologies*, vol. 26, pp. 279-310, 2021.
- [42] V. Matzavela and E. Alepis, "M-learning in the COVID-19 era: physical vs digital class," *Education and Information Technologies*, pp. 1-21, 2021.
- [43] J. S. Kamaghe, E. T. Luhanga, and K. Michael, "The challenges of adopting M-learning assistive technologies for visually impaired learners in higher learning institution in Tanzania," 2020.
- [44] A. O. Inorio, "Technological and Operational Mobile Learning Readiness of Secondary Teachers," *International Journal of Professional Development, Learners and Learning*, vol. 2, p. ep2103, 2021.
- [45] J. Danish and C. E. Hmelo-Silver, "On activities and affordances for mobile learning," *Contemporary Educational Psychology*, vol. 60, p. 101829, 2020.
- [46] H. Hamidi and A. Chavoshi, "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*, vol. 35, pp. 1053-1070, 2018.
- [47] B. Biswas, S. K. Roy, and F. Roy, "Students perception of Mobile learning during Covid-19 in Bangladesh: university student perspective," 2020.
- [48] A. Al-Hunaiyyan, R. A. Alhajri, and S. Al-Sharhan, "Perceptions and challenges of mobile learning in Kuwait,"

Journal of King Saud University-Computer and Information Sciences, vol. 30, pp. 279-289, 2018.

- [49] R. M. I. Khan, A. Ali, and A. Alourani, "Investigating Learners' Experience of Autonomous Learning in E-learning Context," *International Journal of Emerging Technologies in Learning*, vol. 17, 2022.
- [50] A. Ali, and A. Alourani, "An Investigation of Cloud Computing and E-Learning for Educational Advancement," *International Journal of Computer Science and Network Security* vol. 21 (11), pp. 216-222, 2021
- [51] R. M. Ishtiaq Khan, A. Ali, A. Alourani, T. Kumar, and M. Shahbaz, "An Investigation of the Educational Challenges during COVID-19: A Case Study of Saudi Students' Experience," *European Journal of Educational Research*, vol. 11, pp. 353-363, 2022.
- [52] R. Alshammari, M. Parkes, and R. Adlington, "Mobile Devices for English Language Learning: An Exploration of Student and Faculty Member Skills and Attitudes in a Saudi Arabian Context," 2019.
- [53] A. Ali, "An Overview of Cloud Computing for the Advancement of the E-learning Process." *Journal of Theoretical and Applied Information Technology* vol. 100 (3), pp. 847-855, 2022.



**Ashraf Ali** received his B.Sc. (Computer Science and Mathematics) from University of Lucknow, India, Master of Computer Applications from Bundelkhand University, India, and Ph.D. in Computer Science and Engineering from Singhania University, India. He is currently working as an Assistant Professor at the Faculty of

Computer Studies, Arab Open University, Kingdom of Bahrain. He has teaching, research, and administrative experience at the various universities around the world including Saudi Arabia, Yemen, Oman, and Bahrain. His research interest includes Cloud Computing, Web Mining, Web Information Retrieval, Semantic Web, Semantic Similarity, E-Learning, and Artificial Intelligence. He has published numbers of articles in the various journal of repute.



**Raja Muhammad Ishtiaq Khan** is an English language Lecturer at Al-Majma'ah University, Saudi Arabia. He has a Cambridge CELTA certificate in teaching and has 10+ years of experience in ESL and EFL. He holds a PhD degree in Applied Linguistics and his research interests include Applied Linguistics, MALL, L2 Vocabulary learning and Teaching, Second Language Acquisition

and EFL teaching.



**Abdulrahman Al-Awadhi** was born in Kingdom of Bahrain in 1963. He studied in Bahrain for all school grades and continued Diploma in Bahrain University. He received Bachelor degree in Electrical and Electronic Engineering from Roger Williams University, RI, USA in 1987, and Ph.D. degree in

Electrical and Electronic Engineering from Bradford University, Bradford, UK in 1994. He started his professional work in 1995 by establishing his own American franchised IT training center in the name of "New Horizons computer Learning Center" in Kingdom of Bahrain. In March 2007, he started his academic carrier by joining Arab Open University AOU as lecturer then promoted to assistant professor within the first year. In 2010, he promoted as head of IT department in AOU Bahrain Branch. He appointed as Acting Director in AOU Bahrain from January 2011 to September 2013. His main interest of research is IT and E-learning technology. Dr. Al-Awadhi, Assistant Professor, is currently head of research committee in AOU Bahrain. He is also member of few consulting committees in some of the private universities in Bahrain.