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# Factors affecting learners' application of mobile learning technology: A review of the literature

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## ABSTRACT

The rapid growth of technology worldwide has affected all spheres of life and business. Mobile learning technology has become affordable and easily accessible. Despite the numerous benefits of mobile learning technology in education, the problem of its implementation in teaching and learning still exists. Evidence suggests that teachers and students are not prepared to apply mobile learning technology in their teaching and learning process. This article reviews the determinants that influence learners' use of mobile learning technology in their learning process. The determinants reviewed included personal attributes, organizational attributes, technological attributes, benefits and barriers to mobile learning technology usage. The article concluded that with the constant progress of mobile technology, it is possible that mobile learning will continue to play a significant role in school and training.

**Keywords:** *mobile technology; mobile learning; learners; benefits; barriers; factors; computers; personal attribute; organizational attributes; technological attributes*

## INTRODUCTION

The rapid advancement of technology globally has had an impact on every sphere of life, including commerce, and culture. The rapid advancement of technology in the discipline of information and communication, as well as the use of technological devices specifically laptops, mobile phones, and other portable devices, have altered the provision of higher education. Mobile technology which is one such advancement in the field of information systems has become inexpensive and easily available. This has resulted in an explosion of mobile technologies used by learners for mobile learning.

Mobile technology implementation in higher education institutions worldwide is crucial because of its numerous advantages. Mobile learning has assisted learners to gain access to educational resources at any time and from any location. It has also aided learners and educators to communicate more efficiently (Zayim & Ozel, 2015). It has supported and inspired learners with disabilities to attend classes remotely using mobile devices, and assisted two-way instructional prospects (Peck et al., 2010), providing participatory and interactive learning environments for students (Karimi, 2016), and aiding in the support of informal education.

Regardless of the positive impacts of mobile technology in education, the complications with its implementation in academic institutions still persists (Al-Qirim et al., 2018). Prior research highlighted the fact that learners and instructors are not ready to implement mobile technology in their instructional process (Alrasheedi & Capretz, 2015; Wang et al., 2009; Stockwell, 2008). Furthermore, mobile learning has not been applied efficiently in numerous countries due to a lack of foresight, approval, ease of access, and technological abilities among educators and students (Chen, 2016). As a result, it has been noted that user approval is a major element in the achievement of mobile learning deployment (Mac Callum, 2010). Approval of mobile learning among educators and leaners has been accepted as critical since effective integration of mobile learning is dependent on grasping the elements affecting educators' and learners' approval of this

approach (Ilci, 2014). With society's growing reliance on technology to transform education, identifying the factors that affect learners' technology implementation was noted as crucial (Tarhini et al., 2017; Raza et al., 2017).

As the application of mobile devices for studying develops and continues to support learning in schools, sound knowledge of the elements influencing the adoption of mobile learning will become progressively more relevant as noted by Liaw & Huang (2011). To accomplish this, the elements that influence learners' implementation of technology should be well explained (Fauziati, 2020). Therefore, the objective of this study is to review the factors that affect learner's application of mobile learning technology in their studies. The article is divided into sections which explore:

1. personal attributes
2. organizational attributes
3. technological attributes
4. barriers to students' mobile learning technology usage
5. benefits of mobile learning technology to learners

**Personal Attributes**

Personal attributes such as age, educational status, gender, educational experience and attitude were noted as attributes that can affect the application of technology (Schiller, 2003). Other personal attributes have included prior computer knowledge, degree of technology commitment, and attitude towards technology (Selim, 2007). Regarding learning issues, anxiety, lack of skills, lack of experience, fear, and lack of self-confidence are significant elements that affect the acceptance of innovation. Studies have shown that the low acceptance of innovation among educators and learners can be attributed to limited readiness and technical preparation (Callum et al., 2014; Nchunge et al., 2012). In a study conducted by Alhumaid et al. (2021), they revealed that attitude, expectation of confirmation, satisfaction, and fear influenced learners' implementation of mobile learning technology. Though, the authors made some contributions to knowledge, they identified some limitations of their study which included small sample size and the convenient sampling technique adopted. Recommendations for future study included expanding the study to cover many institutions.

Nchunge et al. (2012) studied user's perception on ICT adoption for education support in schools in Kenya. Using a descriptive survey design, they adopted stratified sampling, purposive sampling, and simple random sampling techniques to sample eighty-two (82) people for the study. Descriptive statistics and ANOVA were used to analyze the data. The authors revealed that users' unwillingness to accept technology was due to their lack of psychological and technical readiness. Recommendations were that the schools should address the psychological and technical preparedness of users through huge spending on technology facilities, training of instructors and learners, and provision of resources. Despite the contribution of the authors to knowledge, the study's sample size was too small to generalize the findings of the study.

Abdullah & Ward (2016) also examined predictors impacting the acceptance of technology. The study adopted the technology acceptance model as a framework. The outcome of the study indicated that self-confidence, pleasure, anxiety, and technology experience importantly affected learners' flexibility and benefits of technology acceptance. In a related study, Alhabeeb & Rowley (2017) discovered that educators' technological knowledge, and learner technological knowledge affected the successful implementation of technology in educational institutions. Naveed et al. (2017) advocated that technological keenness with system features were influential elements of the technology approval. While their findings added to understanding of the elements that influence the successful acceptance and use of digital learning systems, the authors identified a significant drawback of their study due to its concentration on the views of online learning professionals.

Recommendations for future work included use of a diverse group of participants such as teaching staff and learners.

Similarly, Bai et al. (2021) studied the elements that influence users' implementation of a mobile technology platform. The study involved 156 participants. The data were collected from participants using a five-point scale questionnaire. Structural equation modelling was applied to compute the data received from the participants. The outcome of the inquiry showed that the user factors such as growth mindset, support-seeking interest, and self-confidence were important predictors of users' implementation of mobile technology. However, anxiety about ICT negatively affected ICT usage. The study recommended that longitudinal and experimental research design should be explored along with an increase in sample size for future work. Also, Ursavaş et al., 2019 found that users' beliefs about technology adoption influenced their intentions to apply technology in instructional activities.

In a related study conducted by Hu et al. (2020), gender, age, and experience were discovered to fairly influence users' adoption of mobile technology in higher education institutions while hedonic motivation and habit were discovered to have substantial impact on users' behaviour toward mobile technology. In another study, Lin et al. (2023) collected data from 327 students. Both descriptive and inferential statistics were applied for the data analysis. The study found that gender did not contribute to differences in the acceptance of mobile learning technology in the classroom. Forehand et al. (2021) researched the elements affecting learners' application of mobile technology. Data from 120 students were analyzed using hierarchical regression, descriptive statistics and ANOVA. The results revealed that age, educational level and type of programme were not determining factors of behavioural intention, while hedonic motivation and habit behaviour were contributing elements of students' intent to use mobile learning technology. Further studies also discovered that social influence, hedonic motivation and habit behaviour also had a positive influence on behavioural intention to apply mobile technology (Ameri et al, 2020; Nawaz & Rusith, 2020; Nikolopoulou et al., 2020). Fagan (2019) also discovered that enjoyment had a substantial impact on behavioural intention to apply mobile learning technology. With the contradictions in research, it is necessary to conduct further studies to unravel this inconsistency in the research findings. Similarly, Dulaym Alotaibi et al (2019) collected data from 460 participants in connection with the contributing factors that impact their acceptance of mobile learning in the study of Arabic language. They revealed that system enjoyment and quality of the content had a substantial impact on their behavioural intention to implement mobile learning technology.

In a related study Khlaif & Salha (2022) investigated the elements that influence mobile technology integration in higher education institutions. A mixed method design was adopted to gather data from 300 learners in 2 universities. The study findings indicated that learners' attitudes and beliefs, prior experience, and personal innovativeness affect mobile technology integration. Also, Abu-Al-Aish & Love (2013) studied one hundred and seventy-four (174) learners' approval of mobile learning in school. The outcome of their study was that personal innovativeness and past experience influenced their beliefs in the use of mobile learning technology. Furthermore, Badwelan & Bahaddad (2021) discovered that personal innovativeness and self-management of learning influenced students' use of mobile learning technology. Finally, Sidik & Syafar (2019) conducted a quantitative study in a school setting. Survey questionnaires were distributed to 284 students and structural equation modelling was adopted to compute the data. The study revealed that personal innovativeness influenced learners' intention to accept mobile learning technology in learning.

Regardless of the vast expenditure on digital learning systems in advanced and underdeveloped nations, the low level of students' application of these systems in basic schools was popular (Nchunge, 2012; Alhabeeb & Rowley, 2017). Several academics have tried to study the most relevant elements that influence the use and acceptance of these systems. Some of these investigations have paid attention to factors such as technical, infrastructure and training. However,

many of these studies have used quantitative methods to investigate factors that affect learners' use of online learning systems, and a few studies have adopted either qualitative or mixed methods approaches.

**Organizational Attributes**

Numerous institutions have seen effective implementation of new technology as a critical competitive advantage (Chiu & Yang, 2019; Gunasekaran et al., 2017), although institutions keep on giving false hope to technology preparedness factors. Most of this inconsistency can be due to a limited awareness about the institutional elements that influence the implementation of evolving technology, particularly when such determinants are unclear (Kamal, 2006). Though it has been discovered that institutional determinants are significant determinants for the implementation of new technology (Bruque-Cámara et al., 2004; Oliveira & Martins, 2011), leaders have frequently found it difficult to understand how new technological advancements can be applied to solve institutional issues and wishes (Mabad et al., 2021; Lynn et al., 2018). Prior studies on technology underscored the relevance of personal factors, institutional factors, technological factors, and the environmental factors for acceptance and use of technology (Tornatzky & Klein, 1990).

Kaliisa & Picard (2017) performed a methodical review on mobile learning in higher education. The review compiled academic work published from 2010 to 2016. The authors reviewed the application, the effect and obstacles of mobile technology-aided learning. The study found that technological resources, access to cutting-edge equipment, pedagogical skills in applying mobile technology, and policies guiding the application of mobile learning technology in school influenced learners' application of the technology in their studies. Chen et al (2015) recommended that schools develop mobile technology policies, and provide technological and pedagogical support for all instructors and learners.

Similarly, Farley et al. (2015) investigated how learners implemented mobile tools to enhance their learning. 749 learners agreed to take part in the study at Southern Queensland University. The participants completed online survey questionnaires. The researchers concluded that in spite of learners' active implementation of mobile technologies to support their studies, the school's learning management system, and teaching practice affected students' mobile learning technology. They also found that technical support, logistical support, pedagogical support, training for learners and educators affected the use of mobile learning technology. Learners also stated that many technical problems such as frequent log-out, applications crashing, connection problems, non-functional downloaded software, and unavailability of support services influenced the application of mobile technology in their learning. Other organizational elements that influenced learners to adopt mobile technology included availability of technological resources, instructors' understanding and familiarity with the technology, backing by the school manager, instructors' attitudes, beliefs and unwillingness to apply innovation in the classroom. The research studies have explained that giving users training on integration of technology is not a guarantee that they will integrate same, but if they are given the opportunity for the needed familiarity, dexterity, materials, and assistance, then they will implement the innovation in the classroom to achieve the greatest impact on instruction (Papanastasiou et al., 2003).

Moreover, other studies have discovered that improving organizational infrastructure and technology support services, network security and academic staff development influenced students' implementation of mobile learning technology (Russell & Jing, 2013; Du & Lin, 2012; Almaiah et al., 2022). Furthermore, Alhumaid et al. (2021) observed that offering sufficient IT facilities is imperative when implementing contemporary technology since scarce IT resources and facilities can hinder the adoption and use of mobile technology. Though resource support is relevant, school technology leadership was earlier found to be a stronger contributing variable of users' application of innovation in education (Anderson & Dexter, 2005). Inquiries have found that

top management support promotes the use of technology by learners (Almaiah et al., 2022; Al Mulhem, 2020).

Additionally, Almaiah et al. (2021), revealed that there was an association between technology resources and real use of mobile learning systems. These authors recommended the provision of technology resources to encourage learners to apply mobile learning technology in their studies. Finally, Alrasheedi et al. (2015) investigated managements' viewpoints on critical success elements influencing mobile learning in higher education. Twenty-four (24) participants from three universities responded to questionnaire items on institutional structure, institutional culture, university commitment, institutional learning practices, change management and conflict management. The findings of the study revealed that institution commitment, learning practices, and change management practices were crucial to the successful implementation of mobile learning.

**Technological Attributes**

Technology attributes impact the diffusion processes of a technology and are substantial determinants influencing technology implementation. Rogers (2003) noted that how people perceive the innovation's relative advantage, compatibility, complexity, trialability, and observability affects how quickly it is adopted.

Alhumaid et al. (2021) explored the variables that influence the application of mobile learning technology in school. In total 280 learners took part in the quantitative study. Both structural equation modelling (SEM) and neural networks were employed to analyze the data. In addition, the importance-performance map analysis was applied to establish the importance and performance of individual determinants. The findings of the study were that perceived ease of use, perceived usefulness, perceived behavioural control, and subjective norm, substantially contributed to the use of mobile learning technology in the classroom. In a similar study, Al-Emran et al. (2020) combined the technology acceptance model, theory of planned behaviour and the expectation-confirmation model to create an integrated model to determine students' continuous application of mobile learning theory. Survey questionnaires were distributed to 273 postgraduate students. The authors employed partial least squares-SEM to compute the data. The results of the inquiry indicated that perceived ease of use, perceived behavioural control, and subjective norms were determinants of learners' continuous use of mobile learning technology in schools.

Kim et al. (2017) combined innovation diffusion theory and the model of innovation resistance to create a research model to study the factors that affected undergraduate students' resistance and intention to use mobile learning technology. Survey questionnaires were distributed to 473 undergraduate learners at a university in South Korea. Data analysis was done adopting structural equation modelling. The results of the study indicated that relative advantage, complexity and inertia affected learners' mobile resistance. In addition, the study found that relative advantage, innovativeness and mobile learning resistance impacted learners' intention to apply mobile learning technology. The study recommended that educational scholars and experts should design and use suitable approaches for mobile learning. Furthermore, in a study conducted by Tang et al (2021) to discover the predictors affecting users' mobile technology usage, the authors noted that perceived usefulness predicted users' application of mobile technology. Hu et al. (2020) also investigated the factors that impacted use and adoption of mobile technology in higher education institutions. The researchers distributed questionnaires to 436 participants. The data received was computed adopting t-test and ANOVA. The study discovered that performance expectancy and facilitating conditions contributed to the participants' use of mobile technology.

Almaiah et al. (2021) also researched the variables that affect students' application of mobile technology in higher education institutions. They distributed online questionnaires to three

thousand students (3000) in seven universities in Jordan. The data collected were computed by applying artificial neural networks (ANN) and structural equation modelling (SEM) techniques. Their study discovered that perceived usefulness was a substantial contributing element of learners' intention to apply the mobile learning platform. They further explained that when learners discovered that the mobile learning system enhanced their learning output, their behavioural intention to use the mobile learning system also improved. In addition, the study revealed that perceived ease of use was a determinant of students' use of mobile learning technology. The study findings suggest the need for a flexible system for use by students to select the learning materials they prefer, and to track their learning performance.

Also, Abu-Al-Aish & Love (2013) inquired into the variables that affect students' application of mobile learning technology in the classroom. The data gathered from 174 participants was computed adopting structural equation modelling. The study findings indicated that performance expectancy and effort expectancy had an impact on learners' adoption of mobile learning technology. Related work by Iqbal & Qureshi (2012) examined mobile learning acceptance in school. The researchers adopted a combined framework of the Technology Acceptance Model (TAM) and Unified Theory of Acceptance and Use of Technology (UTAUT) frameworks. The findings of the study indicated that perceived usefulness, perceived ease of use, social influence, and perceived playfulness had an effect on users' readiness to embrace and apply mobile learning technology. Badwelan & Bahaddad (2021) also conducted a survey on elements that impacted students' acceptance of mobile learning technology in higher education institutions. The study involved 400 participants. The findings of the study indicate that performance expectancy and effort expectancy were correlated with learners' intention to adopt the technology. Also, Sidik & Syafar (2019) discovered that performance and effort expectancies were positively correlated to learners' intention to adopt mobile learning in the learning environment. This indicates that when students realize that the technology is relevant to their academic work and is also simple to operate, they will not hesitate to use it.

Similarly, Al-Mamary (2022) carried out a study on learners' intention to apply mobile learning in the classroom using the UTAUT model in a university. Data were collected from 277 learners. The outcome of the study was that effort expectancy strongly correlated to intention to use the technology. Although the findings did add to existing knowledge on the topic, the author identified some critical limitations of his study relating to the context of the study, research design and absence of moderating variables that could affect the validity of the findings of the study. Recommendations for future study included either replication of the same study in different contexts, use of mixed methods or inclusion of moderating factors.

**Barriers to students' mobile learning technology usage**

Though mobile technology provides several advantages for learning in relation to its support for pervasive learning, it was found to have some drawbacks in relation to mobile devices (Kukulask-Hulme, 2007). This assertion was supported by Yu et al (2014) while noting that although mobile technology had huge benefits for education, there were some drawbacks, concerns and challenges as well.

Chen et al. (2015) conducted a study on students' use of mobile learning technology in higher learning institutions, adopting a quantitative inquiry model that gathered data from 1181 bachelor degree students and graduate students who registered in three forms of learning modes: traditional, fully online and blended. The result of their study indicated that one barrier to the application of mobile learning technology was the ban of mobile devices from schools because of the distractive nature of these devices. In a similar inquiry, Farley et al. (2015) indicated that despite instructional support of mobile learning technology in a Southern Queensland university in Australia, instructors were not willing to integrate mobile learning and at times made a move to ban the use of the

technology in the classroom. They also found that learners' and educators' lack of technical support, scarce logistical support, limited pedagogical support, and lack of training prevented learners use of mobile learning technology. Learners also stated that many technical problems such as frequent log-out, applications crashing, connection problems, non-functional downloaded software, and unavailability of support services were barriers to their application of mobile technology in their learning. Other factors that prevented learners from adopting mobile technology included limited resources, instructors' limited understanding and familiarity with technology, limited backing by the school's authority, instructors' lack of attitudes and beliefs and educators' unwillingness to apply innovation in the classroom. In another study, Hoi (2020) explored students' understanding of acceptance and use of mobile devices for language learning. Questionnaires were distributed to 293 students pursuing their programmes in a higher education institution. The findings indicated that lack of access to fast speed Internet, scarce resources and lack of technical assistance discouraged students from using mobile technology in their academic work

In other studies, researchers classified barriers to mobile learning technology as technology-related issues (Frank & Kapila, 2017; Jarrahi et al., 2017; Masters et al., 2016), basic skills issues (Crane et al., 2011; Jeno et al., 2017; Thomas and Fellowes, 2016), and educators' issues (Gikas & Grant, 2013; Pimmer et al., 2016). The technology-related issues identified were stability of the Internet connection, suitable keyboard and screen size, and disruptions of mobile devices during use. The basic skills issues included inadequate proficiency and expertise in the use of mobile devices that hampered learning experiences. The proficiencies included recording of video, setting up devices (Mori & Harada, 2010) or implementing applications loaded on the mobile devices (Thomas & Fellowes, 2016). Educators' issues included the preference of some educators for traditional teaching as opposed to online teaching (Christensen & Knezek, 2018) while some educators who were anti-technology, opposed students' mobile device use and application in the classroom (Gikas & Grant, 2013).

Similarly, Kukulska-Hulme (2007) recapped the technology-related issues as: (1) physical features including small screen size, low memory, and short life span of battery; (2) content and software application issues including limited built-in functions, and the problem of installing applications; (3) the reliability and speed of network; physical environment concerns including concerns of using the device outside and user security concerns.

Nikolopoulou et al. (2023) explored the barriers to mobile learning technology in education. They distributed survey questionnaires to 557 participants containing items on six barriers. The study found that inadequate resources, inadequate support, classroom conditions, and learners' concerns were obstacles to the use of mobile technology in schools. Furthermore, in a study carried out by Kaliisa & Picard (2017), the authors identified barriers to the integration of mobile learning in higher education institutions, including low quality high-tech resources, insufficient access to advanced mobile devices, inadequate mobile learning didactic skills among instructors, poor student and instructor attitudes towards mobile learning, and insufficient policies regarding the implementation of mobile learning.

Evidence suggests that users who were ready to apply mobile learning technology in the classroom encountered some barriers such as technology infrastructure, insufficient professional development and insufficient technical support (Willemse et al., 2019; Chen et al., 2015). The findings of these research studies suggested that simply giving users training on the integration of technology is not a guarantee that they will integrate same. But if they are given the opportunity to acquire the necessary familiarity, dexterity, materials, and assistance, then they will implement the innovation in the classroom to achieve the greatest impact on instruction (Papanastasiou et al., 2003).

**Benefits of learners' use of mobile learning technology**

Mobile learning technology has become popular due to its many benefits. For instance, it offers a more suitable and simplified mode of learning, permitting students to coordinate their learning schedules to suit their preferred times, it increases engagement and enthusiasm, it offers a more collaborative and individualized learning skill, it provides ease of access to education for persons who might not gain access to conventional school contexts, and it is profitable (Masero, 2023). Masero (2023) found that mobile learning can save educational institutions a substantial sum of money through reduction of the number of physical classrooms, educators, and resources. Furthermore, the price of mobile devices is consistently reducing, making mobile learning a progressively cheaper choice. It also has the capability to enhance cooperation among students, as it offers a forum for exchange of interaction and collaboration in real time. Finally, it promotes a network of community and collaboration among students, regardless of where they are located around the globe through discussion boards, instant messaging, and group projects.

Mobile learning devices have permitted students to study anywhere they find themselves and in their individual setting so that the learning is significant (Sharples, 2000). Gikas & Grant (2013) also affirmed that mobile devices can offer learning benefits for learners to gain access to course materials, and interact with teachers and peers anywhere they are located. In addition, Crompton (2013) found that mobile learning permitted:

1. learners to study wherever, whenever, and for whichever subject
2. social and subject matter cooperation
3. situated learning.

Attewell (2005) also listed the following usefulness of the application of mobile learning:

1. encourages students' independent and collaborative learning experiences
2. assists students to find areas where they require help and assistance
3. assists to fight opposition to ICT usage
4. assists students to remain focused for longer periods
5. assists to improve self-esteem
6. assists to increase self-confidence.

Wagner (2005) also revealed that mobile learning technology can improve learning by placing learners in an actual setting and produce new education settings. Learners may improve their skills achievements, proficiencies and increase their learning overall. Learners can also easily leave their learning environment; they are not forced to stay in a school setting with their mobile devices. They can study anywhere at any time, while they are on the move. Mobile technologies have revolutionized education. It does not only link users to information, but provides the prospect for an instinctive, individual, casual and situated learning experience. Mobile technologies have provided the necessary approaches, applications, and resources needed to support links to conventional and situational studying, and individual motivation explorations.

Moreover, Sheikhtaheri et al. (2018) examined the usefulness of applying mobile technologies in learning from the perspectives of student nurses and medical students. The study involved 372 students who completed questionnaires. The authors found that learners' efficiency, swift access to information and enhancement in quality of care were some of the advantages of adopting mobile learning technologies in the instructional process. In a similar study conducted by Kaliisa & Picard (2017), the authors discovered that mobile learning improved learner and instructor cooperation. Also, it provided for immediate communication, improved learner collaboration and interaction, facilitated authentic and reflective learning, and inspired learning. Also, other authors asserted that mobile learning technology has the capability to help students to share knowledge, improve critical

thinking, to participate in collaborative learning, to improve problem solving and communication skills, and improve learners' levels of understanding of concepts (Utulu & Alonge, 2012; Njoku, 2015; Abidin & Tho, 2018). In addition, Bere & Rambe (2019) investigated mobile learning in higher education institutions in a poor nation. Their findings pointed to prospects for cooperative learning through information sharing, academic community development, and real-time interaction.

The studies reviewed suggest that mobile learning offers many benefits to students, such as convenience and flexibility, enhanced engagement, improved accessibility, profitability, and increased collaboration. With the constant progress of mobile technology, it is possible that mobile learning will continue to play a significant role in school environments and in training.

## CONCLUSION

Technology is fast improving in all sectors of contemporary societies, as well as education. To keep pace with this change, information and communication technology has been gradually applied as a tool for instructional activities (Matimbwa & Anney, 2016). Educational establishments have placed maximum importance on the utilization of novel innovation to assist their development (Grabe & Grabe, 2007). Mobile learning technology has also arisen as a fresh innovative accomplishment and pedagogical phenomenon that presents numerous options for teachers as well as students (Ilci, 2014). The usage of mobile technologies has expanded the possibility for successful instruction (Sanga et al., 2016). For efficient use of mobile learning technology in the classroom, the review has drawn attention to elements that progressively or retrogressively affect learners' use of mobile learning technology. These are personal attributes, organizational attributes, technological attributes, benefits and barriers. Studies have found that these elements function in relation to one another.

With regard to personal attributes, there are many attributes that affect student use of mobile learning technology in learning. Students' skills and technology experience, preparation and technical readiness, self-confidence, pleasure, anxiety, and distrust of technology impact their adoption of mobile learning technology in learning and influence their use of technology. Studies have noted that students' attitudes toward technology, expectation of confirmation, satisfaction, technological keenness, and technological knowledge influenced their effective application of technology in their learning (Alhumaid et al.,2021; Callum et al., 2014; Alhabeeb & Rowley, 2017; Naveed et al., 2017).

Among the organizational attributes, factors such as technical support, logistical support, pedagogical support, leadership support, instructors' attitudes and beliefs, and training for learners affect their use of mobile technology for learning. The studies have noted that simply giving users training on the integration of technology is not a guarantee that they will integrate same, but if they are given the opportunity to acquire the familiarity, dexterity, materials, and assistance, then they will implement the innovation in the classroom to achieve the greatest impact on instruction (Papanastasiou et al., 2003).

With regard to the technological attributes, for efficient application of mobile learning technology in learning, the learners must see the technology as being superior to the former practice. In line with the current tenets, former experiences and needs, it must be flexible, and able to be tested on a limited basis prior to deciding to implement, and lastly the outcomes of the technology must be evident to others. The significant element in the studies is students' intention to implement mobile learning technology in learning. If students have undesirable intentions to use technology, supporting them with excellent technology resources will not persuade them to implement it in their learning. Hence, learners must be confident that technology may make their learning more fascinating, more fun, more pleasurable and easier.

The benefits of applying mobile learning technology by learners was also reviewed. The factors discussed included provision of a more suitable and simplified mode of learning, permitting students to schedule their learning to suit their preferred times; increased engagement and enthusiasm, which offers a more collaborative and individualized learning skill, and provides ease of access to education for persons who might not gain access to conventional school contexts. It was noted that mobile learning provides many benefits to learners, such as convenience and flexibility, enhanced engagement, improved accessibility, profitability, and increased collaboration. With the constant progress and advances in mobile technology, it is possible that mobile learning will continue to play a significant role in school environments and in training.

Finally, the barriers to the use of mobile learning technology by students were also reviewed. These elements included inadequate resources, inadequate support by school leadership, classroom conditions, instructors' limited knowledge and experience with technology, instructors' attitudes and lack of beliefs, and unwillingness to apply technology in the classroom. In addition, barriers to mobile learning technology usage were categorized into technology-related issues, basic skills issues, and educators' issues. The technology-related concerns noted were stability of Internet connection, suitable keyboard and screen size, computational power, and battery life. The basic skills concerns were inadequate proficiency and expertise in the use of mobile devices. Educators' issues included some educators' preference for traditional learning versus mobile learning, technology infrastructure, insufficient professional development and insufficient technical support. It was noted that simply giving users training on integration of technology is not a guarantee that they will integrate same. This is best expressed in one of the earlier studies by Papanastasiou et al., (2003). The authors noted that if users are provided with the opportunity to gain the necessary knowledge and skills, and are provided with the resources, and support, then they will integrate the technology in the classroom to achieve the greatest impact on instruction.

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