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The use of mobile technology in higher education: implications for students and instructors

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Abstract: Mobile learning has become a prominent topic in educational settings today due to its significant developments in information and communication technology (ICT). This flexibility not only benefits student-teachers who can learn at their own pace and convenience but also empowers instructors to engage with their student-teachers more dynamically. Literature indicates that mobile learning encourages collaboration and active participation, fostering critical thinking skills and creating a more engaging learning experience. Despite the many advantages of integrating technology into the classroom, research indicates that most faculties higher education are resistant to incorporating technology into their activities since there are no institutional norms. The study aims at evaluating the use of mobile learning in higher education in Lesotho and the implications it has on both instructors and student-teachers when using mobile learning. The study adopted a systematic literature review to review the available research using an integrative method of studies conducted on mobile learning in higher education between 2013 and 2023. The study found that some instructors ban the use of mobile devices because they distract from teaching and learning. In addition, not all devices can handle the demands of remote learning. Student-teachers believe that mobile technology enhances communication with peers and instructors. Among other factors, limited Internet connectivity and funding are the most common inhibiting factors for instructors to adopt technology into the teaching and learning process. Other inhibiting factors are the high costs of mobile data access and smart mobile devices. The study recommends that ICT policy must be in place to manage and control mobile learning for effective adoption.

Keywords: *Higher education, Instructors, Integrative method, Mobile devices, Mobile learning.*

1. Introduction

Mobile learning (also known as m-learning) has become a popular topic in educational settings due to major advances in information and communications technology (ICT) [1,2]. Mobile learning allows for anytime and anywhere learning, changing the way education is offered and made more accessible [3-5]. This flexibility not only allows student-teachers to learn at their own pace and convenience, but it also enables instructors to engage with student-teachers in a more energetic manner [6,2]. According to the literature, it encourages cooperation and active engagement, fosters critical thinking abilities, and provides a more interesting learning experience for student-teachers. This suggests that a wide range of resources are accessible from mobile devices, enabling a more tailored and flexible approach to education. This approach therefore better accommodates each student-teacher's requirements and needs, while also making the teaching and learning process more possible. Through leveraging various technologies and teaching platforms for students, universities can now cater to diverse learning styles and preferences, enabling student-teachers to engage with educational content anytime and anywhere [1]. Moreover, technology equips them with the skills and resources they need to make informed

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decisions about their future careers [7]. [6] articulate that mobile learning plays numerous roles in educational settings, including higher education, when its use is not based on technological possibilities but rather on the educational needs of instructors and student-teachers. This means that when mobile learning is provided as an additional strategy to teaching and learning, it can address the challenges that instructors and student-teachers face in using it [6,8–10]. Meanwhile, mobile learning has the potential to improve education in higher education in Lesotho, but there are still some challenges in demonstrating its full potential. The major challenges faced by Lesotho institutions of higher education revolve around instructors and student-teachers as the main users of mobile devices for instructional purposes. These challenges further impede the smooth and effective use of mobile devices in their classroom practices [11,5]. Owing to a lack of knowledge of the factors that influence the adoption of mobile technology in teaching and learning, instructors fail to support student teachers in using it. Hence, the study aimed to evaluate factors that influence the use of mobile learning in higher education and determine the implications of such factors on instructors and student-teachers.

2. Research Questions

The study evaluated the use of mobile learning in higher education and the implications mobile learning has on both instructors and student-teachers. Hence, the study responded to the following research questions:

a) What factors influence the use of mobile learning in higher education in Lesotho?
b) What implications do these factors have on instructors and student-teachers?

3. Conceptualizing Mobile Learning

Mobile learning is defined as a method of learning that uses portable devices such as mobile phones for learning without confinement of time and place [12]. [13], mobile learning, also known as m-learning, is e-learning that is performed through mobile devices. This is the method of learning that Lesotho institutions of higher learning have adopted. As [14] indicate, mobile learning helps both instructors and student-teachers to expand their knowledge, satisfy their curiosity, work with others, and enhance their experiences. In other words, it is straightforward and easily available, anywhere and anytime. Since learning can take place anywhere and anytime through mobile learning, student-teachers can send and receive assignments and share information relating to learning to their peers through the platform. It is a method of teaching and learning that creates student-teachers who are proficient in digital technology through the creative, innovative, and integrative use of technology [15]. It also requires digital know-how by student-teachers and instructors so that they can achieve creative and innovative use of digital technology to learn because, without this knowledge, they are not able to use it effectively.

The educational use of mobile devices in- and outside of the classroom in Lesotho helps student-teachers develop positive attitudes toward their courses. They even do well in courses that they do not like because learning materials are presented in small chunks (known as nuggets) that are easy to swallow [1]. When student-teachers are proficient in using their mobile devices, mobile learning increases their interest and motivation [6]. Moreover, the use of mobile devices in learning environments encourage student-teachers to participate in learning activities. Mobile devices may therefore become a necessity for student-teachers and educators. This mode of instant learning can provide access to learning materials outside the course class time. This means that it caters to diverse ways of learning, supporting and encouraging learning to all student-teachers. Student- teachers must therefore maintain a positive attitude toward mobile learning, as it might impact their academic achievement and motivation toward using the platform [15].

4. Model of Effective Integration

The study adopted the model of effective integration of technology proposed by Bitner et al. [17]. In their study, they mention that teachers must learn to use technology positively and must follow it to

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change their attitudes toward technology. They have identified eight critical aspects that need to be taken into account for instructors to successfully incorporate technology into the curriculum [17]. These areas include: fear of change, training in basics, personal use, teaching models, learning-based, climate, motivation, and support. In addition, they indicate that changes bring about fear or anxiety [17]. When instructors are forced to just change their traditional ways of teaching to m-learning, they can resist change because they are not familiar with technology or even the basics of operating mobile devices. The model of effective integration of technology relates to the current study in that most instructors in Lesotho fear using technology and tend to be reluctant to learn how to use new technology, as they have developed what is called "technophobia". They might also fear being embarrassed in front of their students.

The model further explains that teachers must be offered training in the basic operations of mobile devices. Acquiring this kind of knowledge would help them apply those basics that would help them use mobile devices effectively. The use of mobile learning would also mean increased productivity that results from less fear, making it easier for instructors to perform their roles [17]. This also means increased chances of exploring around the globe with the Internet. Once the technical skills have been acquired, integration thus becomes the norm. Another area that relates to technology integration is the use of teaching models as tools in the classroom to facilitate teaching and learning. Learning should always drive the use of technology in higher education. This allows both instructors and student-teachers time to collaborate in the learning process, since mobile learning changes the traditional paradigm in which student-teachers are used to absorb knowledge. They have been enabled to discover knowledge for themselves and to communicate it effectively to others. M-learning should help student-teachers to search for and find knowledge for themselves, to communicate, and to solve problems for themselves. A learning climate should also be created that allows both instructors and student-teachers to experience m-learning without fear. They must therefore be free to use it because that would minimize mistakes when using mobile devices, leading to increased motivation. Motivation only increases when they are supported in using mobile devices successfully [17].

5. Materials and Methods

The research used a comprehensive literature review to evaluate existing studies through an integrative approach. According to Langan et al. [18], a systematic review aims to identify studies relevant to the current study and making a decision on whether to include them or not. This approach was tailored to explore the use of mobile learning in higher education, specifically focusing on the factors that enable or hinder the use of mobile learning in higher education in Lesotho. The study used a well-designed approach to conducting an integrative review, which is essential for synthesizing and evaluating existing research effectively. We used the five-step process [19–21], as researchers have ensured that there is a comprehensive understanding of non-experimental studies related to mobile learning in higher education. Utilizing previous empirical studies, particularly

qualitative, it was crucial to gain insights into the practical applications and impacts of mobile learning in educational settings, especially higher education. This approach allowed us to not only analyze the current state of knowledge but also identify potential gaps and areas for further exploration within this domain.

The five-step process started with the guiding question to determine which studies to include in the study, using the terms "mobile learning in higher education" [20,21,22]. In this case, the research questions were: *What factors influence the use of mobile learning in higher education in Lesotho? and: What are the implications of such impact on instructors and student-teachers?* The sampling, as the second step, included all electronic studies using the critical term "mobile learning in higher education", manually searched from journals and conference papers published between 2013 and 2023. In deciding on the studies to be included in the final selection, the term "higher education" was added as criterion for the selection of articles for inclusion. This was done by reading the abstract of each of these studies to identify the impact on either instructors or student-teachers as the main users of mobile learning in higher

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education [19]. The idea was to include all studies relevant to the guiding questions. The other step involved extracting data using themes from the

selected articles to respond to the guiding questions to form new themes for the current study. In the fourth step, data were extracted from the full text, synthesized into new themes for this study, and then the last step was to present and discuss findings if the study [20,21,22]. For this study, seven themes were extracted and are discussed in the next sections.

6. Discussions of Results

The current study evaluated the use of mobile learning (m-learning) in higher education, focusing mainly on the benefits and challenges that both instructors and student-teachers face. It adopted the integrative method of analysis where results are presented thematically. The themes for this study are individualized learning; easy access to information; distraction and misuse; training and technical support; interactive learning; privacy and security; curriculum design and unclear ICT policies.

6.1. Individualized Learning

In general, the integration of mobile learning in education has opened new possibilities for teaching and learning, empowering both student-teachers and instructors to create engaging and effective learning experiences. The use of mobile devices has also made personalized learning more manageable, entailing that student-teachers should set their learning goals and milestones, evaluate their learning, and even choose the learning channels that best suit them. This adheres to what research [15,1,2,6,34] has illustrated, that mobile learning has the potential to foster effective teaching and learning due to its ability to allow the sharing of knowledge without limits of time and space, and its capacity to develop critical thinking and participatory learning. It is also indicated [32] that mobile devices allow student-teachers to complete their tasks at their own pace and based on their own choices that meet their individual goals or demands, or various learning styles. They also make situated learning possible, in other words, learning in real-life contexts, because they allow student-teachers to search for related information to verify information or materials that they already have. This means that student-teachers' motivation will be increased, since mobile learning provides a variety of learning paths, making education interesting and easy because of its convenience. It is thus the responsibility of higher education in Lesotho to help student-teachers overcome their fears so that they will keep on using mobile learning.

6.2. Easy access to Information

Since information is freely available online, both instructors and student-teachers can easily access such information, read it, and even share it with their peers because it is available and accessed at any time [34]. Mobile devices have a complete set of applications and can support and aid educational organizations. The advancement of mobile technology has made the teaching and learning processes more accessible. This accessibility has provided instructors with a way to support learning inside and outside the classroom by integrating a wide set of tools and applications that enables learning to be dynamic. This means that student-teachers can access resources from around the globe and engage in interactive discussions with their peers and instructors. This increases their interests and motivation when their learning is enhanced. Alternatively, this is what [22] put forth, that not all student-teachers have equal access to mobile devices or reliable Internet connectivity, which can create disparities in learning opportunities. This implies that not all devices can handle the demands of remote learning in some locations since connectivity is difficult. Moreover, it encourages student-teachers to participate in all learning activities when they can connect conveniently. Student-teachers' interest and motivation are enhanced by mobile learning [24]. Since mobile devices are also more portable than computers, the user can take them with them everywhere, making it easier to access and share information when the need arises [26].

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On the other hand, some student-teachers may come from poor families that cannot afford ICTs, that is, buying data to connect to the Internet. This becomes a challenge for them when assignments are uploaded onto the Internet, and they must search for information to complete such assignments. Unlike other student-teachers, these student-teachers believe that when their learning is negatively impacted by accessibility, mobile learning lowers their efficacy and motivation. This echoes the statement made by [26], that certain underprivileged schools in South Africa lack resources and that their student-teachers do not migrate to digital platforms because they do not have access to ICT infrastructure, such as the Internet. It is at institutions of learning where student-teachers from various backgrounds are all exposed to ICTs to ensure that each student-teacher has access to the Internet for learning to take place. This can rarely be attributed to the incapacity of universities to maintain their ICT infrastructure in the absence of funding.[27] brought up the point that inadequate connectivity prevents student-teachers from using the Internet to do homework and conduct research.

6.3. Distraction and Misuse

Mobile devices can be a source of distraction for effective learning, leading to reduced focus and productivity in the classroom. The text messages, notifications, and the appeal of social media feeds that student-teachers receive on their devices have the potential to disrupt learning. Therefore, instructors need to control the use of these devices by implementing strategies to mitigate distractions and promote responsible use of technology. This has influenced some instructors to ban the use of mobile devices in their classroom. This is because when student-teachers are allowed to use their mobile phones, it encourages the use of these devices for personal needs other than learning, posing a challenge to instructors as they do not have control over variables. In addition, using social networks and mobile technologies negatively affects student-teachers' performance in courses. Sometimes, learning might be disrupted by instructors' lack of exposure to using ICT tools. In this regard, [5] and [27] argue that when instructors are not aware of advanced ICT in teaching and learning, the process can be disrupted because student-teachers might lose interest and focus on something else other than learning. Subsequently, mobile learning becomes ineffective. This also increases the workload of instructors, as they have to set principles that guide the use of mobile devices and monitor student-teachers' behaviors. Furthermore, it makes it difficult for other students in the class to focus on the lesson deliverance.

6.4. Training and Technical Support

Effective use of mobile learning in education requires digital literacy skills. Therefore, instructors and student-teachers need to be proficient in using these tools to maximize their benefits. Instructors also need adequate time to learn how to use mobile devices and incorporate them into teaching and learning. This would require them to attend a training that would prepare them to fully embrace the adoption of mobile learning in their classrooms. Failing to provide technical support can lead to instructors becoming unwilling to try mobile learning because of anxiety, lack of interest, or even inability to use mobile devices (technical knowledge). Hence, providing training and support for both teachers and student-teachers is essential because they need to understand the basics of how to operate mobile devices for learning purposes. [11] and [5] argue for the inclusion of these basics in training so that instructors and students can perform basic operations such delete, install, and input in and out of the printing when required. Instructors should be able to alter their traditional paradigm of being instructors and provide student-teachers with the knowledge needed for the future. Instructors and student-teachers need to be proficient in using these tools to maximize their benefits. Providing training and support for both teachers and students is essential [5,33,28] to help instructors maintain a certain degree of proficiency in the level of integration due to the acquisition of new and relevant skills. Possessing the updated knowledge can enable instructors to operate their classes smoothly without the fear of being embarrassed in front of the student-teachers.

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6.5. Interactive Learning

Additionally, mobile learning is useful in developing 21st-century skills such as creativity and critical thinking because digital devices have features that support these skills. Therefore, both instructors and student-teachers should understand and have information about operating mobile devices and ensure that student-teachers are also able to use mobile devices before assigning them some work using appropriate learning platforms. Moreover, persistence in the use of mobile devices equips student-teachers with the tools and resources to make informed decisions about their future careers. By leveraging technology in their education, student-teachers can develop critical skills that

are essential for success in the digital age, such as problem-solving, collaboration, and digital literacy. This concurs with literature showing that the use of mobile devices leads to an increase in their application in higher education [28,29,16]. As [30] maintain, it assists with the impartation of knowledge, taking into consideration student-teachers' needs. It allows collaboration, since content can be shared with many people at the same time, as both instructors and student-teachers can communicate regarding the work just uploaded using mobile devices. This increases learning effectiveness, since the materials uploaded for learning can be re-used at any time.

6.6. Privacy and Security

Mobile technology use gives rise to fears about data security and privacy. Instructors and student-teachers have seen several concerns related to their privacy and security since the transition from personal computers to mobile devices. This is because student-teachers are on the move; they are sophisticated and adaptive, so their devices must be controlled and protected. This is especially true when they use unsecured wireless Internet, which might put their data at risk. This concurs with [12] and [31], who indicate that since instructors and student-teachers use their own mobile devices to access and use the information, they should be protected from attackers by making their information private and confidential. Educational institutions need to implement robust measures

to protect sensitive student information and ensure compliance with data protection regulations. As [32] has indicated, some platforms do not provide security or privacy as others do. Therefore, before choosing a reliable platform to use, considerations must be taken about privacy policies to ensure that student-teachers and instructors understand them. This is because they need to make sure that any information, they share with others is safe by creating strong passwords to protect their data.

6.7. Curriculum Design and Unclear ICT Policies

As argued by [34] and [35], mobile learning in higher education existed before the COVID-19 pandemic, but it was optional for both instructors and student-teachers to use. Each party seldomly used it because they were not even familiar with it. If there are thus policies that govern the operation of mobile learning, both instructors and student-teachers are likely to resist it as they might experience techno-stresses. Administrators must also ensure that mobile learning is incorporated in the designing of the curriculum and that policies regulating their use are in place. Sometimes, institutions of higher education introduce mobile learning without clear policies and curricula designed for the inclusion of mobile learning. This impedes both instructors and student-teachers from using mobile learning since there is no clear ICT policy in place for the effective implementation of mobile learning. The curriculum should be designed in such a way that it accommodates mobile learning, and policy should be in place on how to integrate this technology into teaching and learning [31].

7. Conclusion and Recommendations

This study aimed to evaluate the impact of mobile learning in higher education. It also discussed the implications that the adoption of mobile learning can have on both instructors and student-teachers. The study identified that mobile learning can be individualized in that student-teachers can freely access the information online, read this information, share it, and even communicate it to others. This can happen without the confinement of time and place. This enhances education and increases the

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motivation of these teachers to continue using their mobile devices to learn. It was also identified that mobile learning is interactive because instructors can communicate with each other and interact in other aspects. However, the study identified some challenges in higher education. This includes unclear ICT policy, where plans for mobile learning are only strategized but not incorporated into the curriculum content, making it difficult to implement it. Mobile devices have also been found to cause distraction in class due to the notifications and other information received during class. Mobile devices can also be misused by student-teachers by using it for other purposes during class, causing others to lose focus in class and pay attention to the noise. Technical training and support are another challenge found to impede effective mobile learning. If all these issues regarding mobile learning are properly addressed, negative implications could be avoided in higher education. Therefore, future research should assess the ICT policies in higher education to ensure that curriculum content entails the components of mobile learning, allowing its smooth implementation and use.

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