




## The effective use of smartphones for teaching and learning among undergraduates in higher institutions



 Bukelwa Belinda Mbinda <sup>(a)\*</sup>  Sam Erevbenagie Usadolo <sup>(b)</sup>  Itumeleng Judith Maome <sup>(c)</sup>

<sup>(a)</sup> Ms, Department of Entrepreneurial Studies and Management, Durban University of Technology, South Africa

<sup>(b)</sup> Doctor, Department of Media, Language and Communication, Durban University of Technology, South Africa

<sup>(c)</sup> Doctor, Department of Entrepreneurial Studies and Management, Durban University of Technology, South Africa

### ARTICLE INFO

#### Article history:

Received 17 May 2024

Received in rev. form 18 June 2024

Accepted 22 July 2024

#### Keywords:

Smartphone, Undergraduates,  
Learning, Higher Education, Teaching

#### JEL Classification:

I 23,033

### ABSTRACT

*This study examines the efficacy of using smartphones for teaching and learning in higher education, with a particular emphasis on undergraduates and blended learning. It is vital to investigate how cellphones, favored by Generation Z and Millennials, might improve academic achievement because the COVID-19 epidemic required a change from traditional teaching approaches to accommodate remote and online learning. The scholarly article explores smartphones' potential as an effective teaching and learning aid by conducting a theoretical investigation. Understanding how these tools can promote learning outcomes is crucial given the prevalence of smartphones and our escalating reliance on digital technologies. This systematic literature review aims to shed light on the potential benefits and challenges associated with integrating smartphones into the educational process for undergraduate students within the Higher Institutional learning environment of the University of Technology (UoT). Drawing upon peer-reviewed articles and studies published from early 2020 to the present, the review critically examines the advantages and drawbacks of smartphone usage, investigates undergraduate preferences, and assesses the implications for teaching and learning methodologies. The findings of this study provide valuable insights into the efficacy of smartphones in enhancing teaching and learning outcomes, emphasizing their positive impact on student engagement, academic achievement, and overall satisfaction within blended learning environments. The review offers practical recommendations for educators to promote greater student engagement by prioritizing individual needs and leveraging digital resources to foster creativity and innovation.*

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## Introduction

Smartphones play a pivotal role in contemporary pedagogy, particularly among Generation Z and Millennials, underscoring their significance within higher education. Their integration is paramount for institutions of higher learning, given the myriad benefits they offer in engaging and captivating the minds of learners. The importance of this paper is to shed light on the potential benefits and drawbacks of using smartphones in the educational process, as well as to provide a comprehensive analysis of mobile phone use in higher education institutions.

Understanding how students, particularly Generation Z and Millennials, perceive and experience smartphone usage for academic purposes is a critical research question. This includes evaluating their attitudes, experiences, and overall satisfaction with the blended learning environment, which includes smartphone use.

According to Ajani and Maphalala (2023) opportunities for innovation and change have also been brought about by the pandemic, such as the creation of more flexible learning options and increased university collaboration. The paradigm shift induced by the COVID-19 pandemic has necessitated institutions to depart from traditional modes of instructional delivery. In response to this shift, smartphones have emerged as indispensable tools for teaching and learning, particularly given their widespread adoption among

\* Corresponding author. ORCID ID: 0009-0005-2290-3512

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<http://dx.doi.org/10.36096/ijbes.v6i3.517>

students globally. This trend is mirrored in South Africa, where a significant proportion of student's hail from poor backgrounds, relying predominantly on smartphones due to their affordability compared to laptops and tablets.

Learning with mobile technology (mobile learning) is becoming a more appropriate way to encourage real-world problem solving within the classroom as students engage in more casual mobile learning (Farley et al., 2015). According to (Lötter & Jacobs 2020) cited Kim and Hannafin (2011) lecturers purposefully and methodically engage students in demanding and meaningful problem-solving activities to improve and encourage students' cognitive growth depending on their zone of proximal growth.

Digital transformation is the intentional and prioritized transformation of company activities and organizations, processes, competences, and models for maximal transformation of the changes and opportunities of a technological mix and its accelerated influence on society. If Higher Education Industrys (HEIs) are to persist in time as a vital component of this change and not fade away, they must evolve holistically. Furthermore, utilizing all the prospects and potentialities made available by the plethora of digital technologies available, as well as reinventing entire business models across the entire value chain, is not an easy or simple undertaking (Benavides et al., 2020).

According to Adekola et al. (2017) cited in Garrison and Vaughan (2008) the value of blended learning is becoming more widely recognized in the HEI, particularly as the shifting digital landscape continues to impact learning and teaching. According Mdletye and Usadolo (2024) cited in Simonson and Seepersaud (2018), blended learning is a formal education model that uses interactive telecommunications to connect learners, instructors, and resources. Simonson and Seepersaud's definition focus on telecommunications links between Previous scholars (Garrison & Kanuka, 2004; Graham, 2006) have stated that blended learning combines face-to-face teaching and computer-assisted learning to improve learning outcomes (Gaol & Hutagalung, 2020). According to opinion Voicu and Muntean (2023) cited in El-Hussein and Cronje (2010), adds that mobile learning refers to "...any type of learning that takes place in learning environments and spaces that take account of the mobility of technology, mobility of learners, and mobility of learning." Mobile learning (m-learning) refers to e-learning using personal devices like smartphones, tablets, laptops, and digital notebooks. M-learning is a natural evolution of e-learning that incorporates wireless capabilities.

The overarching aim of this systematic literature review is to comprehensively evaluate the ramifications of smartphone integration on pedagogical efficacy and learning outcomes within the higher education landscape, particularly within the framework of blended learning. This endeavor seeks to elucidate both the potential benefits and challenges inherent in smartphone utilization by undergraduate cohorts, thereby offering actionable insights to optimize their integration into educational environments.

## **Literature Review**

Kopp et al. (2019) cited in Cameron & Green (2009) posit that in the context of HEIs digital transformation can be defined as the sum of all digital processes required to complete a transformation process that allows higher education institutions to optimally apply digital technologies This process also includes proper strategy planning, trust building, process thinking, amalgamation and reinforcement of all parties involved, as well as separate, collaborative, and organizational knowledge

According to Adedoyin and Soykan (2023) cited in Hiltz and Turoff (2005), the contemporary transformation will be seen as revolutionary changes in the specifications of higher education as a process and as an institution in the next 50 years because the transformation has moved face-to-face instructional programs for thousands of home-grown, provincial, and domestic universities to online and hybrid programs using digital technologies to enhance learning As a result, as lecturers are forced to devise tactics to attract and retain students (for the successful design of teaching and learning experiences has attracted broad attention from HEIs (Frawley et al., 2019). Dollija et al. (2023) adds that students were unprepared for the abrupt transition from traditional to virtual learning: they had no prior e-learning experience, no online platform training, insufficient infrastructure to support the online process, and a host of other social and psychological difficulties. Consequently, it is critical to comprehend the ways in which various factors influenced students' intentions to use e-learning during COVID-19

A paradigm change is necessary for the new and demanding activities. Students should be taught multiple ways of thinking, how to be creative, how to come up with answers on their own, and how to perform well in both conventional and unconventional circumstances as part of the new paradigm. Within the context of the Bologna process, these developments in higher education signify the shift from the centralization of transmittal instruction to an appreciation of the added value of a learning process in which students play a more active part in knowledge construction This is made feasible by information technologies, which allow for a distinct arrangement of how teachers and students interact. They help to bring together the positions of instructors and students, stimulate their creative potential, and transform the routine transfer of knowledge into cooperative learning (Monteiro et al., 2013).

According to Rellinger (2011), a significant proportion of universities are implementing mobile technologies, which facilitate constant communication between students and instructors throughout the day. However, a study by Chan et al. (2015) claims that there isn't much research on smartphone use in postsecondary institutions. Considering the gap in the existing literature, it is noteworthy that claims persist regarding the dearth of extensive research on smartphone utilization within post-secondary institutions.

Marks and Al-Ali (2022) advise that there is a scarcity of literature on the maturity of digital transformation. Digital transformation can also be viewed as a link between structural, strategic, and technological changes that are required to fulfill the demands of the modern digital era, emphasizing the need to align the organization's old and new processes and systems Alenezi (2021) cited in Drechsler et al. (2020). Digital transformation in higher education is seen as unavoidable, particularly after COVID-19.

Rahim (2019) cited in Zhang and Zhu (2018) is of the opinion that one of these technologically advanced instructional strategies that successfully includes active language acquisition is blended learning. assert that it is challenging to create a learning context that is suited for each learner, but the blended learning strategy aids in creating a flexible, interactive, supportive, and motivating teaching and learning environment. This clearly demonstrates the popularity of blended learning modules, which combine modern technology with established educational practices.

Reddy et al. (2022) advise that m-learning is based on the three pillars of learning: just-in-time, just-enough, and just-for-me, and that the literature generally supports that m-learning can be self-paced, self-directed, individualized, and either subscription or micro-learning. With the increased demand for m-learning, a plethora of educational mobile apps are made freely available to students and teachers (StatCounter, 2016). Adekola et al. (2017) cited in Owston, York, and Murtha (2013) posit that while blended learning offers benefits and opportunities, its limitations have become more apparent as it gains popularity. found that higher-achieving students preferred blended learning over face-to-face classes due to its convenience, engagement, and effectiveness. Low-achieving students require more structure in traditional face-to-face classes due to a lack of independent study skills needed for blended learning.

According to Rahim (2019) there has been research looking into the impact of technology tools and approaches in teaching and learning because of the new age revolution of Information Communication Technology (ICT) and its extensive integration into education. Matyokurehwa et al. (2020); cited in Mansour (2014), advise that smartphones are widely used globally.

### **Smartphone Usage in Education**

According to Jurayev (2023) mobile technologies, as opposed to traditional classrooms, successfully provide students with greater convenience and flexibility, allowing them to learn wherever and whenever they want. Because each learner is "connected" wherever they choose to be in that learning area, there are potential to soften the rigidity of the typical classroom arrangement when mobile devices are integrated into a classroom environment (Barianos, Papadakis, & Vidakis, 2022). Learners can continue their studies outside of the classroom in settings that match their specific needs (Chaldi & Mantzanidou, 2021).

According to Lötter and Jacobs (2020), learning with mobile technology is becoming a more appropriate way to encourage real-world problem solving within the classroom as students engage in more casual M-learning (Farley et al., 2015). This necessitates groups of students with varying competencies seeking, analyzing, and synthesizing web facts into a final argument. To equip students to deal in an ever-changing society, student-centered learning is essential (Esterhuizen & Grosser, 2014). Active student engagement, in which the student is actively engaged in the learning process, is essential. To educate students for their new role as global citizens, passive learning could be replaced with an active learning approach (Beetham & Sharpe, 2013; Keengwe, Onchwari, & Onchwari, 2009).

Singh and Samah (2018) state that because of its advanced capabilities, smartphone use among university students in the twenty-first century is viewed as a significant element of their lives. Students utilize their smartphones to complete many daily duties. Various research revealed that students use smartphones for a variety of purposes. Most students use smartphones for entertainment, socializing, and learning. The rapid advancement of technology has resulted in the development of electronic devices such as smartphones, whose functions are not limited to messaging but also allow for long-distance communication. Smartphone can be referred to as a minicomputer since the capabilities and functionalities given are like those of a computer but in a smaller and more portable form (Rambitan, 2015).

Mobile technologies enable learners to participate in learning settings more conveniently (Dahal et al., 2022; Shih & Mills, 2007). Mobile technologies are used in an auditory environment in higher education. Because of technological advancements, there are chances to reduce the rigidity of the typical classroom setup. Each student wants to utilize a mobile device, the rigidity of the typical classroom set up Drolia et al. (2002). Learners can continue their studies outside of the classroom in settings that match their specific needs (Chaldi & Mantzanidou, 2021). Mobile technology adoption has resulted in a major transformation of the institution, affecting procedures, operations, and organizational structures by introducing new management concepts (Karakose et al., 2022).

Higher education institutions are thus urged to integrate the functional structures through which they work with a mobile education strategy with their available administrative and operational capability and culture (Lazarinis et al., 2022). M-learning has the potential to be a successful educational tool in addition to traditional ways (Kalogiannakis & Papadakis, 2017). Motivating students to use m-learning for higher education is critical (Lavidas et al., 2022). The usability and utility of m-learning systems can add value to an existing learning management system by advancing the learning process and increasing learner acceptance of m-learning (Sarrab et al., 2016). In the assessment phase of education, for example, it can be demonstrated that the usage of mobile applications is based on the liberalization of assessment valuing (Jurayev, 2023).

Xiao (2019); Munro (2018); Fish (2006) posit that digital technologies, enable digital products to be used as building blocks for further development and enable institutions to scale up enrolment at little or no cost, reduce workload in relation to teaching and

administrative activities, reuse digital content in different contexts, and maintain digital technology resources at low costs. These arguments are still frequent themes in the mainstream discourse of higher education digitalization today.

### **Theoretical Framework**

According to Dollija et al. (2023) researchers have analyzed students' behavioral intention to use e-learning using the TAM model, which Davis (1986) first proposed (Fathema, Shannon, & Ross, 2015; Fathema & Sutton, 2013; Ibrahim et al., 2017; Mailizar, Burg, & Maulina, 2021; Masrom, 2007; Park, 2009; Salloum, Alhamad, Al-Emran, Monem, & Shaalan, 2019; Setiyani, Effendy, & Slamet, 2021). TAM could assist researchers in comprehending the attitudes and intentions of instructors and students regarding the use of smartphones for educational purposes in the context of higher education. According to Tawafak et al. (2023) TAM is a clear-cut, basic model that emphasizes perceived utility (PU) and perceived ease-of-use (PEOU) as its two main components. The degree to which a user feels that utilizing a specific technology would be effortless is known as PEOU, and the degree to which a user feels that utilizing a technology will improve their performance at work or produce better results is known as PU. The relationship between technology adoption and system utilization was investigated using PU. The way the e-learning system is really used affects satisfaction and either confirms or contradicts expectations.

Mugo et al. (2017); Rueckert et al. (2013) state that among learners, using mobile technology for instruction is starting to become expected and commonplace. The students are showing a desire to use mobile technologies as tools that can be used for more than just communication and entertainment, especially those who live in rural and isolated places. The claim is that because the devices are portable, people find them to be convenient, giving students the flexibility to study whenever they choose. Furthermore, it's been suggested that mobile devices give students more control over their education, which can result in more fulfilling learning opportunities. Scholars have concluded that one cannot want away the technologies because of these affordances. In this context the perceived usefulness is the degree to which students think that using smartphones for educational purposes will improve their experiences teaching or learning, whereas perceived ease of use is the degree to which students think using smartphones for educational purposes will be easy and convenient.

It is this benefit that the students would use the smartphones for academic performance. TAM can assist in identifying tactics to encourage smartphone acceptance and adoption for educational uses. Ahmed et al. (2023) encompasses the creation of user-friendly educational applications, provision of assistance and training to educators and students, and emphasis on the benefits of utilizing smartphones for teaching and learning purposes. Ahmed et al. (2023) posit that TAM is gaining traction in e-learning and has been observed by practitioners and academics in recent years in Saudi Arabia.

Ahmed et al. (2023) advise that when it comes to e-Learning, TAM aims to understand the factors that affect users' adoption and use of e-Learning platforms. eLearning improves education, literacy, and economic development in developing and underdeveloped nations. Feng and Yao (2023) state that with the help of information technology and smart phones, students can access important learning resources without worrying about location or timing. They can complete their learning tasks in the comfort of their own homes. Owing to their rapid rise in use, smartphones can be integrated into contemporary technology and used as highly effective learning agents.

The TAM was crucial in helping educators comprehend the key components and strategies for utilizing technology (Scherer, Siddiq, & Tondeur, 2019). Numerous empirical studies have also confirmed the validity of TAM, and the model has several built-in limitations. One of the most notable restrictions is related to the discrepancies between people's intentions and actual usage of contemporary technology (Bagozzi, 2007); (Alshurideh et al., 2023).

### **Research Methodology**

A comprehensive systematic literature review was conducted to examine the methodologies employed in synthesizing extant literature pertaining to the utilization of smartphones. A total of 36 publications, spanning the years 2010 to 2024, were meticulously retrieved to ensure a comprehensive and thorough examination of the available literature. Scopus, Google scholar. The key words that were used to search were as follows: smartphone effectiveness, undergraduate education, blended learning, academic performance, generation z and millennials. PRISMA is a peer-accepted methodology that improves review quality and replicability (Parola et al., 2024).

### **The Benefits of Smartphones in Education**

During the COVID-19 pandemic, smart M-learning applications demonstrated various new benefits for higher education institutions, including support for distance learning (Almaiah et al., 2022). M-learning apps have expanded in popularity and demand in recent years, becoming a common occurrence in modern educational systems, particularly with the implementation of M-learning programs. Reddy et al. (2022) advise that given the increasing ownership of smartphones, scholars are drawn to mobile devices' evolutionary benefits to boost learning and teaching.

According to Wali and Omaid (2020) smartphones are the most powerful technical tools available today, and their multi-functional capabilities have made them an essential part of practically everyone's daily routine. Smartphones play an important role in practically everything an individual performs daily. It is acknowledged as a vital instrument for work, pleasure, learning, and teaching, among

other things. Smartphones have been acknowledged as an important educational instrument that facilitates both the learning and teaching processes in the field of education, in addition to their usefulness in various sectors of life.

Reddy et al. (2022) further add that the adoption of mobile learning in developing countries has been shown to improve educational standards, make educational services available in remote areas, and create cost-effective and flexible learning solutions (Bachmair & Pachler, 2015; Sharma et al., 2019; Reddy et al., 2020, Reddy et al., 2021b). Mobile phones, particularly smart phones, are the most frequent device for m-Learning nowadays. Students use their mobile phones not only to make calls but also to access university information, course resources, navigate through locations, and communicate via various platforms such as social networking sites, emails, and online forums (Iqbal et al., 2017; Reddy et al., 2017; & Sharma et al., 2019). Voicu and Muntean (2023) posit that the convergence of mobile devices and educational technologies offers learners greater flexibility by enabling homogeneous learning activities across multiple devices.

According to Rahim (2019) mobile devices not only provide access to information, but also facilitate simultaneous activities and experiences (Almaiah et al., 2019a, 2019b). Mobile devices can be used for a variety of learning activities, such as document searching, surveying, reading, recording, sharing, and taking notes (Camilleri & Camilleri, 2017; Sönmez et al., 2018). By 2025, 5 billion people are expected to access the internet via mobile devices, driven by increased usage and advancements in 5G technologies (Sophonhiranrak, 2021).

### **Challenges of Smartphones in Education**

Adedoyin and Soykan (2023); Kopp et al. (2019) identified five assumptions that hinder digital transformation in higher education institutions: change, pace, technology, competences, and financing. Higher education institutions' digital transformation encompasses more than just online learning. As stated by Kamaghe et al. (2020) numerous challenges have been discovered in the adoption of m-learning, including financial limits in purchasing and using devices, as well as a lack of information about the presence of m-learning in Tanzania, which is the main constraint when compared to skills and knowledge of usage. There are also institutional hurdles, such as the fact that most Higher Learning Institution (HLI) have yet to adopt and use m-learning platforms, even though some of them have been employing E-learning for teaching and learning. The study also discovered that learners' attitudes and behaviors concerning the use of smart devices for learning can impede the use of m-learning platforms, therefore HLI do not perceive the advantage of having it. Furthermore, there are obstacles involving smart device technical know-how, such as applications, physical properties of mobile devices, and network and memory capability. A similar study conducted in Kuwait on the adoption of m-learning, which discovered that the usage of mobile technology in learning is not as widespread as the devices themselves, as most devices are used for communication and social networking.

According to Kamaghe et al. (2020) a study conducted in Kuwait on the acceptance of m-learning UNESCO (2020) which discovered that the usage of mobile technology in learning is not as widespread as the devices themselves, as most smartphones are used for communication and social networking. Kaliraj, Singaravelu and Devi (2024) some of the challenges are the issues with software include difficulty upgrading to the latest version, frequent crashes, conflicts that disrupt mobile learning, and other limitations. Hardware issues, unlike software, hardware requires physical devices. The actual gadgets used may break down over time. Dissolving may occur due to factors such as overuse, pollution, and hard handling. These cause phones and other devices to stop working properly. Distraction, mobile learning can cause significant distractions. Students often use their smartphones for social media, chat, image sharing, and online games, rather than for discovery. To abuse the device diversions can take away time from more important tasks. Misuse, many students use the device for a variety of purposes. Some people abuse it for entertainment, while others have hidden and malicious intentions that must be prevented.

According to Matyokurehwa, Rudhumbu and Mlambo (2020) several obstacles influenced students' intentions to use smartphones as learning tools. Reddy et al. (2023) posit that, unpredictable connections, and the challenge of obtaining inexpensive data to access course resources remain major issues, particularly for students from lower socioeconomic backgrounds. Onyema (2019) adds that there are various obstacles to the use of mobile phone technology in teaching and learning. These issues are interrelated, making them even more difficult to address. However, to maximize the potential benefits of mobile technology in pedagogy, governments, policymakers, educational institutions, and other stakeholders must establish ways to address these developing issues. Also, adds that most technologies are frequently impeded by many linking elements that are heavily dependent on context and location. Mobile phone use in school is not exempt. While it has a good impact on teaching and learning, there are numerous obstacles that prevent the seamless integration of mobile phones and other educational technologies into the teaching and learning process.

According to Kamaghe, Luhanga and Michael (2020) suggests that many higher education institutions lack m-learning technology and rely solely on e-learning. This can make it challenging for visually impaired learners to engage in learning through smart devices. Moreover, the study found that learners' attitudes and behaviors towards using smart devices for learning can hinder their use of m-learning platforms, leading to a lack of perceived benefits for Higher Learning Institutions (HLI). Other challenges include technical knowledge of smart devices, such as applications, physical attributes, and network and memory capabilities.

## **The Preferences of Generation Z and Millennials**

Kole et al. (2023) support that traditional teaching approaches, which mostly depended on lecturing and rote memorizing, no longer resonate with the mindsets of Millennials and Generation Z (Gen Z). Because of their considerable exposure to technology and information accessibility, these digital natives have a natural preference for interactive and experiential learning. To satisfy these learners' needs and expectations, instructors must use pedagogical approaches that leverage technology, create collaboration, and encourage active engagement. Al-Adwan and Al-Debei (2023) posit that because of their significant exposure to technology, Gen Z students are skilled at multitasking. They can frequently manage several sources of information and easily transition between them (Talmon, 2019). Students in Gen Z are accustomed to collaborating with others online and expect to do so in their classroom environment (Haleem et al., 2022). They respect teamwork and the ability to collaborate with others to solve difficulties (Al-Adwan & Al-Debei, 2023).

According to Ishak et al. (2022) a new generation of students Gen Z has entered universities/colleges. They were raised in a technologically advanced atmosphere with easy access to the online world, which influenced their information choices. People born between the mid-1990s and the early 2000s are considered Gen Z (Howe, 2014). Gen Z grew up in a high-tech, on-demand, hyper-connected, and impatient world. Gen Z is the first worldwide generation with a strong interest in and access to education (Hampton & Keys, 2016). Technology has a significant impact on Gen Z learning (Nicholas, 2019). Teaching Gen Z is difficult because educators must abandon traditional teaching learning methodologies and devise new teaching strategies to capture their imagination, curiosity, and knowledge (Cilliers, 2017). These digital natives are expected to have distinct preferences and learning styles. As a result, inferring Gen Z pupils' learning styles is unavoidable. Kole et al. (2023) adds that educators have the unique difficulty of engaging millennials and Gen Z learners in today's quickly changing educational world. Millennials (those born between the early 1980s and the mid-1990s) and Gen Z (those born between the mid-1990s and the early 2010s) are the first generations to have grown up with technology at their fingertips.

According to Abousaber (2023) Gen Z pupils are adept at multitasking due to their extensive exposure to technology. They can commonly manage multiple sources of information and switch between them with ease (Talmon, 2019). Students in Gen Z are used to working with others online and anticipate doing so in the classroom (Haleem et al., 2022). They value teamwork and the capacity to work with others to solve problems. In the opinion of Tan et al. (2023) current research on Gen Zs, they are the first true 'digital natives,' also known colloquially as the TikTok generation, who have evolved in a hyper-connected world, live ubiquitously in a global digital playing field, and typically prefer virtual means of communication (Haddouche & Salomone, 2018; Francis & Hoefel, 2018; Mahapatra et al., 2022). Most Gen Zs, who are now in their mid-20s, are well-educated, tech-savvy, and used to making informed purchasing decisions (Francis & Hoefel, 2018). Among the many generational cohorts, Gen Z will become the largest consumer base. As a result, there is an environment and interest in academia and industry in understanding their requirements, attitudes toward the environment, and purchasing behavior.

Although Millennials and Gen Z share many commonalities, there are variances in their travel perspectives, attitudes, interests, and consumption behaviors. First, in comparison to Millennials, Gen Z values the complete travel experience rather than specific destinations, and originality is important in Gen Z's travel preferences (Whitmore, 2019).

## **Mobile Phones as Catalysts for E-Learning in the Era of Digital Transformation: Trends and Implications**

Reddy et al. (2023) posit that Mobile devices are unquestionably the best digital technology for facilitating transformative and smart learning and providing outstanding learning support. Mobile devices are becoming more powerful and capable of supporting a wide range of applications and services, invariably promoting student-centered learning, nurturing student agencies, and strategically designed to mobilize societal changes. Mobile learning is defined as learning using mobile devices, with a focus on mobility.

In the opinion of Voicu and Muntean (2023) Mobile learning enables informal learning through apps like WhatsApp, messaging, and YouTube. M-learning complements existing learning methods, rather than replacing them. Smartphones are the leading IT&C tools for transforming education, followed by notebooks and handheld devices. According to Onyema (2019) the use of mobile phone technology in education is hindered by various factors, including economic, infrastructure, and network issues. Institutional, resistance, and sociocultural factors.

In the opinion of Moya and Camacho (2023) stakeholders are considered the key pillars for mobile learning adoption, not only during the implementation phase but also throughout the process. All parties involved in the institution should be aware of the ICT resources that are available as well as how valuable they are for the tasks at hand. Tsubira and Mulira (2004), however, claim that there is often a lack of clarity regarding ICTs, with some people viewing them as merely sophisticated technologies requiring a high level of expertise and a large financial investment. They are not valued to increase productivity and cut costs. Almaiah et al. (2022) posit that previous research has confirmed that university management support is critical to the development of M-learning system adoption, which in turn positively influences actual use (AU) and student acceptance of M-learning.

Previous research has discovered that university culture predicts technology adoption, including M-learning adoption. Younger generations who were born and raised in a world full of technology tend to be more familiar with it than older generations who did

not grow up with it. As stated by (Rahim, 2019); Dziuban et al. (2018); blended learning is having a significant impact on educational settings, including its implications and future directions According to Adekola et al. (2017) today's students expect technology-enhanced learning to be an integral part of their university experience, and they will need to adapt to this new way of learning (Beetham, White, & Wild, 2013; Dzakiria, Mustafa; & Bakar, 2006). This adaptation is not only important for acquiring knowledge and skills, but it also has implications for future career opportunities in terms of social and digital literacies (Concannon, Flynn, & Campbell, 2005).

According to Efiloğlu Kurt (2023) the use of technology in education has increased in conjunction with technological advancements. By removing time and space constraints, technological tools enable more flexible learning environments. In this vein, recent studies emphasize the significance of nurturing and enhancing higher education e-learning environments. Given Gen Z's high level of integration with the internet and mobile phones, m-learning has become and will become even more important for higher education in the future.

Reddy et al. (2023) state that students nowadays prefer to use mobile phones for learning purposes due to the capabilities of mobile phones. According to a study conducted by Iqbal et al. (2017), 84% of students agreed that mobile phones are useful mediums for imparting knowledge and 65% agreed that mobile phones allow for a more flexible method of learning. According to Traxler (2010), learning with mobile phones allows the owner to become an active producer of content, allowing learners to explore their thinking capabilities. He also mentions how facilitators can use mobile phones to engage learners by providing a variety of course materials, learning resources, and assessment information.

According to Turnbull et al. (2023) education has undergone a substantial digital transformation because of the quick development of digital technologies. Digital tools and online platforms have supplemented and, in some cases, completely replaced traditional teaching methods. Blended learning, which mixes in-person instruction with virtual elements, is becoming more and more popular as a successful teaching strategy.

According to the findings of other scholars, the study findings of Rahim (2019) found that mobile learning positively impacts higher education adoption and supports all assumptions. According to Lötter and Jacobs (2020); Heinrich (2012); Hattie (2013); Farley et al. (2015), Montreux et al. (2015), found that mobile learning can promote real-world problem-solving in the classroom, mobile learning is increasingly effective for delivering higher education.

Adekola et al. (2017), cited in Concannon et al. (2005) findings found that students expected to use technology-enhanced learning in their studies, which aligns with their finding. Students perceived the blended approach as providing flexibility and control over their learning space, pace, and strategies, which aligns with Concannon et al. (2005). Students reported increased participation, improved communication, and peer learning opportunities. Lötter and Jacobs (2020) findings also support the findings of Rossing et al. (2012), who stated that students would view smartphone use for learning as beneficial since it allows for instant information access and enhances the learning process by incorporating varied learning approaches and preferences.

According to Reddy et al. (2023) as the varied use of mobile phones among today's students becomes more common, it can be used to provide amazing capabilities to students and facilitators, as demonstrated by various researchers. For more effective learning and better outcomes, teaching and learning processes can be transformed and mobilized, learners can be better engaged through their personal space, and content delivery can be reengineered. Because of the falling prices of mobile devices and data plans, the prevalence of mobile phone ownership and usage has increased exponentially among the younger generation and student-aged people.

The findings of the study of Ishak, Ranganathan and Harikrishnan (2022) posit that most Gen Z undergraduates, regardless of program of study, prefer multimodal learning. Most Gen Z undergraduates preferred multimodal learning, regardless of gender or program of study. The findings study of Kole et al. (2023) suggests that interactive digital tools, multimedia resources, and online platforms can increase student engagement. However, they should be integrated into teaching strategies. The study found that these approaches are effective in increasing student engagement and could potentially improve learning outcomes.

In the developing countries like South Africa, Nigeria, and Botswana, despite its numerous benefits, M-learning is still underutilized in teaching and learning processes. According to Matyokurehwa et al. (2020) smartphones offer more benefits than drawbacks, leading to a higher likelihood of students using them as learning tools compared to other methods. Lötter and Jacobs (2020) advise that while it's important to prioritize student needs for technology, using smartphones as a social constructivist pedagogical tool for inquiry-based problem-solving cannot be overlooked. Mobile phone technology can be a valuable pedagogical tool when used properly. Mobile technology is crucial for 21st century teaching and learning success, according to the study's findings. Mobile phone technology improves access to digital learning materials like MOOCs and videos, leading to better conceptual understanding among students. Using mobile phones in teaching can boost creativity and knowledge sharing among students. Effectiveness depends on addressing the challenges identified in this study and others (Onyema, 2019).

Based on the literature the following are the recommendations for HLI in accommodating mobile learning. Open education resources for mobile learning, such as Moodle Mobile and Blackboard Mobile, should be customized to meet learners' needs and made more affordable for students. According to Kamaghe et al. (2020) assistive technologies are limited in their ability to read and describe graphical content, such as photos, charts, and graphical representations. Only text-based navigation and some translations are

available, making it difficult for visually impaired individuals to use independently and compromising their privacy. Onyema (2019) states that there are several challenges to implementing mobile phone technology in teaching and learning. These challenges are interconnected, making them even more difficult to address. To maximize the benefits of mobile technologies in pedagogy, stakeholders such as government, policy makers, and educational institutions must develop strategies to address emerging challenges.

## **Conclusion**

Preference for Multimodal Learning, regardless of gender or program of study, the conclusion emphasizes that Generation Z undergraduates prefer multimodal learning approaches. This emphasizes how crucial it is to use a variety of learning modalities to meet the needs of today's students. Integration of digital tools for engagement highlights how online platforms, multimedia resources, and interactive digital tools can all effectively raise student engagement. To optimize their influence on learning outcomes, it also emphasizes how crucial it is to incorporate these tools into instructional strategies. Underutilization of mobile learning in developing countries, despite its potential advantages, the conclusion notes that mobile learning is underutilized in developing nations like South Africa, Nigeria, and Botswana. This emphasizes the necessity of more research and funding to fully utilize mobile technology for teaching in these areas. Benefits of smartphone use in Learning acknowledges the value of smartphones as learning tools, emphasizing their ability to improve access to digital learning materials, improve conceptual understanding, and foster student creativity and knowledge sharing. The conclusion recognizes the difficulties associated with mobile learning implementation, as identified in the study and other research. It implies that addressing these issues is critical for maximizing the effectiveness of mobile technology in education and training.

## *Recommendations*

The recommendations address both technical and pedagogical aspects and cover important areas for enhancing the integration of mobile learning in higher education in South Africa:

- i. Customizing Open Education Resources (OER) for mobile learning: It is practical to customize platforms such as Moodle mobile and Blackboard mobile to meet the needs of learners. Making these resources more affordable for students can improve accessibility and encourage greater use of mobile learning tools.
- ii. Improving assistive technologies, addressing assistive technologies' limitations in reading, and describing graphical content is critical to ensuring inclusivity in mobile learning environments. Text-based navigation and better translations can improve accessibility for visually impaired people.
- iii. Addressing the challenges of mobile learning implementation, recognizing the interconnected challenges of implementing mobile learning, such as infrastructure limitations, technical barriers, and pedagogical concerns, emphasizes the importance of stakeholder collaboration. The government, policymakers, and educational institutions should work together to create strategies that effectively address these challenges.
- iv. Maximizing the potential benefits of mobile technology in pedagogy, governments, policymakers, educational institutions, and other stakeholders must establish ways to address these developing issues. Also, adds that most technologies are frequently impeded by many linking elements that are heavily dependent on context and location.

It is critical that institutions consider the specific contexts and needs of their students and faculty when implementing these recommendations.

## *Research Limitations*

The systematic literature review only utilized sources from the years 2010 to 2024, exclusively drawing from Scopus and Google Scholar. The materials were painstakingly retrieved to guarantee a full and exhaustive analysis of the body of work that was available. The study focused only on the use of mobile devices for learning and teaching among Generation Z and Millennials.

## *Significant of The Study*

The thorough examination of smartphone use in higher education provided by this study provides insights into pedagogical approaches, technological interventions, and Millennial and Generation Z preferences. Its conclusions can guide the creation of inclusive, interesting, and productive learning environments that meet the needs of contemporary learners. They can also guide research, practice, and policy initiatives. The study can promote innovation, equity, and quality in higher education by filling in knowledge gaps and offering practical suggestions.

## *Areas of Future*

Future studies could examine more closely the complex relationships between learning outcomes and smartphone use, considering elements like academic performance metrics, student engagement levels, and content delivery strategies. Furthermore, examining the effectiveness of technological interventions and pedagogical strategies in various learning environments would improve knowledge and direct the creation of evidence-based practices. Additionally, longitudinal research monitoring the long-term effects of



smartphone integration on digital literacy, educational equity, and student learning would offer important new perspectives on how education is changing in the digital age.

## Acknowledgement

**Author Contributions:** Conceptualization, methodology, validation, formal analysis; investigation; resources, writing—original draft preparation, writing—review and editing by all the authors with equal participation.

**Funding:** This research was not funded

**Informed Consent Statement:** Informed consent not applicable in the study.

**Data Availability Statement:** The data presented in this study are available on request from the corresponding author. The data are not publicly available due to restrictions.

**Conflicts of Interest:** The authors declare no conflict of interest.

## References

- Abousaber, I. (2023). Evaluating the digital divide between Saudi University academics and Gen Z students. *Journal of Southwest Jiaotong University*, 58(3).
- Adedoyin, O. B., & Soykan, E. (2023). Covid-19 pandemic and online learning: the challenges and opportunities. *Interactive learning environments*, 31(2), 863-875.
- Adekola, J., Dale, V. H., Gardiner, K., & Fischbacher-Smith, M. (2017). Student transitions to blended learning: an institutional case study. *Journal of Perspectives in Applied Academic Practice*, 5(2), 58-65.
- Ahmed, S., Noor, A. S. M., Chen, C.-L., Deng, Y., Mehmood, A., Ahmad, A., Uddin, M., & Reegu, F. (2023). Investigation a technology acceptance model (TAM) of e-learning in Higher Education Institutions (heis). *Mitteilungen Klosterneubg*, 63, 294-312.
- Ajani, O. A., & Maphalala, M. C. (2023). The impact of the COVID-19 pandemic on educational transformation in African higher education: a systematic literature review on rural universities. *International Journal of Research in Business and Social Science (2147-4478)*, 12(8), 445-453.
- Al-Adwan, A. S., & Al-Debei, M. M. (2023). The determinants of Gen Z's metaverse adoption decisions in higher education: Integrating UTAUT2 with personal innovativeness in IT. *Education and Information Technologies*, 1-33.
- Alenezi, M. (2021). Deep dive into digital transformation in higher education institutions. *Education Sciences*, 11(12), 770.
- Almaiah, M. A., Ayouni, S., Hajje, F., Lutfi, A., Almomani, O., & Awad, A. B. (2022). Smart mobile learning success model for higher educational institutions in the context of the COVID-19 pandemic. *Electronics*, 11(8), 1278.
- Alshurideh, M., Abuanzeh, A., Kurdi, B., Akour, I., & AlHamad, A. (2023). The effect of teaching methods on university students' intention to use online learning: Technology Acceptance Model (TAM) validation and testing. *International Journal of Data and Network Science*, 7(1), 235-250.
- Benavides, L. M. C., Tamayo Arias, J. A., Arango Serna, M. D., Branch Bedoya, J. W., & Burgos, D. (2020). Digital transformation in higher education institutions: A systematic literature review. *Sensors*, 20(11), 3291.
- Dollija, E., Teneqexhi, M., & Gura, S. (2023). Students' behavior and intention to use e-learning during the COVID-19 pandemic: A case of TAM through SEM analysis in Albania. *Journal of Education and e-Learning Research*, 10(4), 616-626.
- Efiloğlu Kurt, Ö. (2023). Learning with smartphones: the acceptance of m-learning in higher education. *Online Information Review*, 47(5), 862-879.
- Feng, X., & Yao, J. (2023). Role of information technology in blended learning, flipped learning and e-learning. *Soft Computing*, 1-14.
- Frawley, T., Goh, E., & Law, R. (2019). Quality assurance at hotel management tertiary institutions in Australia: An insight into factors behind domestic and international student satisfaction. *Journal of Hospitality & Tourism Education*, 31(1), 1-9.
- Ishak, N. M., Ranganathan, H., & Harikrishnan, K. (2022). Learning Preferences of Generation Z Undergraduates at the University of Cyberjaya. *Journal of Learning for Development*, 9(2), 331-339.
- Jurayev, T. N. (2023). The use of mobile learning applications in higher education institutes. *Advances in Mobile Learning Educational Research*, 3(1), 610-620.
- Kamaghe, J. S., Luhanga, E. T., & Michael, K. (2020). The challenges of adopting M-learning assistive technologies for visually impaired learners in higher learning institution in Tanzania.
- Kole, I. B., Vidyapeeth, D. P., Birajdar, S., & Kanki, N. A. (2023). Innovations in teaching pedagogy: for higher engagement with Millennials and GenZ. *The Online Journal of Distance Education and e-Learning*, 11(2).
- Kopp, M., Gröbinger, O., & Adams, S. (2019). Five common assumptions that prevent digital transformation at higher education institutions. *Inted2019 Proceedings*,
- Lötter, M. J., & Jacobs, L. (2020). Using smartphones as a social constructivist pedagogical tool for inquiry-supported problem-solving: An exploratory study. *Journal of Teaching in Travel & Tourism*, 20(4), 347-363.
- Marks, A., & Al-Ali, M. (2022). Digital transformation in higher education: A framework for maturity assessment. In *COVID-19 challenges to university information technology governance* (pp. 61-81). Springer.

- Matyokurehwa, K., Rudhumbu, N., & Mlambo, C. P. (2020). Intentions of First Year University Business Students to Use Smartphones as Learning Tools in Botswana: Issues and Challenges. *International Journal of Education and Development using Information and Communication Technology*, 16(1), 27-43.
- Mdletye, Z., & Usadolo, S. E. (2024). Using a Blended Learning Approach to Encourage Course Interaction in a First-Year Business Communication Module. *Research in Social Sciences and Technology*, 9(1), 185-212.
- Monteiro, A., Leite, C., & Lima, L. (2013). Quality of blended learning within the scope of the bologna process. *Turkish Online Journal of Educational Technology-TOJET*, 12(1), 108-118.
- Mugo, D. G., Njagi, K., Chemwei, B., & Motanya, J. O. (2017). The technology acceptance model (TAM) and its application to the utilization of mobile learning technologies.
- Onyema, E. M. (2019). Opportunities and challenges of the use of mobile phone technology in teaching and learning in Nigeria—a review. *International Journal of Research in Engineering and Innovation*, 3(6), 352-358.
- Parola, A., Di Fuccio, R., Marcionetti, J., & Limone, P. (2024). Digital games for career guidance: a systematic review using PRISMA guidelines. *Behaviour & Information Technology*, 43(3), 475-485.
- Rahim, M. N. (2019). The use of blended learning approach in EFL education. *International Journal of Engineering and Advanced Technology*, 8(5), 1165-1168.
- Reddy, E. V., Reddy, P., Sharma, B., Reddy, K., & Khan, M. G. (2022). Readiness and perception of pacific students to mobile phones for higher education. *Technology, Knowledge and Learning*, 1-20.
- Singh, M. K. K., & Samah, N. A. (2018). Impact of smartphone: A review on positive and negative effects on students. *Asian Social Science*, 14(11), 83-89.
- Tan, E., Wanganoo, L., & Mathur, M. (2023). Generation Z, sustainability orientation and higher education implications: An ecopedagogical conceptual framework. *Journal of Applied Learning and Teaching*, 6(1).
- Tawafak, R. M., Al-Rahmi, W. M., Almogren, A. S., Al Adwan, M. N., Safori, A., Attar, R. W., & Habes, M. (2023). Analysis of E-learning system use using combined TAM and ECT factors. *Sustainability*, 15(14), 11100.
- Turnbull, D., Chugh, R., & Luck, J. (2023). Learning management systems and social media: A case for their integration in higher education institutions. *Research in Learning Technology*, 31.
- Voicu, M.-C., & Muntean, M. (2023). Factors That Influence Mobile Learning among University Students in Romania. *Electronics*, 12(4), 938.
- Wali, A., & Omaid, M. (2020). The use of smartphones as an educational tool in the classroom: Lecturers' perceptions. *International Journal of Emerging Technologies in Learning (IJET)*, 15(16), 238-247.
- Xiao, J. (2019). Digital transformation in higher education: critiquing the five-year development plans (2016-2020) of 75 Chinese universities. *Distance Education*, 40(4), 515-533.

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