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Bridging the Digital Divide: Leveraging Mobile Technology to Transform Learning in ODEL Higher Education

Buhle Stella Nhlumayo*

Department of Educational Foundations, College of Education, University of South Africa, Pretoria, South Africa

**Corresponding author: nhlumbs@unisa.ac.za*

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Abstract: Students in Open and Distance e-Learning (ODEL) continue to experience digital inequalities related to device access, connectivity, and digital literacy. Guided by Digital Divide Theory and Mobile Learning Theory, this qualitative case study explored how mobile technology can help address the digital divide in ODEL higher education. Data were generated through an online focus group discussion with six purposively selected students from one ODEL university and analysed thematically. The findings revealed that mobile technology supports access, flexibility, and continuity of learning, while also transforming learning practices. However, economic and pedagogical challenges continue to limit their effectiveness. The study recommends mobile-first institutional strategies, digital literacy support, and professional development for academic staff to strengthen mobile-supported pedagogies and promote equitable learning opportunities.

Keywords: digital divide; Open and Distance e-Learning (ODEL); mobile learning; higher education; educational equity

INTRODUCTION

The rapid advancement of digital technologies has significantly reshaped higher education globally, altering how knowledge is accessed, constructed, and shared. Open and Distance e-Learning (ODEL) institutions have been at the forefront of this transformation, offering flexible learning opportunities to students who are geographically dispersed, employed, or otherwise unable to participate in traditional campus-based education (Akintolu & Letseka, 2024). By removing spatial and temporal barriers, ODEL has expanded access to higher education and contributed to widening participation. However, Maphosa and Bhebhe (2019) argue that the effectiveness of ODEL remains closely tied to students' access to and effective use of digital technologies, exposing persistent challenges associated with the digital divide. The digital divide refers to disparities in access to information and communication technologies (ICTs), as well as differences in digital skills, usage patterns, and learning outcomes (Rodgers, 2025; Bentley et al., 2024). Furthermore, Cele and Maphalala (2025) indicate that in ODEL contexts, these disparities are particularly pronounced, as teaching, learning, and assessment are predominantly mediated through online platforms. Students from socioeconomically disadvantaged backgrounds, rural areas, and marginalised communities often experience limited access to reliable internet connectivity, appropriate digital devices, and affordable data. These challenges can constrain students' participation, engagement, and academic success, undermining the equity-driven mission of ODEL institutions.

Mobile technology has emerged as a promising avenue for addressing aspects of the digital divide in higher education. The widespread availability of mobile phones, including smartphones, offers students more flexible and affordable access to learning resources than traditional desktop-based technologies. In their study on university students' engagement in mobile learning, Salhab

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and Daher (2023) observe that mobile devices enable students to engage with course content, communicate with peers and lecturers, and participate in learning activities across diverse contexts. For ODEL students balancing multiple responsibilities, mobile technology offers opportunities for continuity of learning and greater autonomy. Despite the growing presence of mobile devices, their pedagogical integration within ODEL institutions remains uneven. While many students use mobile technology informally for communication and content access, fewer studies have examined how mobile learning can be intentionally leveraged to transform pedagogical practices and promote equitable learning experiences. Existing research often focuses on technological adoption rather than on how mobile technologies can support meaningful engagement, collaboration, and learning transformation in distance education settings.

This study addresses this gap by examining how mobile technology can be utilised to bridge the digital divide and enhance learning in ODEL higher education. By foregrounding students' experiences, the study aims to deepen our understanding of how mobile technologies mediate access, engagement, and pedagogical practices within ODEL contexts. In doing so, this paper contributes to ongoing debates on digital equity, mobile learning, and the future of inclusive higher education.

Open and Distance e-Learning (ODEL) institutions have expanded access to higher education for students who are geographically dispersed, employed, or otherwise unable to attend traditional campuses. Despite this promise, students in ODEL contexts continue to face significant challenges related to the digital divide, including limited access to devices, unreliable internet connectivity, and gaps in digital literacy (Gasa, 2024). These disparities hinder students' ability to fully engage with online learning platforms, participate in collaborative activities, and benefit from flexible, mobile-mediated educational opportunities. Mobile technology offers a potential solution to these challenges by providing portable, flexible, and often low-cost access to educational content and learning activities. However, Memon and Memon (2025) argue that while mobile devices are increasingly ubiquitous, their integration into ODEL learning environments remains uneven, and their potential to bridge digital inequities and enhance learning outcomes has not been fully realised. Kyambade and Namatovu (2025) note that many ODEL institutions struggle to effectively implement mobile-supported pedagogies, and students often lack the necessary skills or guidance to leverage these tools for meaningful learning.

Consequently, there is a critical need to understand how mobile technology can be strategically leveraged to mitigate the digital divide, enhance student engagement, and transform learning experiences in ODEL higher education. Addressing this gap is essential to ensuring that ODEL institutions fulfil their mandate to provide equitable, accessible, and high-quality education to diverse student populations. The study was conducted at University of South Africa (UNISA), one of the largest open distance e-learning (ODEL) universities in Africa, which serves a diverse student population across different geographical, socio-economic, and technological contexts. As an ODEL institution, UNISA relies heavily on digital platforms and online learning systems to facilitate teaching and learning. However, Kulal et al. (2024) indicates that many students continue to experience challenges associated with unequal access to digital devices, internet connectivity, and digital literacy, which affect their participation and success in online learning environments. Against this background, the study aimed to explore how mobile technology can be leveraged to address the digital divide and transform learning in ODEL higher education. Guided by Digital Divide Theory and Mobile Learning Theory, the study responded to the following research question: *How can mobile technology be strategically utilised to mitigate the digital divide and enhance learning experiences in ODEL higher education?*

LITERATURE REVIEW

Theoretical Framework

This study is guided by Digital Divide Theory and Mobile Learning Theory, which together provide a robust lens for examining the role of mobile technology in ODEL higher education. Digital Divide Theory conceptualises disparities in access to and effective use of digital technologies, highlighting not only differences in connectivity and device availability but also gaps in digital

literacy, skills, and meaningful engagement (van Dijk, 2013). Within ODEL institutions, these disparities can limit students' opportunities to participate fully in mobile-mediated learning, exacerbating educational inequities. Mobile Learning Theory complements this perspective by emphasising the pedagogical and practical potential of mobile technologies to enhance access, flexibility, and student-centred engagement (Sharples & Spikol, 2017). Mobile learning enables students to engage with educational content across temporal and spatial boundaries, offering opportunities for self-directed learning, collaboration, and timely feedback. In the context of ODEL, mobile devices can therefore serve as both tools for bridging access gaps and platforms for fostering interactive, flexible learning experiences.

By integrating these two frameworks, this study examines how mobile technology can mitigate the digital divide while supporting meaningful, student-centred engagement in higher education. Digital Divide Theory provides an analytical lens for understanding access-related challenges, while Mobile Learning Theory highlights the potential of mobile technologies to transform learning experiences and promote educational equity within ODEL institutions.

The Digital Divide in Open and Distance e-Learning (ODEL) in Higher Education

The digital divide remains a persistent challenge in Open and Distance e-Learning (ODEL) higher education, despite significant advances in information and communication technologies. Initially conceptualised as disparities in physical access to digital devices and internet connectivity, the digital divide is now widely understood as a multidimensional phenomenon encompassing access, skills, usage, and outcomes (van Dijk, 2013). In ODEL contexts, where learning is largely mediated through digital platforms, these disparities have profound implications for student participation, engagement, and academic success (Tsindoli, 2025). In their study on the implications of the digital divide on rural students enrolled in ODEL institutions, Gasa (2024) argues that access-related challenges continue to affect many ODEL students, particularly those from socioeconomically disadvantaged and rural backgrounds. Moreover, Yeh and Tsai (2022) indicate that limited access to suitable devices, high data costs, unstable network coverage, and inconsistent electricity supply hinder students' ability to fully engage with online learning environments. While ODEL institutions are designed to widen participation, these structural barriers can inadvertently reproduce educational inequalities by privileging students with reliable technological access over those without.

Beyond access, Reddy and Babu (2024) mention that the second-level digital divide, often referred to as the skills or usage divide, poses significant challenges in ODEL higher education. Many students lack the digital literacy and self-regulated learning skills necessary to effectively navigate learning management systems, participate in online discussions, and access digital academic resources. Research suggests that without adequate institutional support, students' limited digital competencies can negatively affect motivation, persistence, and learning outcomes in distance education settings (Maphalala & Nkosi, 2025; Wong et al., 2025; Vaszkun & Mihalkovné Szakács, 2025). Furthermore, the digital divide in ODEL also extends to differences in the quality of learning experiences and outcomes. Students with greater digital proficiency and access are more likely to engage in interactive, collaborative learning activities, whereas those facing digital constraints often experience isolation and reduced academic engagement. These inequities highlight the need for ODEL institutions to move beyond assumptions of technological readiness and adopt inclusive strategies that address both structural and skills-based dimensions of the digital divide. Overall, the literature emphasises that addressing the digital divide in ODEL higher education is not solely a technological issue, but also a pedagogical and equity concern. Understanding the nature and impact of digital inequalities is, therefore, critical to informing strategies that leverage mobile technology to enhance access, participation, and learning transformation in ODEL contexts.

Mobile Technology as a Tool for Access and Equity in Higher Education

Mobile technology has increasingly been recognised as a powerful tool for expanding access and promoting equity in higher education, particularly within Open and Distance e-Learning

(ODEL) contexts. The widespread ownership of mobile phones, including smartphones, presents opportunities to mitigate certain aspects of the digital divide by enabling students to access educational resources without relying on fixed infrastructure, such as computer laboratories or high-speed broadband. Okai-Ugbaje et al. (2022) argue that for students facing geographical, financial, or temporal constraints, mobile devices offer flexible and often more affordable pathways to higher education. The literature highlights that mobile technology supports equitable access by enabling learning to occur across diverse contexts and schedules (Memon & Memon, 2025; Berdiyorovna & Uktamovna, 2025). Mobile devices enable students to download materials, participate in discussions, submit assessments, and communicate with peers and instructors asynchronously. In a study on flexible learning adaptability, Santiago et al. (2021) found that mobile phones provided flexible learning opportunities for students using various online platforms. This flexibility is particularly significant for ODEL students, who balance their studies with employment and family responsibilities. Additionally, the study found that smartphones and mobile applications emerged as the primary educational tools and e-learning resources utilised by participants. Askarovich (2024) indicates that when learning platforms are optimised for mobile use, students experience improved access to course content and greater continuity in their learning engagement.

In addition to institutional learning management systems, a range of mobile applications has been identified as supporting learning and academic engagement. Communication and collaboration applications, such as WhatsApp, Telegram, and Microsoft Teams, facilitate peer interaction, group discussions, and timely feedback, helping to reduce the isolation common among students in distance education (Motlhaka, 2021; Biliuk et al., 2023; Kimbi & Laurent, 2023). Content-access and productivity applications, including Google Classroom, Moodle mobile apps, Google Drive, and Microsoft OneDrive, enable students to access learning materials, manage assignments, and collaborate on shared documents. Furthermore, Chaithra and Sandhya (2020) assert that educational applications, such as YouTube, Coursera, Khan Academy, and Quizlet, support self-directed learning through video-based instruction, microlearning, and formative assessment tools.

Findings from a study by Memon and Memon (2025) revealed that mobile technology also enhances equity by supporting inclusive learning practices. Features such as offline access, multimedia content, and assistive functionalities (e.g., text-to-speech, captions, and adjustable text sizes) enable diverse students to engage with content in ways that suit their needs. However, the literature cautions that, although students may rely heavily on their smartphones (Banerjee, 2022), access to mobile devices alone does not guarantee equitable learning outcomes. Issues related to data affordability, digital literacy, and pedagogical integration remain critical considerations. Overall, research suggests that mobile technology holds significant potential to enhance access and equity in higher education when accompanied by supportive institutional policies, mobile-responsive course design, and guidance on effective educational app use. Strategically leveraging mobile technologies can therefore contribute to more inclusive and equitable learning experiences in ODEL higher education.

Pedagogical Transformation through Mobile Learning in ODEL Contexts

Mobile learning has been increasingly recognised as a catalyst for pedagogical transformation in Open and Distance e-Learning (ODEL) contexts, reshaping how teaching and learning are designed, delivered, and experienced. Unlike traditional e-learning models that often replicate teacher-centred approaches, mobile learning emphasises flexibility, student agency, and contextualised engagement, enabling pedagogies that extend beyond fixed institutional spaces (Okai-Ugbaje et al., 2022). In ODEL environments, where students are geographically dispersed, mobile technologies offer opportunities to transition from content transmission to more interactive and student-centred pedagogical practices. Jeong (2022) highlights that mobile learning supports active and self-directed learning by enabling students to access content, participate in discussions, and engage with learning activities at any time and from any location. This mobility facilitates microlearning, reflection, and just-in-time access to resources, which are particularly beneficial for adult students in ODEL contexts. Research suggests that mobile-enabled pedagogies enhance learner autonomy

and motivation by empowering students to control the pace, place, and pathways of their learning (Li & Lan, 2022; France et al., 2021).

Mobile learning also enables greater interaction and collaboration, addressing a longstanding challenge in distance education, which Uyun and Fitriani (2025) refer to as student isolation. Through mobile-supported communication tools and collaborative platforms, students can engage in peer discussion, group problem-solving, and knowledge sharing. These pedagogical practices align with social constructivist principles, which understand learning as a socially mediated process (Mishra, 2023). Pimmer et al. (2019) state that in ODEL settings, mobile learning thus facilitates the creation of virtual learning communities that support engagement and persistence. Furthermore, mobile technologies support multimodal and inclusive pedagogical approaches by enabling the use of various media, including text, audio, video, and interactive content. Such diversity in learning materials accommodates different learning preferences and enhances accessibility for students with varied needs. Studies indicate that when mobile learning is intentionally integrated into curriculum design, it can enhance learner engagement, facilitate formative feedback, and promote reflective practice.

Despite its transformative potential, the literature cautions that pedagogical change does not occur automatically through the adoption of technology. Effective mobile learning in ODEL contexts requires deliberate instructional design, academic support, and professional development for educators. Without pedagogical alignment, mobile technologies risk reinforcing passive learning practices. Consequently, mobile learning should be understood not merely as a technological innovation but as a pedagogical shift that can transform teaching and learning in ODEL higher education when strategically implemented.

METHOD

This study employed a qualitative case study design to explore how mobile technology can be leveraged to bridge the digital divide and transform learning in an Open and Distance e-Learning (ODEL) higher education context. A case study approach was chosen for its suitability in providing an in-depth understanding of complex phenomena within real-life contexts (Yin, 2018). A convenience sampling technique was employed to select one ODEL university in South Africa. The institution was selected because the researcher had easy access to it. A sample of six students was purposively selected based on their direct experience with mobile learning, ensuring that participants could provide rich insights into the challenges and opportunities of digital access and technology use. Data were collected through an online focus group discussion (FGD), which enabled participants to share experiences, reflect collectively, and generate interactive insights. The discussion was audio-recorded, transcribed verbatim, and analysed using thematic analysis, following the systematic steps of familiarisation, coding, and theme development (Braun & Clarke, 2006). Themes were iteratively reviewed to ensure they accurately represented participants' perceptions and experiences.

To ensure trustworthiness, ethical clearance (REF#2023/05/10/90522648/10/AM) was obtained from the relevant institutional review committee, and participants provided informed consent. Through an online meeting, member checking was conducted, allowing participants to verify the accuracy of the findings (McKim, 2023). Triangulation was applied by comparing focus group insights with relevant literature and theoretical frameworks (Natow, 2020). These measures enhanced the credibility, dependability, and validity of the study. This methodology provided a rich, contextualised understanding of how ODEL students experience mobile technology and how it can help bridge the digital divide.

Table 1 presents a demographic and contextual profile of the six student participants included in the study. The table outlines key characteristics relevant to understanding their mobile learning experiences in an ODEL context, including age, gender, programme, level of study, and years of enrolment. It also highlights important access-related variables, such as the primary device used for learning and the type of internet connectivity. These variables provide contextual insight into participants' technological access, socio-economic positioning, and engagement with mobile

learning, which are central to interpreting the study's findings on access, equity, and digital participation.

Table 1. Profile of the Participants

Participant	Age	Gender	Programme	Connectivity type	Primary device	Years in ODEL
Student 1	24	F	B.Ed.	M-data	Smart phone	3
Student 2	29	M	B.Ed.	Wi-Fi	Tablet	3
Student 3	32	F	B.Ed. Hons	Wi-Fi M-data	Tablet	2
Student 4	27	M	B.Ed. Hons	M-data	Smart phone	1
Student 5	35	F	B.Ed. Hons	Wi-Fi	Tablet	1
Student 6	30	M	B.Ed. Hons	M-data	Smart phone	2

Keys: B.Ed. Hons – Bachelor of Education Honours, F – Female, M – Male, M-data -Mobile data

RESULTS & DISCUSSION

Mobile Technology as an Enabler of Access and Continuity of Learning

The data revealed that participants found mobile learning provided the continuity they needed in their studies as distance education students. When responding and describing situations in which their mobile devices enabled them to continue learning despite challenges, students 1 and 3 indicated they could continue learning even when offline. This is what they said:

"Using my smartphone has enabled me to stay connected to my studies even when I don't have access to a computer or a stable internet connection. I can download learning materials when I have data and study offline later, which helps me keep up with my coursework despite connectivity challenges." (S1)

"My tablet has become my main learning tool. Even during power outages or network issues, I can still access messages, announcements, and recorded lectures. This helps me maintain continuity in my studies and reduces the stress of missing important information." (S3)

Student 2 reported that they could continue learning even while travelling or busy with other tasks. This was their view:

"Mobile technology allows me to continue learning wherever I am. Because I work full-time, I often study during breaks or while travelling. Having access to course content and communication tools on my phone means I don't fall behind when I'm unable to log in from home." (S2)

Overall, the findings under this theme underscore the critical role of mobile technology in mitigating structural and contextual barriers to learning within ODEL higher education. Drawing on digital divide theory, the participants' experiences illustrate how mobile devices help to narrow gaps in access related to infrastructure, geography, and socioeconomic constraints, even as broader inequalities persist. At the same time, insights from mobile learning theory highlight the affordances of portability, flexibility, and learner control, which enable students to sustain engagement with learning across diverse contexts and disruptions. Together, these perspectives suggest that mobile technology functions not merely as a supplementary tool, but as a central mechanism through which access to and continuity of learning are realised, particularly for students navigating constrained educational environments.

Affordability, Flexibility, and the Pragmatics of Mobile Learning

Mobile learning provides an affordable and flexible option for students, including those without laptops, as it is cost-effective for data and connectivity. When asked if they found mobile learning more flexible than other forms of online learning, this is what students had to say:

"Studying through my phone is more affordable for me than using a laptop because I can better manage my data usage. I mostly use mobile apps that don't consume much data, which makes it easier to continue studying without spending too much money." (S4)

"Mobile learning is practical because it fits into my daily routine. I don't always have access to a computer, but my tablet is always with me. This flexibility allows me to study at times that work for me, especially when balancing work and family responsibilities." (S5)

"Using mobile technology helps me adapt to my situation. Even when I can't afford constant internet access, I can download materials and use them later. This makes learning possible despite financial challenges and limited connectivity." (S6)

This theme highlights how affordability and flexibility shape students' everyday engagement with mobile learning in ODEL contexts. From a digital divide theory perspective, participants' accounts reveal that economic constraints, particularly data costs and device access, remain central determinants of who can participate fully in digital learning. However, mobile technology also emerges as a pragmatic response to these inequalities, enabling students to manage limited resources by selectively using data, accessing offline content, and relying on low-cost applications. In line with mobile learning theory, the findings demonstrate how the portability and adaptability of mobile devices support learning that is responsive to students' personal, social, and economic realities. Collectively, these insights suggest that while mobile learning does not eliminate the digital divide, it offers flexible and context-sensitive pathways that make participation in ODEL more attainable and sustainable for economically constrained students.

Transforming Learning Practices through Mobile Use

For participants, mobile learning has proved transformative, shifting learning from a largely passive, content-consumption activity to a more interactive, self-directed, and collaborative process, enabling greater engagement, continuous interaction, and active participation in their educational experiences. When asked whether using a mobile device has changed the way they learn, communicate, or collaborate with these were the responses:

"Initially, I used my phone solely to access notes and announcements, but over time, it evolved into a tool for active learning. I participate in discussion groups, watch recorded lectures, and use learning apps to revise, which has made me more engaged with my studies." (S2)

"Mobile learning has changed how I interact with my lecturers and classmates. Through apps like WhatsApp and the learning platform, I ask questions, share ideas, and get quick feedback. This makes learning more interactive compared to just studying on my own." (S3)

"Using my phone has helped me take more responsibility for my learning. I set reminders, search for additional resources, and collaborate with other students. It feels less like passively receiving content and more like actively participating in the learning process." (S6)

This theme illustrates how mobile technology extends beyond addressing access challenges to fundamentally reshaping how learning is experienced in ODEL contexts. While digital divide theory highlights persistent inequalities in access to digital resources, the findings suggest that mobile learning can partially offset these disparities by enabling more active and participatory forms of engagement. Drawing on mobile learning theory, participants' experiences demonstrate how mobile devices support learner agency, interaction, and collaboration through flexible, context-aware learning practices. Mobile technology thus facilitates a shift from access-oriented use toward meaningful engagement, where students not only consume content but also communicate, collaborate,

and take greater responsibility for their learning. These transformations point to the pedagogical potential of mobile learning to enhance both equity and quality in ODEL higher education.

Discussion

This study examined how mobile technology can be strategically leveraged to mitigate the digital divide in ODEL higher education, drawing on Digital Divide Theory and Mobile Learning Theory as interpretive frameworks. The findings reveal that mobile technology plays a multifaceted role in addressing access and affordability, and in transforming pedagogy, while also exposing persistent structural inequalities that continue to shape students' learning experiences. Mobile technology as an enabler of access and continuity of learning highlights the extent to which mobile devices function as critical gateways to educational participation. In line with Digital Divide Theory, participants' accounts demonstrate how mobile technology helps to narrow access gaps caused by geographical location, limited infrastructure, and unstable connectivity. While the digital divide is not eliminated, Anand and Krishnan (2026) observe that mobile devices provide alternative pathways for sustaining engagement with learning platforms and institutional communication. From a mobile learning theory perspective, the portability and ubiquity of mobile devices enable learning across time and space, supporting continuity that traditional, fixed technologies often cannot.

Affordability, flexibility, and the pragmatics of mobile learning underscore the economic realities that shape students' engagement with digital learning. Consistent with digital divide theory, affordability emerges as a central determinant of participation, particularly in relation to data costs and device ownership. However, participants also highlighted pragmatic strategies, such as selective data use, offline access, and reliance on low-bandwidth applications, which make mobile learning viable within constrained contexts. Mobile learning theory further illuminates how flexibility and student control enable students to adapt their learning to their personal, social, and economic circumstances, thereby reinforcing the role of mobile technology as a context-responsive learning tool.

Transforming learning practices through mobile use points to a shift from access-focused engagement to more active, participatory learning. While digital divide theory emphasises inequalities in access, the findings suggest that once access is established, mobile technology can facilitate deeper engagement through interaction, collaboration, and self-directed learning (Laubscher & Bosch, 2025). Drawing on Mobile Learning Theory, mobile devices support learner agency by enabling communication, resource sharing, and continuous engagement beyond formal learning spaces. This transformation highlights the pedagogical potential of mobile learning to enhance both equity and quality in ODEL higher education.

Collectively, these findings suggest that mobile technology holds significant promise for bridging aspects of the digital divide in ODEL contexts. However, its effectiveness depends on strategic institutional support, inclusive policy frameworks, and pedagogical practices that move beyond access to foster meaningful engagement and learning transformation.

Limitations of the Study

This study has several limitations that should be acknowledged. First, the use of a single case study limits the generalisability of the findings to other ODEL institutions, particularly those operating in different socio-economic or technological contexts. Second, the small sample size of six participants, while appropriate for in-depth qualitative inquiry, may not fully capture the diversity of student experiences within the institution. Additionally, reliance on a single online focus group as the primary data source may have constrained the depth of individual perspectives, as some participants may have been less inclined to share openly in a group setting. Finally, as the institution was selected through convenience sampling, contextual bias may have influenced the findings. Despite these limitations, the study offers valuable, contextually grounded insights into mobile learning in ODEL environments.

Recommendations and Implications for Practice

Based on the findings of this study, several practice-oriented recommendations emerge for ODEL institutions seeking to strategically leverage mobile technology to mitigate the digital divide and enhance learning outcomes.

- *Optimising Learning for Mobile Access:* First, institutions should adopt mobile-first policy and design approaches that recognise mobile devices as primary learning tools rather than supplementary technologies. This includes optimising learning management systems, digital content, and assessment platforms for mobile access, particularly in contexts where students have limited or inconsistent access to computers and broadband connectivity.
- *Improving Digital Access and Connectivity:* Addressing inequities in access and connectivity requires targeted institutional interventions. ODEL providers should explore partnerships with telecommunications companies to subsidise data costs, zero-rate educational platforms, and expand offline or low-bandwidth learning options. Such measures are critical for reducing the structural barriers that continue to limit students' participation and learning continuity in digitally constrained environments.
- *Building Digital and Mobile Learning Capacity:* The findings highlight the need for systematic support for students' digital literacy and mobile learning. Institutions should embed digital skills development within their orientation programs and ongoing academic support structures, focusing on how mobile technologies can be utilised for academic communication, collaboration, information evaluation, and self-regulated learning. Equally important is professional development for academic staff to strengthen their capacity to design and facilitate mobile-supported pedagogies that promote active engagement rather than passive consumption of content.
- *Strategic Integration of Mobile Learning:* Finally, ODEL institutions should integrate mobile learning into broader teaching and learning strategies, supported by clear guidelines and pedagogical frameworks. This includes aligning mobile learning practices with curriculum design, assessment strategies, and student support services to ensure coherence and sustainability. Collectively, these recommendations suggest that realising the transformative potential of mobile technology in ODEL higher education requires coordinated policy, pedagogical innovation, and capacity-building efforts that move beyond access toward inclusive and meaningful learning practices.

CONCLUSION

This study has demonstrated that mobile technology plays a multifaceted role in ODEL contexts: as an enabler of access and continuity, as a pragmatic and flexible learning tool, and as a catalyst for transforming learning practices. While mobile devices have significantly reduced barriers associated with distance and infrastructure, access alone does not guarantee meaningful learning. Their transformative potential depends on intentional pedagogical integration, institutional support, and equitable connectivity. The findings underscore that mobile learning in ODEL is not merely a technological adjustment but a strategic response to structural inequality. When supported by mobile-first design, data accessibility initiatives, digital literacy development, and coherent institutional frameworks, mobile technologies can shift learning from passive consumption toward active, collaborative, and self-directed engagement. Ultimately, bridging the digital divide in ODEL requires moving beyond viewing mobile technology as a stopgap solution. Instead, it should be embedded within systemic policy, curriculum, and pedagogical reform efforts aimed at fostering inclusive, sustainable, and context-responsive higher education.

DECLARATIONS

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Declaration of AI Use. During the preparation of this work, the author utilised ChatGPT (free version) and Grammarly to assist with text structuring, grammar correction, stylistic refinement, and overall language coherence. QuillBot was also employed to support paraphrasing. The author reviewed and take full responsibility for the accuracy and content and the entire manuscript.

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