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Empowering Students Through a Mobile Learning Masterclass in an Open Distance E-Learning Context: Design, Implementation, and Early Outcomes

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Abstract
Mobile learning is widely promoted as a practical route to broadening access and strengthening digital capability in higher education, particularly in open distance e-learning environments where students' connectivity, devices, and study contexts vary considerably. This study reports the design and implementation of a short, mobile-first masterclass delivered using a hybrid flexible model at a mega ODeL institution. Using a pre-post survey design complemented by open-ended responses, we examined changes in students' perceived digital literacy and digital self-efficacy following participation in the masterclass. Results indicate meaningful improvements in perceived capability and confidence for learning with mobile technologies, alongside high levels of satisfaction with the flexibility afforded by HyFlex participation. While outcomes are based on self-report and reflect short-term shifts, prior research has positioned digital self-efficacy as a key determinant of competent and sustained technology use, as well as a pathway to engagement in online learning. The paper discusses implications for scalable mobile learning support in resource-constrained settings and outlines next steps for integrating objective indicators, such as learning analytics and performance-based tasks, into future evaluations.

Keywords:
Mobile learning, HyFlex, Open distance e-learning, Digital literacy, Digital self-efficacy

1. Introduction

Higher education institutions increasingly rely on digital and mobile technologies to reach students, particularly within ODeL environments. In many sub-Saharan African contexts, however, structural constraints such as unstable connectivity, high data costs, and limited access to appropriate devices continue to shape students' learning opportunities and participation (Baidoo Anu et al., 2023; Moonasamy & Naidoo, 2022). These constraints can intensify transactional distance and disproportionately affect students whose engagement depends on consistent broadband access or ownership of laptops rather than more ubiquitous mobile devices.

Mobile learning presents a pragmatic response to these challenges, as smartphones are often students' primary, or only, means of accessing digital learning resources. However, access to mobile devices alone does not guarantee effective learning. Research consistently demonstrates that the educational value of mobile technologies depends on purposeful instructional design and structured learner support (Adzifome & Agyei, 2023; Rangel de Lazaro & Duart, 2023). Recent synthesis evidence further confirms that well-designed mobile learning interventions can produce meaningful learning gains across diverse educational contexts (Garzón et al., 2025).

Beyond technical access and design considerations, students' capacity to benefit from mobile learning is closely linked to the development of digital competence and motivational factors. In particular, digital self-efficacy has been shown to influence students' willingness to adopt, persist with, and effectively use digital tools for learning (Getenet et al., 2024; Ulfert Blank & Schmidt, 2022). Against this backdrop, the present study reports on the design and evaluation of a short Mobile Learning Masterclass implemented in an ODeL context, with the aim of strengthening students' perceived digital literacy and digital self-efficacy for mobile-enabled academic tasks. Accordingly, this study examines students' self-reported changes in digital literacy and self-efficacy, as well as their perceptions of the usefulness and accessibility of a mobile-first HyFlex delivery approach.

The paper addresses two research questions:

1. To what extent do students report changes in perceived digital literacy and digital self-efficacy after participating in the masterclass?
2. How do students describe the usefulness and accessibility of a mobile-first HyFlex delivery approach?

2. Literature review

Mobile learning in higher education has shifted from a supplementary practice to a strategic mode for enabling flexible access, content interaction, and collaboration, especially when embedded within online programmes (Rangel de Lazaro & Duart, 2023). Meta-analytic evidence suggests that mobile learning interventions are, on average, associated with improved learning outcomes, with benefits observable across various educational levels and disciplines (Garzón et al., 2025). Additionally, studies also highlight that design quality, facilitation, and contextual constraints, such as connectivity and platform usability, influence how students actually engage with mobile learning opportunities (Adzifome & Agyei, 2023). In African higher education contexts, the 'access divide' remains salient, with rural students often facing compounded barriers related to devices, network stability, and supportive infrastructure (Baidoo Anu et al., 2023; Moonasamy & Naidoo, 2022).

HyFlex pedagogy, offering students meaningful choices across in-person, synchronous online, and asynchronous pathways, has gained prominence as a flexible model for participation under varied constraints. Recent systematic reviews characterise HyFlex as promising but implementation-sensitive, requiring careful alignment of learning activities, technology support, and student guidance to avoid inequities between participation modes (Barr & Luo, 2025; Beatty, 2019). In large-scale HyFlex implementations, learning analytics can complement survey-based evaluations by providing behavioural traces, such as logins, completion pathways, and resource use, that help triangulate engagement and identify design elements that sustain participation (Yu, 2025).

A key mechanism for effective technology-supported learning is digital self-efficacy, which refers to students' confidence in their ability to use digital systems to accomplish learning tasks. Digital self-efficacy is widely described as a determinant of competent digital system use, and recent measurement work has emphasised its multidimensional structure and relevance for educational settings (Ulfert-Blank & Schmidt, 2022). Empirical evidence in online higher education indicates that digital literacy and self-efficacy are positively associated with online learning engagement, suggesting that capability-building interventions can plausibly act as precursor conditions for sustained behavioural change (Getenet et al., 2024).

3. Methodology

3.1 Conceptual and Theoretical Framework

This study is informed by mobile learning research, digital self-efficacy theory, and HyFlex pedagogy, which together frame the evaluation of students' experiences in a mobile-first open distance e learning context. Mobile learning research emphasises how the portability, connectivity, and learner-centred characteristics of mobile devices create affordances for learning across contexts when instructional design aligns with pedagogical goals and learner needs (Rangel de Lazaro & Duart, 2023). Digital self-efficacy,

grounded in social cognitive perspectives, emphasises individuals' beliefs in their ability to use digital tools effectively as a key determinant of engagement and sustained technology use for learning. Empirical studies have linked digital literacy and self-efficacy to higher levels of online engagement and persistence (Getenet et al., 2024). HyFlex pedagogy complements these perspectives by enabling flexible participation pathways while underscoring the importance of instructional alignment and learner support to ensure equitable experiences across modalities (Cumming et al., 2024). Together, these perspectives provide a coherent conceptual foundation for examining students' perceived changes in digital competence and self-efficacy, as well as their views on the usefulness and accessibility of a mobile-first HyFlex learning approach.

3.2 Research Design

The study employed a mixed-methods evaluative research design to examine students' experiences of a Mobile Learning Masterclass implemented in an open-distance e-learning context. This design aligned with the dual focus of the study, namely assessing changes in students' perceived digital literacy and digital self-efficacy, and exploring students' perceptions of the usefulness and accessibility of a mobile-first HyFlex delivery approach.

The intervention was conducted as an institutionally embedded educational initiative within the University of South Africa's Student Digital Resilience programme. As such, the research design prioritised ecological validity and scalability over experimental control. Rather than isolating causal effects, the study aimed to generate practice-oriented evidence regarding the feasibility and short-term outcomes of a large-scale mobile learning intervention in an ODeL setting.

3.3 Context and participants

The masterclass was implemented at the UNISA, a mega ODeL institution. Participants were adult students enrolled across multiple programmes who opted into the masterclass. Given the focus on scalable student support, recruitment was broad and open; therefore, the evaluation reflects a self-selected sample typical of voluntary academic development interventions. The Mobile Learning Masterclass had a total reach of 22,140 students, with students opting to attend the workshops online or in-person, through watching the recording of the workshops and or enrolling for the self-paced course see Figure 1 below.

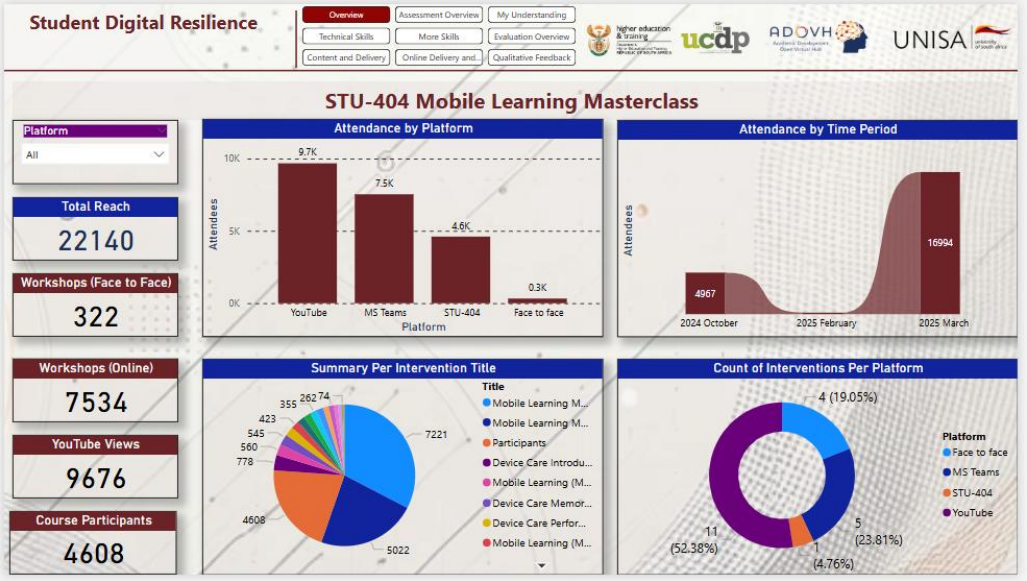

Figure 1. ***Student participation in the Mobile Learning Masterclass***

3.4 Intervention design

The masterclass followed a mobile-first design, with content optimised for low-bandwidth access, short learning objectives, and asynchronous completion using smartphones. Delivery followed a HyFlex structure, providing asynchronous modules, optional synchronous webinars, and downloadable resources to mitigate connectivity interruptions, in line with current HyFlex implementation recommendations (Barr & Luo, 2025). Learning activities focused on practical academic tasks, including accessing the learning management system via mobile devices, managing data usage, submitting assessments, and using communication tools responsibly for academic collaboration.

3.5 Data collection and instruments

Quantitative data were collected using pre- and post-intervention self-report surveys to capture changes in students perceived mobile learning competencies and confidence. Self-report measures were selected deliberately, as the study focused on learners' perceptions, beliefs, and readiness to engage with mobile-enabled learning tasks, constructs widely recognised as meaningful indicators of early-stage educational impact and technology adoption. Qualitative data were collected through open-ended survey responses and learner feedback, allowing for a deeper understanding of students' experiences with the HyFlex delivery model and their perceptions of the masterclass content's relevance.

3.6 Measures and analysis

Quantitative and qualitative data were analysed using complementary procedures aligned with the mixed methods evaluative design. Quantitative survey data were analysed descriptively using frequencies, percentages, and mean scores to examine patterns of perceived change in digital literacy and digital self-efficacy. Qualitative data were analysed thematically to identify recurring patterns related to the usefulness and accessibility of the mobile-first HyFlex delivery approach. During interpretation, findings from both data strands were integrated and considered alongside learning analytics from institutional platforms to support triangulation between self-reported perceptions and observed engagement patterns.

3.7 Ethical considerations

The study was conducted in accordance with UNISA's ethical guidelines for educational research. Participation was voluntary, informed consent was obtained, and all survey data were anonymised prior to analysis. The evaluation formed part of the approved monitoring and evaluation framework of the Student Digital Resilience Project.

4. Discussion

4.1 Strengthening Mobile Learning Readiness in ODeL Contexts

The findings of this study provide evidence that a short, mobile-first masterclass can positively influence students' perceived readiness for mobile-enabled learning in an open distance e-learning (ODeL) environment. In contexts where mobile devices are the primary or sole means of accessing higher education for students, supporting effective mobile use is a prerequisite for meaningful participation. The observed increases in perceived digital literacy and digital self-efficacy suggest that targeted, skills-focused interventions can help bridge the gap between device access and effective academic use. These findings align with synthesis research demonstrating that mobile learning interventions, when intentionally designed, can support learning engagement and outcomes across diverse higher education contexts (Garzón et al., 2025; Rangel-de Lazaro & Duart, 2023).

Importantly, this study extends existing mobile learning literature by providing empirical evidence from a large-scale intervention situated in a Global South ODeL institution an area that remains underrepresented in published research. By focusing on foundational mobile learning competencies rather than advanced technologies, the masterclass addressed a critical but often overlooked layer of digital inequality: students' capacity to translate mobile access into effective learning practices.

4.2 The Role of a Mobile-First HyFlex Delivery Approach

The mobile-first HyFlex delivery model played a central role in shaping students' experiences of accessibility and usefulness. Consistent with prior research, the provision of multiple participation pathways synchronous, asynchronous, and face-to-face appears to have reduced barriers associated with connectivity constraints, competing responsibilities, and geographical distance (Barr & Luo, 2025; Cumming et al., 2024). Qualitative feedback highlighted the particular value of asynchronous participation and practical, task-oriented guidance, suggesting that flexibility alone is insufficient without clear instructional structure and relevance to students' immediate academic needs.

These findings reinforce evidence that HyFlex pedagogy is effective when participation modes are equivalently supported and when learning activities are designed with learners' technological realities in mind. In this case, mobile-first design choices such as utilising low-bandwidth resources, providing step-by-step demonstrations, and employing device-agnostic tools directly addressed structural constraints commonly reported in sub-Saharan African higher education (Baidoo-Anu et al., 2023; Moonasamy & Naidoo, 2022). The results therefore support the argument that HyFlex approaches can promote inclusion in ODeL contexts when aligned with mobile learning principles rather than traditional desktop-centric assumptions.

4.3 Digital Self-Efficacy as a Precursor to Sustained Engagement

While the study does not claim direct measurement of long-term behavioural or academic outcomes, the observed shifts in perceived digital self-efficacy are nevertheless meaningful. Prior research consistently positions self-efficacy as a key determinant of technology adoption, persistence, and engagement in online learning environments (Getenet et al., 2024; Ulfert-Blank & Schmidt, 2022). From this perspective, increases in students' confidence to perform mobile learning tasks represent important precursor conditions for sustained engagement rather than trivial short-term effects.

The findings also suggest that practical, skills-based instruction may be particularly effective in enhancing self-efficacy among students who have access to digital tools but lack confidence in their academic use. In ODeL environments, where learners must independently navigate platforms and resolve technical challenges, such confidence gains may play a critical role in reducing disengagement linked to technological frustration or uncertainty.

4.4 Implications for Scalable Student Support Interventions

From an institutional perspective, the study highlights the potential of short, non-credit, mobile-first interventions as scalable mechanisms for supporting student success in digitally mediated learning environments. The combination of self-reported survey outcomes and complementary engagement indicators illustrates how evaluation data can inform iterative design improvements without requiring resource-intensive experimental designs. Prior work demonstrates that learning analytics can strengthen such evaluations by providing behavioural traces that complement learners' perceptions and help identify design elements associated with sustained participation (Yu, 2025).

Future iterations of the Mobile Learning Masterclass could therefore benefit from integrating learning analytics and brief performance-based tasks to triangulate perceived gains with observable learning behaviours. Such approaches would enable a more nuanced understanding of how mobile learning readiness translates into engagement with institutional platforms and academic activities over time.

4.5 Limitations and Future Directions

There are a few limitations that warrant consideration. First, the study relies primarily on self-reported data, which captures perceived change rather than objectively measured skill acquisition or academic performance. Second, participation in surveys was voluntary, resulting in uneven response rates between pre- and post-assessments. Third, the evaluation focused on short-term outcomes, leaving longer-term impacts on engagement and academic success unexamined.

Future research should adopt longitudinal designs that link mobile learning readiness to subsequent learning behaviours, such as assignment submission patterns, platform usage, and course completion. Additionally, differentiated learning pathways tailored to varying levels of prior digital competence, may enhance the effectiveness of future offerings. Despite these limitations, the study provides a robust foundation for understanding how mobile-first, HyFlex interventions can support digital readiness in ODeL contexts.

5. Conclusion

A mobile-first, HyFlex-enabled masterclass represents a feasible and scalable approach to strengthening students perceived digital literacy and digital self-efficacy in ODeL contexts. In settings characterised by persistent access constraints, particularly in sub-Saharan Africa, support initiatives that explicitly design for mobile realities can help reduce participation barriers and enhance digital readiness. Future research should extend beyond self-report measures by incorporating behavioural and performance-based indicators and by examining longer-term academic outcomes

6. References

Adzifome, N. S., & Agyei, D. D. (2023). Learning with mobile devices: Insights from a university setting in Ghana. *Education and Information Technologies, 28*, 3381–3399. https://doi.org/10.1007/s10639-022-11300-4

BaidooAnu, D., Gyamerah, K., & Munezhi, M. (2023). Digital divide in higher education in Sub-Saharan Africa: Evidence from online learning during the COVID-19 pandemic. *SN Social Sciences, 3*, Article 122. https://doi.org/10.1007/s43545-023-00717-4

Barr, T., & Luo, T. (2025). HyFlex course design: Outcomes, challenges, and supports for students and instructors. *Journal of Computing in Higher Education*. Advance online publication. https://doi.org/10.1007/s12528-025-09452-6

Beatty, B. J. (2019). Teaching a hybrid-flexible course. In B. J. Beatty (Ed.), *Hybrid-flexible course design: Implementing student-directed hybrid classes* (pp. 104–115). EdTech Books. https://edtechbooks.org/hyflex/hyflex_course_design

Creswell, J. W., & Creswell, J. D. (2023). *Research design: Qualitative, quantitative, and mixed methods approaches* (6th ed.). SAGE.

Cumming, T. M., Han, C., & Gilanyi, L. (2024). University student and instructor experiences with HyFlex learning: A scoping review. *Computers & Education: Open, 5*, Article 100229. https://doi.org/10.1016/j.caeo.2024.100229

Garzón, J., Burgos, D., Kinshuk, & Tlili, A. (2025). Mobile learning significantly enhances student learning gains: A meta-analysis and research synthesis. *Computers & Education, 238*, 105415. https://doi.org/10.1016/j.compedu.2025.105415

Getenet, S., Cantle, R., Redmond, P., & Albion, P. (2024). Students' digital technology attitude, literacy, and self-efficacy and their effect on online learning engagement. *International Journal of Educational Technology in Higher Education, 21*, Article 3. https://doi.org/10.1186/s41239-023-00437-y

Mahrishi, M., Abbas, A., Siddiqui, M. K., & Aladhadh, S. (2025). The genesis and prevalence of the HyFlex model: A systematic review and bibliometric analysis. *International Journal of Educational Research Open, 8*, 100410. https://doi.org/10.1016/j.ijedro.2024.100410

Moonasamy, A. R., & Naidoo, G. M. (2022). Digital learning: Challenges experienced by South African university students during the COVID-19 pandemic. *The Independent Journal of Teaching and Learning, 17*(2).

Rangel de Lazaro, G., & Duart, J. M. (2023). Moving learning: A systematic review of mobile learning applications for online higher education. *Journal of New Approaches in Educational Research, 12*(2), 198–224. https://doi.org/10.7821/naer.2023.7.1287

Ulfert Blank, A. S., & Schmidt, I. (2022). Assessing digital self-efficacy: Review and scale development. *Computers & Education, 184*, 104626. https://doi.org/10.1016/j.compedu.2022.104626

Yu, J. (2025). Integrating actionable analytics into learning design for MOOCs: A design-based research. *Journal of Computing in Higher Education, 37*, 993–1031. https://doi.org/10.1007/s12528-024-09413-5