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Wired for Success: Curriculum-Driven Digital Literacy for First-Year Students in Open Distance Learning

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Abstract: In Open Distance Learning (ODL), digital literacy is essential for student success in a technology-driven learning environment. Embedding digital literacy into the first-year curriculum is critical for developing foundational competencies and bridging skill gaps among remote learners. This study explores the impact of a curriculum-integrated digital literacy programme on equipping first-year students with essential digital skills at a distance education institution. The purpose of this study was to investigate the impact of curriculum-driven digital literacy initiatives on students' digital competencies and engagement with online learning platforms. A qualitative approach, informed by constructivist learning theory, was employed to gather in-depth insights from 20 purposively selected first-year students enrolled in a digital literacy training programme. Data were collected through semi-structured interviews and focus group discussions and were analysed thematically. Findings revealed that students experienced enhanced confidence, improved critical thinking, and increased proficiency in navigating various digital tools. However, persistent challenges included inconsistent training delivery and limited ability to critically evaluate online content, which undermined the full potential of the programme. The study underscores the importance of systematically integrating digital literacy into early academic curricula to foster student agency and technological competence in ODL settings. Institutions must ensure consistent delivery and targeted support to maximise programme effectiveness. It is recommended that higher education institutions adopt standardised, scaffolded digital literacy frameworks that are embedded within the curriculum. Additionally, providing ongoing support, structured evaluation tools, and hands-on digital engagement activities will further strengthen student outcomes. Future studies should investigate the long-term impact of such interventions on academic success and digital resilience in ODL contexts.

Keywords: curriculum integration; digital literacy; distance education; first-year students

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Introduction

In today's rapidly evolving digital era, higher education institutions, particularly those operating in Open Distance Learning (ODL) environments, face growing responsibility not only to impart

traditional academic knowledge but also to equip students with the digital competencies essential for success in both academic and professional spheres. The ability to engage critically with digital tools, assess digital content effectively, and apply technological skills across diverse contexts has become a cornerstone of 21st-century learning. As society becomes increasingly dependent on digital platforms for communication, collaboration, research, and innovation, digital literacy is no longer an optional supplement but a fundamental necessity. The concept of digital literacy originates from the broader notion of literacy, which has historically been confined to reading and writing. However, the rise of computers and the internet in the late 20th century expanded this scope to include the ability to interact meaningfully with digital technologies. According to Gonzalez-Mohino et al. (2023), digital literacy has evolved from being about the functional use of digital tools to encompassing the capacities for critical and ethical evaluation of digital information. This reflects a broader trajectory in the literature, following earlier definitions, most notably those of Bozeman et al. (2001), which emphasised technical ability but has since expanded to include cognitive, evaluative, and social dimensions

The digital landscape has since grown in complexity with the emergence of Web 2.0, mobile technologies, and artificial intelligence, necessitating a more nuanced and integrated approach to digital engagement (Alam & Mohanty, 2023). Despite these technological advancements, a persistent gap remains between students' everyday digital use and the skills required for academic and professional tasks (Singun, 2025). Several studies have highlighted the digital skill disparities faced by students, particularly those from underserved or rural backgrounds. Deng and El Hag (2024) examine how educational inequalities intersect with digital access, revealing significant gaps in students' preparedness for digital academic tasks. Similarly, Gutiérrez-Ujaque (2024) underscore the uneven development of digital literacy among university students, noting that many enter higher education without the critical digital skills needed for effective learning. Memon and Memon (2025) further emphasise that students' digital competence is strongly influenced by socioeconomic factors, which can hinder equitable participation in digitally mediated learning environments.

Limited digital competence among students from rural or underserved areas highlights a critical issue known as the digital divide, which refers to the disparity between individuals who have reliable access to digital technologies and the necessary skills to utilise them effectively, and those who do not (Han & Kumwenda, 2025). This divide extends beyond mere access to devices and internet connectivity; it also encompasses essential aspects of digital literacy required for academic success, including the ability to engage with educational technologies, navigate online learning resources, and participate in digitally mediated communication and collaboration (Upadhyaya, 2024). Addressing this divide is imperative, as a significant number of students enter higher education inadequately prepared to meet the digital demands of contemporary academic environments. In the context of ODL, where digital platforms serve as the primary medium of instruction, the consequences of limited digital literacy are even more pronounced. The COVID-19 pandemic further exposed this vulnerability. As Ndibalema (2025) highlights, the shift to fully digital learning environments revealed systemic gaps in digital preparedness and underscored the urgent need for targeted interventions. Many institutions adopted digital tools reactively, but few implemented cohesive strategies to integrate digital literacy as a core academic competence, especially in the early stages of a student's academic journey (Quraishi et al., 2024).

The problem this article explores is the inadequate integration of comprehensive digital literacy frameworks within the ODL curricula, particularly for first-year students. These students are especially vulnerable to digital exclusion, as they are in the early stages of transitioning into higher education and are often required to engage with unfamiliar digital platforms and academic technologies without sufficient preparation or structured support (Han & Kumwenda, 2025; Upadhyaya, 2024). Their limited prior exposure to digital learning environments, especially among those from underserved educational backgrounds, places them at a distinct disadvantage in navigating the demands of ODL systems. The problem this article explores is the inadequate integration of comprehensive digital solutions. The purpose of this study is to explore, assess, and advocate for curriculum-embedded digital literacy development for first-year students in ODL contexts. ODL refers to a mode of education that combines the principles of openness. It is designed to provide access to education for diverse, often geographically dispersed, student populations through the use of printed materials, online platforms, and other digital technologies (Ndibalema, 2025). In such environments, students are expected to take greater responsibility for their own learning, often navigating digital tools and content with limited direct support. Therefore, digital literacy is not merely a supplementary skill but a foundational competency for academic participation and success. By focusing on first-year students, many of whom may be unfamiliar with digital learning environments or lack adequate technological preparation, this study highlights the urgent need to

embed digital literacy systematically within ODL curricula to promote equity, access, and meaningful learning engagement.

The following research questions guided this study:

- What barriers do first-year students in ODL settings face in accessing and using digital tools essential for curriculum-integrated learning?
- How do first-year ODL students experience and perceive the effectiveness of existing digital literacy training embedded in their academic programmes?
- In what ways does curriculum-embedded digital literacy support influence the academic confidence, critical engagement, and psychological well-being of first-year students in ODL settings?

Literature review

Digital literacy has progressed well beyond the realm of basic technical proficiency to encompass a multidimensional set of cognitive, communicative, and ethical capabilities necessary for effective engagement in digital learning environments. Ng et al. (2023) assert that digital literacy encompasses not only the operational use of digital tools but also the ability to critically assess online information, communicate effectively in virtual settings, and participate responsibly within digital spaces. In contemporary higher education, digital literacy is increasingly regarded as a foundational academic competency integral to student engagement, academic success, and lifelong learning (Wei, 2024). This imperative is particularly pronounced in ODL, where students are expected to engage with digital platforms as their primary means of accessing course content, interacting with peers and lecturers, and managing their learning processes autonomously. As Chawla et al. 2024 aptly states, "digital literacy is no longer a luxury or an add-on; it is a foundational enabler of academic success, equity, and employability in the 21st century." Understanding how digital literacy is conceptualised and operationalised within ODL contexts, therefore, forms the conceptual anchor of this study.

In recent years, there has been growing recognition of digital literacy as a vital enabler of academic success in higher education. However, several studies continue to highlight the inconsistent and often inadequate integration of digital competencies within university curricula, particularly in ODL environments. According to Gudmundsdottir and Hatlevik 2020 Van De Werfhorst et al. (2022), disparities in digital readiness persist among first-year university students, with those from rural and underserved communities facing the most significant challenges. These inequities are exacerbated by the fragmented implementation of digital literacy initiatives across institutions. While digital literacy frameworks exist, they are often delivered as one-off workshops or non-compulsory modules rather than systematically embedded within the academic curriculum (Han & Kumwenda, 2025). This disjointed approach limits students' opportunities to develop and apply digital competencies in meaningful, course-related contexts. As a result, many first-year students enter the digital learning space underprepared and structurally disadvantaged. As Chawla (2024) aptly states, "digital literacy is no longer a luxury or an add-on; it is a foundational enabler of academic success, equity, and employability in the 21st century." In this study, the lack of curriculum-integrated digital literacy is conceptualised as a systemic and structural issue within higher education, one that calls for deliberate, embedded solutions rather than peripheral interventions.

Digital literacy is operationalised through a blended framework that draws on Ng et al.'s (2023) three-dimensional model comprising technical, cognitive, and socio-emotional competencies alongside selected elements from the European Commission's Digital Competence Framework. This combined model offers a comprehensive and contextually relevant lens through which digital literacy can be understood and assessed within academic settings. Specifically, it allows for the evaluation of students' functional ability to use digital tools (technical), their capacity to critically engage with digital content (cognitive), and their aptitude for ethical, responsible, and collaborative digital engagement (socio-emotional). Curriculum integration, in this context, refers to the intentional embedding of digital literacy within course content, assessments, and intended learning outcomes, positioning it as a core academic competency rather than a peripheral or standalone skill (Choudhary, 2024). ODL, as conceptualised in this study, denotes higher education modalities where teaching and learning are primarily facilitated through digital technologies, often characterised by limited or no face-to-face interaction. By clearly defining these key constructs, the study establishes a coherent analytical framework that ensures the examination of curriculum design, policy relevance, and student preparedness is both focused and replicable.

This study is situated within the broader landscape of post-secondary education in digitally unequal environments, with a specific focus on institutions located in the Global South. In these settings, many students enter

university having had limited or inconsistent access to the internet, digital devices, or formal digital skills training, factors that intensify pre-existing educational inequalities (Deng & El Hag, 2024). These challenges are particularly pronounced in ODL institutions, where the pedagogical model often presumes a foundational level of digital readiness that is misaligned with the lived realities of a significant portion of the student population. First-year students represent a critical demographic within this context. As newcomers to higher education, they are expected to engage in self-directed, digitally mediated learning from the outset, frequently without adequate institutional support or scaffolding (Mekheimer, 2025). This contextual backdrop underscores the pressing need for curriculum-level interventions that integrate digital literacy as a core academic competency. Accordingly, the study positions itself as a timely and necessary contribution to the ongoing discourse on equity, access, and student success in digitally driven higher education environments.

Theoretical framework

This study is grounded in Constructivist Learning Theory, which posits that students are not passive recipients of information but active participants in the construction of knowledge. According to Chuang (2021), knowledge is built through processes of experience, reflection, and interaction with one's environment, as students connect new information to their prior understanding. This theory emphasises the importance of student agency, contextual relevance, and the social negotiation of meaning principles that are particularly relevant in ODL environments where digital platforms mediate most learning experiences. In digitally mediated settings, students are often required to navigate unfamiliar tools, interpret online content independently, and collaborate with peers through asynchronous platforms. These dynamics align closely with the constructivist emphasis on active learning, scaffolded support, and the co-construction of knowledge (Kharroubi & ElMediouni, 2024). Constructivism, therefore, provides a critical lens for understanding how first-year students develop digital competencies in curriculum-embedded contexts that assume a certain degree of digital readiness. To reinforce theoretical consistency and methodological rigour, Constructivist Learning Theory also guided the data analysis process. Thematic analysis, as conducted in this study, followed the framework established by Braun and Clarke 2006, while incorporating a constructivist epistemological stance (Byrne, 2022). In particular, the coding process privileged themes that reflected participants' acts of meaning-making, such as their reflections on digital learning, adaptive strategies in using unfamiliar tools, and peer collaboration within virtual learning environments. This approach enabled the study to move beyond surface-level description toward an interpretive understanding of how students construct digital literacy in relation to their academic identities and social contexts. As Creswell (2022) affirms, qualitative inquiry is most effective when interpretive frameworks are explicitly tied to both research design and analysis. By foregrounding constructivism, the study remained analytically aligned with its central research aim: to explore how first-year ODL students experience and perceive the effectiveness of existing digital literacy training embedded in their academic programmes. This theoretical framing not only deepens the insights gained but also supports the transferability of findings to similar educational contexts that rely on student agency and digital engagement.

Method

This study employed a qualitative research design to explore how first-year students in an ODL context engage with curriculum-driven digital literacy initiatives. Given the complexity and contextual nature of digital engagement in ODL environments, a qualitative approach was most suitable for capturing the lived experiences, perceptions, and developmental trajectories of students as they navigate structured digital literacy interventions. ODL refers to a mode of education that combines the principles of open learning, distance education, and digital delivery to provide flexible, student-centred learning opportunities often to geographically dispersed or non-traditional learners (Barbour & Wenmoth, 2025). These environments rely heavily on digital platforms, asynchronous communication, and self-directed learning, which makes digital literacy not only beneficial but essential for student success. This study employed a purposive sampling strategy to select participants who had engaged in a curriculum-integrated digital literacy programme at a South African higher education institution offering ODL. This method was chosen to ensure the inclusion of information-rich cases, focusing on students with direct experience with structured digital literacy instruction. The sample consisted of 20 first-year students from diverse academic disciplines, each having completed at least one semester of embedded digital literacy coursework. Their active engagement with digital learning platforms made them well-positioned to reflect on both the challenges and benefits of digital learning within ODL environments.

Purposive sampling is particularly well-suited for qualitative research that aims for in-depth, context-specific insights rather than broad generalisations (Campbell et al., 2020). By selecting participants with meaningful exposure to digital literacy training, the study explored how students navigate key aspects of digital learning, including accessibility, critical engagement, and self-directed study. This methodological approach offered a rich understanding of how first-year students perceive and respond to digital literacy initiatives, yielding insights with significant implications for curriculum development, pedagogical strategies, and institutional policy in digitally mediated higher education contexts. Data for this study were generated through semi-structured interviews and focus group discussions, enabling the exploration of both individual experiences and collective reflections on curriculum-driven digital literacy among first-year students in an ODL context. The interviews allowed participants to share personal and in-depth perspectives, while the focus groups fostered interaction, dialogue, and shared experiences, enriching the overall dataset. These methods offered the flexibility to probe emerging themes and explore complex issues as they arose. All interviews and discussions were conducted in English, with sessions lasting between 45 and 60 min, and were audio-recorded with the participants' informed consent.

Prior to data generation, the purpose and objectives of the study were clearly communicated to all participants. They were informed that their participation was entirely voluntary, and they retained the right to withdraw at any time. Each participant received a letter of information outlining the nature of the research, associated risks, and anticipated benefits. A consent form was signed by each participant, affirming their understanding of the ethical considerations guiding the study. As Xu et al. (2020) emphasise, ethical research demands ongoing transparency, negotiation, and informed consent. In alignment with these principles, the researchers adhered to strict confidentiality and anonymity protocols to protect the identities and responses of participants. This ethical rigour not only ensured participant protection but also strengthened the credibility and integrity of the findings by fostering an environment of trust and openness, which is essential for eliciting authentic and meaningful data. The generated data were analysed using thematic analysis, guided by Braun and Clarke's (2006) six-phase framework: (1) familiarisation with the data, (2) generation of initial codes, (3) searching for themes, (4) reviewing themes, (5) defining and naming themes, and (6) producing the report. This systematic approach enabled the researcher to identify recurring patterns, challenges, and insights related to students' digital literacy journeys in an ODL setting. The qualitative data were organised and coded using NVivo software, which enhanced analytical efficiency and rigour. As noted by Braun and Clarke (2006), thematic analysis offers a flexible yet robust method for interpreting qualitative data, particularly when examining experiences across diverse contexts. The analysis revealed that while students recognised the importance of digital literacy for academic performance and future employability, they also faced significant barriers, including insufficient training, limited access to digital tools, and institutional constraints. These findings reinforce the need for coherent, curriculum-integrated digital literacy programmes, particularly within ODL institutions, to support student preparedness for the demands of a digitally driven world.

Findings and discussion

The following themes emerged from the participants' responses.

Theme 1: Limited access to digital tools and infrastructure – a call for a digital equity mandate

Participants in this study identified limited access to digital tools and infrastructure as a significant barrier to engaging with digital literacy initiatives in the ODL context. This issue highlights the urgent need for institutions to adopt a digital equity mandate that ensures all students have equitable access to essential digital resources.

Participant A shared, "*I do not have a laptop, so I rely on my phone for assignments, which makes it very hard to type long essays or use advanced features like referencing tools*." Participant B added, "*The Wi-Fi in the dorms is too weak, especially during peak hours, and sometimes I cannot even download notes or attend online classes*." Others described persistent limitations within institutional facilities, *"We have a computer lab, but there are not enough machines for everyone,"* said Participant C. Participant D noted the delays this causes: "*I sometimes have to wait two hours to get a turn on the computer*." Basic infrastructure was also unreliable, with Participant E observing, *"The printers are often out of order, making it even more challenging to submit assignments."*

Such testimony illustrates the consequences of infrastructural neglect. In a digital-first ODL model, the absence of reliable access to laptops, internet, and digital platforms is not a peripheral issue; it undermines the very foundation of equitable academic participation. As Jamil (2021) notes, digital inequality mirrors broader

socioeconomic disparities, while Mulaudzi (2024) highlights how institutions in rural or under-resourced areas often lag in digital provision. Gbadebo (2024) further emphasise that infrastructure deficits continue to be a global barrier to equitable digital learning. Anggraini and Anindyntha 2025 argues that this "digital poverty" limits students' participation in online learning and reinforces academic marginalisation.

Recognising digital access as a foundational component of academic success is increasingly vital in today's higher education landscape. Essential tools, such as laptops, reliable internet connectivity, and IT support, must be viewed not as supplementary aids but as core educational provisions on par with libraries and textbooks (Jamil, 2021). When such access is inconsistent, digital literacy initiatives—no matter how well-intentioned—risk becoming exclusionary, as they privilege students who already possess the necessary resources. The implications of this disparity are far-reaching: students lacking adequate digital tools may be forced to use smartphones for complex assignments, struggle with unstable internet connections, and face heightened risks of academic misconduct due to time constraints and limited access to credible sources (Anggraini, 2025). Embedding a digital equity mandate into institutional policy is therefore essential. By ensuring every student has equitable access to devices, data, and support, universities can foster inclusive, ethical, and practical digital literacy programmes that prepare all learners—regardless of socioeconomic background—for meaningful academic participation and long-term success in a digitally driven world.

Theme 2: Gaps in digital literacy training

Participant E articulated this gap clearly, "*We had one computer class in the first year, and that was it. After that, we were expected to know everything*." When digital training was suddenly halted, many students were unprepared to use the more advanced tools they needed for their academic work. As Participant E further noted, "*It feels like we were just thrown into it, without the necessary support to build our digital competence*." This highlights the disconnect between introductory sessions and the practical, evolving digital skills needed throughout students' academic development.

Participant F emphasised the lack of structured guidance in navigating digital platforms, stating, "*Nobody teaches us how to use learning platforms like Moodle or Blackboard properly. We are just expected to figure it out*." This unstructured approach results in students experiencing digital learning as fragmented and overwhelming. Similarly, Participant G remarked, "*Lecturers assume we already know how to use these tools, but many of us never used them in high school*." This reveals a critical gap in digital preparedness between secondary and higher education systems, where assumptions of prior knowledge may exclude students from effective learning engagement.

Participant H critiqued the current support interventions, saying, "*The workshops are too short to really learn anything practical. I forget most of it after a week*." This highlights the inadequacy of one-off training, which lacks the reinforcement necessary for sustained digital competency.

The findings highlight a broader challenge: digital literacy support in ODL settings is often inconsistent, superficial, and fails to meet the developmental needs of students. As Azionya and Nhedzi (2021) argue, such gaps can severely limit students' capacity to engage meaningfully with technology-enhanced learning. Ng 2012; Ng 2012 further emphasises that digital literacy extends beyond tool usage; it involves the critical and contextual application of digital skills in real academic settings. One-off training efforts overlook this principle, leaving students reliant on inefficient trial-and-error approaches.

Anthonysamy et al. (2020) contend that universities must move beyond surface-level digital orientations and embed digital literacy across academic programmes. Aimicheva et al. (2019) advocate for a spiral curriculum that gradually builds and deepens digital skills over time. Falloon (2020) similarly recommends integrating digital competencies into the curriculum to ensure that students develop skills directly relevant to their academic fields.

Inconsistencies in digital literacy training present significant challenges to both academic integrity and students' preparedness for professional environments. Without the ability to navigate academic platforms, critically evaluate information, and effectively utilise digital tools, students are more prone to plagiarism, reliance on unreliable sources, and superficial learning approaches, all of which diminish the quality of their academic work and hinder the transfer of skills to the workplace. As Azionya and Nhedzi (2021) argue, fragmented or minimal digital support fails to develop the advanced digital literacies essential for meaningful academic participation. Similarly, Ng (2012) emphasises that digital literacy must extend beyond basic tool usage to

encompass thoughtful and contextual application within academic tasks. To address this, universities must shift from one-off digital orientations to comprehensive, curriculum-integrated instruction that is scaffolded across modules and academic years. Anthonysamy et al. (2020) reinforce this view by advocating for digital literacy as a longitudinal competency, while Aimicheva et al. (2019) propose a spiral curriculum that gradually builds digital skills with increasing complexity. Falloon (2020) further emphasises the importance of embedding digital competencies within disciplinary teaching to ensure that students acquire relevant and transferable skills aligned with both academic and professional demands.

Theme 3: Increased academic confidence through digital literacy

Participant I shared, *"Using referencing tools like Zotero made my assignments easier and more accurate because I did not have to worry about the formatting."* Similarly, Participant J stated, *"I can now search scholarly articles on databases confidently, which helps me do better research."* Such comments illustrate how technical digital skills—especially those linked to academic research—empowered students to work more independently and efficiently. Other participants emphasised the impact of digital tools on organisation and time management: *"Digital skills helped me stay organised and meet deadlines,"* said Participant K, while Participant L reflected, *"Knowing how to use online tools made me feel more competent academically. I do not feel lost anymore."*

These findings reflect broader trends identified in the literature. Yuan et al. (2024) found a link between higher digital literacy and increased academic self-efficacy and independence. Vodă et al. (2022) argue that digital literacy not only supports academic tasks but also nurtures transferable graduate attributes such as creativity and analytical thinking. Djunaedi et al. (2023) further highlight how digital literacy shifts learners from passive consumption to active engagement—an essential disposition in ODL settings.

Digital literacy plays a crucial role in academic empowerment, enabling students to navigate technology-rich learning environments with confidence and competence. Carabregu-Vokshi et al. (2024) affirm that students with stronger digital skills engage more meaningfully in online and blended learning. However, while structured interventions build functional competence—such as using referencing tools, managing academic tasks, and accessing databases—they often fall short in fostering critical digital literacy. As Theme 3 reveals, many students feel confident using digital tools but lack the evaluative skills needed to assess credibility, identify misinformation, or engage ethically with digital content. This disconnect poses risks to academic integrity and weakens students' preparedness for professional contexts. Despite gains in procedural knowledge, the inability to critically engage with information may result in unintentional plagiarism, poor source selection, and limited academic judgement. Scholars such as Kumar and Jere (2023), Moradi et al. 2024, and Mulaudzi (2024) argue that digital literacy must move beyond basic tool use toward integrated, discipline-specific instruction that develops ethical reasoning and critical thinking. Without this shift, students may remain functionally capable but critically unprepared, undermining both their academic development and their ability to succeed in increasingly complex digital professional landscapes.

Theme 4: Difficulty evaluating online information

Participant M noted, *"It is hard to know which sources are trustworthy online, especially when everything looks professional."* Participant N added, *"I sometimes use information from blogs or websites without checking if it is academic enough because I do not know how to evaluate them."* These remarks highlight a widespread uncertainty in distinguishing peer-reviewed content from non-scholarly or misleading sources. Participant O was more explicit: *"We are not taught how to evaluate digital content critically, so I just go with what seems right."* Similarly, Participant P recounted an instance where they were misled by an unauthoritative source, *"Some articles look real, but they are fake or outdated. I only found out after my lecturer corrected me."*

These findings highlight a crucial gap in current digital literacy interventions, a gap that aligns with the broader literature on this topic. Martínez-Bravo et al. (2022) emphasise that critical evaluation of information is a foundational component of 21st-century literacy. Nevertheless, without explicit instruction, students may remain confident in navigating digital tools while lacking the analytical capacity to verify the quality or accuracy of the content they encounter. Phippen et al. (2021) stress that in the South African ODL context, students operate with minimal direct oversight. Ng et al. (2023) argue that digital education should incorporate structured frameworks for critical evaluation, such as source triangulation and fact-checking strategies, while Weiss et al. (2020) advocate for systematically embedding these skills within digital curricula.

Theme 4 reveals that the same students continue to struggle with critically evaluating digital content, particularly in terms of quality, credibility, and academic validity. Although participants demonstrated technical proficiency in using tools such as Zotero, Moodle, and Google Scholar, many expressed uncertainties regarding how to assess the trustworthiness of sources, verify information, or distinguish scholarly content from opinion-based or misleading material. This deficiency in critical digital literacy is oversight.

The persistent difficulty students face in critically evaluating online information—despite their technical proficiency—poses a serious threat to both academic integrity and long-term professional success. In ODL contexts, where learners operate autonomously, the inability to assess the credibility or academic rigour of digital sources increases the risk of unintentionally relying on misinformation, outdated data, or non-peer-reviewed content, thereby compromising the quality and honesty of their academic work (Phippen et al., 2021; Martínez-Bravo et al., 2022). This is not merely a skill gap but an ethical and intellectual vulnerability that undermines students' preparedness for both higher education and the workplace. As Moradi and Vaezi (2023) contend, today's professionals must possess digital fluency and the critical judgment needed to navigate complex information landscapes responsibly. Therefore, institutional efforts must evolve beyond mere tool exposure and move toward critical engagement literacy—embedding structured, iterative training in source evaluation, triangulation, and ethical reasoning across the curriculum (Ng et al., 2023; Weiss et al., 2020). Only then can digital literacy programmes truly equip students to uphold academic standards and thrive in ethically demanding, information-rich professional environments. To ensure programme evaluation captures deeper learning outcomes, not just tool usage, future implementations should include metrics for assessing students' critical evaluation skills. Such metrics could involve pre- and post-tests of source credibility discernment, task-based assessments in which students evaluate various online sources, or rubrics that measure analytical reasoning regarding digital content.

Theme 5: Emotional and psychological impact of digital disempowerment

Participant Q shared, "*I feel overwhelmed when I have to use unfamiliar digital tools because I am scared I will mess something up*." This anxiety was compounded by social comparison, as Participant R remarked, "*It is embarrassing to ask for help with basic tech stuff when everyone else seems to know what they are doing*." For some, this fear led to academic avoidance, as highlighted by Participant S, "*Sometimes I avoid assignments that need digital tools because I do not want to fail or look stupid*." Participant T further revealed the isolating effect of unequal access, stating, "*Digital challenges make me feel left behind compared to others who grew up with better access*."

These testimonies reflect how digital disempowerment can erode students' confidence and contribute to emotional disengagement from learning activities. Larsen et al. (2022) argue that digital exclusion often leads to academic exclusion, with learners withdrawing not due to lack of ability but due to emotional distress. The psychological burden is especially pronounced in ODL settings, where self-directed learning is paramount, yet digital fluency is assumed. Smith and Brinkman emphasise that digital anxiety disproportionately affects first-generation students and those from under-resourced backgrounds, creating invisible barriers to full academic participation. Hsu et al. (2024) further demonstrate that low digital confidence is closely linked to feelings of imposter syndrome and, ultimately, academic burnout. Akimkhanova et al. (2024) emphasise the importance of psychological readiness, arguing that digital learning environments should prioritise emotional resilience in addition to technical proficiency. Consequently, curriculum-driven digital literacy programmes for first-year ODL students must be designed with an empathetic and inclusive lens. These initiatives should not only equip learners with practical skills but also foster a sense of digital self-efficacy through ongoing, supportive, and psychologically informed instruction. Recognising and addressing the emotional dimensions of digital disempowerment is crucial for ensuring that all students are truly equipped for success.

The emotional and psychological toll of digital disempowerment in ODL settings extends far beyond individual well-being; it directly jeopardises academic integrity and the long-term professional development of affected students. When learners feel anxious, ashamed, or overwhelmed by unfamiliar technologies, they are more likely to disengage from core academic tasks, rely on inappropriate shortcuts, or avoid digital assignments altogether—behaviours that can compromise both learning outcomes and ethical academic conduct (Larsen et al., 2022; Hsu et al., 2024). This vulnerability is particularly dangerous in ODL environments, where independent navigation of digital platforms is not optional but central to academic success. Smith and Brinkman emphasise that unchecked digital anxiety can trigger a cycle of avoidance and underperformance, weakening not only students' confidence

but also their future readiness for a technology-driven professional world. Therefore, institutional responses must transcend basic digital skills training and embrace a model of critical engagement literacy—one that integrates emotional resilience, inclusive pedagogy, and scaffolded support into digital literacy curricula (Akimkhanova et al., 2024). Only through such intentional, psychologically aware approaches can institutions empower students to ethically and confidently participate in both academic and professional digital ecosystems. To measure whether programmes truly address these psychological barriers, evaluation should include metrics that capture digital self-efficacy and levels of digital anxiety. Possible tools include validated survey scales (e.g., digital anxiety scales), longitudinal tracking of student confidence, and mixed methods approaches that allow students to narrate their emotional and motivational shifts over time.

Theme 6: Need for continuous support and mentorship – institutionalising digital literacy through a centralised digital competence hub

For first-year students navigating the complexities of ODL, sustained digital mentorship emerged as a cornerstone of successful academic engagement. Participants overwhelmingly indicated that digital support should not be confined to one-off orientation sessions, but must be embedded throughout the academic year, delivered in ways that are hands-on, accessible, and tailored to their evolving needs. Participant U suggested, "*If we had peer mentors to guide us through using different apps and platforms, it would make learning easier*," highlighting the value of relatable, peer-led assistance. Similarly, Participant V emphasised the importance of proactive academic staff engagement, *"Lecturers should not just give us links; they must show us how to use the platforms in class*." Others called for long-term support structures, as Participant W noted, "*I forget things after orientation week. We need digital help all year.*" Participant X proposed, "*Digital tutors or lab assistants would help a lot, especially for first years who struggle with the basics*."

The growing complexity of digital learning environments underscores the need for structured, sustained support systems that extend beyond sporadic or ad hoc assistance. Wineburg et al. (2022) emphasise that digital literacy cannot be effectively developed without consistent instructor modelling and guided practice. Complementing this, Bhat et al. (2022) and and Singh et al. (2021) advocate for peer-assisted and hybrid mentorship models, which have been shown to significantly improve digital fluency—particularly in ODL contexts. However, when such initiatives are left to individual lecturers or isolated faculty-led efforts, they remain fragmented, inconsistent, and ultimately unsustainable. Wagg and Simeonova (2022) warn that without central coordination, institutions risk limiting their capacity to build inclusive and supportive digital learning ecosystems.

To address this, the establishment of a centralised Digital Competence Hub is proposed—a university-wide structure that would coordinate digital mentorship, peer support, academic staff training, and ongoing student coaching. This Hub would embed digital support into the core of the academic experience, ensuring equitable, continuous, and discipline-aligned guidance across departments and student cohorts. Its absence, however, not only hampers effective learning but also compromises academic integrity and professional preparedness. Without long-term support, students may misuse digital tools, rely on guesswork, or inadvertently engage in academic misconduct (Wineburg et al. 2022; Singh et al., 2021). As Bhat et al. (2022) and Wagg and Simeonova (2022) caution, operational fluency without critical engagement leaves graduates underprepared for ethical digital participation. A Digital Competence Hub would provide the institutional backbone necessary to integrate digital literacy as a foundational academic and professional skill.

Conclusion and recommendations

This study examined the digital literacy development of first-year students in ODL settings, identifying six interrelated themes that highlight both the potential of digital literacy and the persistent barriers that hinder its equitable development. The findings reveal that while digital proficiency enhances academic confidence and engagement, structural challenges (such as limited access to devices and internet), pedagogical shortcomings (including fragmented training), and psychological barriers continue to undermine students' ability to thrive in digital learning environments. To address these challenges, the study recommends that digital literacy be positioned as a core academic competency, embedded across curricula through a spiral model that reinforces and deepens skills over time. Institutions must invest in digital infrastructure to ensure equitable access to devices, reliable internet, and functional learning spaces, particularly for under-resourced students. Establishing dedicated Digital Literacy Centres, offering continuous support through peer mentoring and trained digital tutors, will ensure sustainable, year-round assistance. In parallel, critical digital literacy training should be embedded to teach students how to evaluate information, identify misinformation, and engage ethically with

digital content, which are key skills for maintaining academic integrity and navigating the information-rich professional landscape. Lecturers also play a central role and should receive training in digital pedagogy to model effective use of educational technologies. Additionally, institutions must address students' emotional readiness by fostering psychologically supportive environments that normalise digital struggle and promote resilience. Finally, robust monitoring and evaluation systems incorporating student feedback, performance data, and assessments of digital self-efficacy are essential to ensure the continued relevance and impact of digital literacy programmes. Through coordinated, inclusive, and sustained efforts, institutions can foster digital confidence, resilience, and academic integrity, empowering first-year ODL students to succeed in an increasingly digital world. This study contributes to global digital education discourse by offering a comprehensive, student-centred framework for advancing equitable and ethical digital literacy in higher education.

Declarations

Interdisciplinary Scope: This study presents an interdisciplinary examination of digital literacy in higher education by drawing on insights from education, information and communication technology (ICT), and digital learning practices. Focusing on open and distance education, the research explores how the integration of pedagogical and technological approaches supports student learning and development. By examining both the technical and instructional dimensions of digital literacy, the study identifies the essential competencies required by first-year students to navigate a digitally mediated academic environment successfully. The findings are particularly relevant to educators, curriculum designers, and researchers across disciplines, highlighting the value of curriculum-driven digital literacy initiatives in promoting academic success in an increasingly technological context

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