Journal of Nursing, Midwifery and Allied Health Sciences
J. Nurs. Midwifery Allied Health Sci. | ISSN: 3141-4729 | Open Access
Volume 4(2): 132-139 (2026)
Received: 23 Apr 2026 | Accepted: 24 May 2026 | Published: 02 Jun 2026

Digital Technology Policy, Use, and Barriers among Educators in Nursing and Midwifery Schools in South-South Nigeria

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Abstract

Digital technologies are increasingly recognised as essential for contemporary nursing and midwifery education, yet their integration remains uneven in Nigeria. This study examined digital technology policy, use, and barriers among educators in nursing and midwifery schools in South-south Nigeria. A cross-sectional design was adopted. The sample size of 395 but 392 is the number that responded. Cluster sampling technique was applied for selecting the respondents. The study included educators from Schools of Nursing, Schools of Midwifery, and universities offering nursing programmes. Data were collected using a structured self-report questionnaire. Data were analysed using descriptive statistics and chi-square tests. About half of respondents (52.6%) reported that their institutions did not permit use of digital learning management systems like Google Classroom, Moodle, and Blackboard. The findings showed low use of digital technologies, with 23.7% of educators reporting frequent use but none for consistent routine use. Computers (92.5%) and projectors (79.6%) were widely available, while e-learning management platforms and online assessment tools were less common. Advanced technologies such as simulation software and virtual reality were completely unavailable. A significant association was found between the type of institution and permission to use digital technologies ($\chi^2 = 25.77$, $df = 2$, $p < 0.001$), with universities more likely to permit use. In conclusion, digital technology integration in nursing and midwifery education in South-South Nigeria is fragmented and institutionally constrained. It is recommended that targeted investment in infrastructure, formal institutional policies, and sustained capacity-building programmes be prioritised to strengthen digital education integration.

How to Cite this Article

Eddy, I. N., Ani, G., Asagba, P., & Eleke, C. (2026). Digital Technology Policy, Use, and Barriers among Educators in Nursing and Midwifery Schools in South-South Nigeria. Journal of Nursing, Midwifery and Allied Health Sciences, 4(2), 132–139. https://doi.org/10.54117/jnmahs.v4i2.94

Keywords: Digital technology, E-learning, Education, Midwifery, Nursing, Technology adoption, Nigeria

Introduction

The integration of digital technologies into education has transformed teaching and learning across the world (Haleem *et al*., 2022). In nursing education, these technologies support skill development, improve learning experiences, and prepare students for modern healthcare environments that increasingly depend on technology (Kleib *et al*., 2023). Digital technologies also encourage flexible and student-centred learning approaches. Despite these advantages, many developing regions continue to experience difficulties with adoption and implementation. In Africa, several nursing and midwifery institutions still face barriers that limit effective integration of digital technologies into teaching and learning processes. These limitations may affect the quality and relevance of professional training.

Digital technologies have introduced innovative approaches that improve educational delivery and student engagement (Heinonen *et al*., 2019). Learning Management Systems such as Moodle and Blackboard provide students with easy access to learning materials and support flexible learning schedules (Badaru & Adu, 2022). These platforms also include quizzes, discussion forums, and multimedia resources that promote interactive learning experiences (McKeithan *et al*., 2021). In healthcare education, simulation software and virtual reality technologies create safe environments for students to practise clinical skills and decision-making (Javaid & Haleem, 2020). Mobile learning through smartphones and tablets further improves accessibility to educational resources (Criollo *et al*., 2021). Educational applications and online platforms such as Khan Academy and Coursera also provide additional learning opportunities for students globally (Rahman & Dar, 2022). Furthermore, artificial intelligence and machine learning technologies now support personalised learning and student assessment processes (Gligorea *et al*., 2023).

Nursing and midwifery education are essential for preparing competent healthcare professionals who can provide safe and quality care. These programmes combine theoretical instruction with practical training to develop clinical competence and critical thinking skills (Cooper *et al*., 2019). Nursing education covers subjects such as anatomy, physiology, pharmacology, and patient care procedures (Lilley *et al*., 2022). Students also gain practical experience through laboratory sessions and clinical placements in

healthcare settings (Wong & Kowitlawakul, 2020). Midwifery education focuses on maternal and child health, including antenatal care, labour, delivery, and postnatal care (McKellar *et al*., 2023). Both disciplines emphasise evidence-based practice, ethical conduct, and compassionate care delivery (Megregian *et al*., 2021). As healthcare systems continue to evolve, educational institutions increasingly adopt digital technologies such as telehealth and simulation-based learning to improve educational quality and professional preparedness (Almousa *et al*., 2021). In Africa, strengthening nursing and midwifery education remains necessary for improving healthcare outcomes and workforce capacity (Brobbey *et al*., 2024).

The emergence of digital technologies has created new opportunities for nursing and midwifery education. Traditional teaching methods that relied mainly on lectures and practical demonstrations can now be strengthened through digital tools and online learning resources. Technologies such as e-learning platforms, mobile applications, simulation software, and virtual reality provide flexible and interactive learning experiences for students (Neffati *et al*., 2021). These tools enable students to access educational materials at convenient times and from different locations. They also support experiential learning through the simulation of clinical situations. This approach allows students to practise procedures and decision-making skills safely before caring for real patients (Mucundanyi & Woodley, 2021).

Several developed countries, including Canada, the United Kingdom, and the United States, have successfully integrated digital technologies into nursing and midwifery education programmes (Brown *et al*., 2020). These developments have improved learning outcomes and enhanced graduates' readiness for clinical practice. In contrast, the level of digital technology integration in many African countries, including Nigeria, remains uncertain and underdeveloped (Harerimana & Mtshali, 2018). Challenges such as poor internet access, inadequate infrastructure, and limited educator training continue to hinder effective implementation (Okoye *et al*., 2023). In addition, educators' perceptions and attitudes towards digital technologies strongly influence their acceptance and utilisation within educational settings (De-Leeuw *et al*., 2020).

Although digital technologies are increasingly used in education globally, their integration into nursing and midwifery schools in South-South Nigeria remains poorly documented. Continuous evaluation of digital technology use is important because these tools can improve interactive learning and educational quality. However, important gaps remain in the literature. There is limited evidence regarding the extent of digital technology use among nursing and midwifery educators in the region. Information on institutional policies, available infrastructure, internet access, and educator preparedness is also inadequate. These gaps make it difficult to identify the challenges affecting effective integration and to develop targeted interventions for improvement within the educational system.

Previous studies conducted in developing countries reported inconsistent and suboptimal integration of digital technologies within educational institutions (Bester *et al*., 2021; Essel *et al*., 2020; Gause *et al*., 2022). These persistent gaps highlight the need for further investigation in Nigeria, particularly within the South-South region. Examining educators' use of digital technologies and identifying barriers affecting implementation are necessary for evidence-based planning. Such evidence may guide the development of interventions aimed at improving digital technology integration in nursing and midwifery education within the region.

Methods

This study employed a cross-sectional descriptive design. The study was conducted among nurse and midwife educators in selected nursing and midwifery institutions across South-South Nigeria. The institutions included Schools of Nursing in Anua-Uyo, Eket, Ikot-Ekpene, and Ituk-Mbang; Schools of Midwifery in Anua-Uyo, Iquita-Oron, Ituk-Mbang, and Urua-Akpan; Bayelsa State School of Nursing Tombia and School of Basic Midwifery Tombia; the Department of Nursing, University of Calabar; School of Nursing, University of Calabar Teaching Hospital; Schools of Nursing in Itigidi and Ogoja; and Schools of Midwifery in Obudu, Moniaya-Ogoja, and Calabar. Other institutions included the Department of Nursing, Delta State University Abraka; Schools of Nursing in Agbor, Eku, and Warri; and Schools of Midwifery in Asaba and Sapele. The study also involved the Department of Nursing, University of Benin; Department of Nursing, Edo State University Uzairue; Edo State School of Nursing Benin City; School of Nursing, University of Benin Teaching Hospital; Edo State School of Midwifery Benin City; and School of Midwifery, University of Benin Teaching Hospital. In Rivers State, the Department of Nursing, University of Port Harcourt, and the School of Nursing and School of Midwifery Port Harcourt were included.

The population comprised 651 nurse and midwife educators across the selected institutions in South-South Nigeria. Population figures were obtained from the administrative offices of the institutions. The sample size was determined using Cochran's formula for descriptive studies with finite populations as recommended by Bolarinwa (2020). The formula considered a population size of 651, a 95% confidence level, 5% margin of error, 80% power level, and an estimated proportion of 0.5. The calculated minimum sample size was 356 participants. A 10% adjustment for non-response was added to reduce the effect of attrition. This process produced a final sample size of 395 nurse and midwife educators.

A two-stage cluster sampling technique was used for the study. In the first stage, the institutions served as clusters and all identified clusters were included in the study. In the second stage, participants were selected randomly and proportionately from each cluster. This approach ensured adequate representation of educators across the institutions. The inclusion criteria were nurse and midwife educators who were actively teaching in the selected institutions and were physically present during data collection. The exclusion criteria included educators who were on leave, physically ill, or engaged solely in administrative and non-teaching duties.

Data were collected using the Digital Technologies Integration in Nursing and Midwifery Education Questionnaire (D-TIME Questionnaire; developed by the research team). The questionnaire contained four sections labelled A to D. Section A collected socio-demographic information using five categorical items. Section B assessed institutional permission for digital technology use through

yes/no responses. Section C examined the types of digital technologies available and used by respondents through yes/no responses. Section D assessed barriers to digital technology integration using yes/no responses.

Content validity of the D-TIME Questionnaire was established through expert review. A three-member panel comprising specialists in nursing education, digital technologies, and survey design evaluated the instrument for relevance, clarity, and comprehensiveness. Each item was rated as relevant or not relevant. The ratings were used to compute the Content Validity Index (CVI). A CVI of 0.89 was obtained and was considered acceptable in line with Polit and Beck (2020). The reliability of the questionnaire was tested among 40 nurse and midwife educators in Schools of Nursing and Midwifery in Abia State. The split-half reliability method was used. The completed questionnaires were divided into odd-numbered and even-numbered sets. Responses from the two sets were ranked and analysed using the Spearman-Brown formula. A reliability coefficient of 0.91 was obtained, which indicated high reliability according to Polit and Beck (2020).

Ethical approval was obtained from the University of Port Harcourt Research Ethics Committee (UPH/CEREMAD/REC/MM108/007) before the commencement of the study. Administrative permission was also obtained from the heads of the selected nursing and midwifery institutions and universities. Informed consent forms were distributed to eligible respondents. The forms explained the purpose of the study, procedures, benefits, possible risks, and participants' rights, including the right to withdraw at any stage without penalty. Participants who agreed to participate were selected randomly from the institutions. Copies of the questionnaire were distributed to the participants for completion. The completed questionnaires were collected after one hour through anonymous paper collection boxes placed within the administrative offices of the schools.

Data were analysed using descriptive and inferential statistics. Descriptive statistics included frequencies, percentages, means, and standard deviations. Inferential statistics were applied to test relationships between variables. The Chi-square test of independence was used to examine the association between type of institution and permission to use digital technologies. Statistical significance was set at $p < 0.05$.

Results

Out of the 395 respondents only 392 responded to the questionnaire. Three persons fell out of the study for undisclosed reasons.
Table 1 presents the socio-demographic profile of 392 respondents, and revealed that most of them were aged 35–44 years (36.2%), followed by 25–34 years (24.5%) and 45–54 years (24.0%). Females constituted the majority (72.4%). Regarding educational qualification, 39.8% held bachelor's degrees, while 32.7% possessed master's degrees. Most respondents had 6–10 years of teaching experience (32.7%), whereas only 5.6% had less than one year's experience. The respondents were mainly drawn from Schools of Nursing (42.9%), followed by Schools of Midwifery (31.6%) and universities (25.5%).

Table 1: Socio-demographic Characteristics of Respondents (n = 392)

Category	f	%
Age (years)		
Under 25	18	4.6
25–34	96	24.5
35–44	142	36.2
45–54	94	24
55 and above	42	10.7
Gender		
Male	108	27.6
Female	284	72.4
Highest Educational Qualification		
Diploma	64	16.3
Bachelor's degree	156	39.8
Master's degree	128	32.7
Doctorate	44	11.2
Years of Teaching Experience		
Less than 1 year	22	5.6
1–5 years	104	26.5
6–10 years	128	32.7
11–15 years	78	19.9
More than 15 years	60	15.3
Type of Institution		
School of Nursing	168	42.9
School of Midwifery	124	31.6
University	100	25.5

% = percentage, f = frequency, n = sample size

Figure 1 presents digital technology policy which appeared to be inconsistent. Slightly more than half of the respondents (52.6%) reported that their institutions do not permit the use of digital technologies in the education process, while 47.4% indicated that such use is permitted.

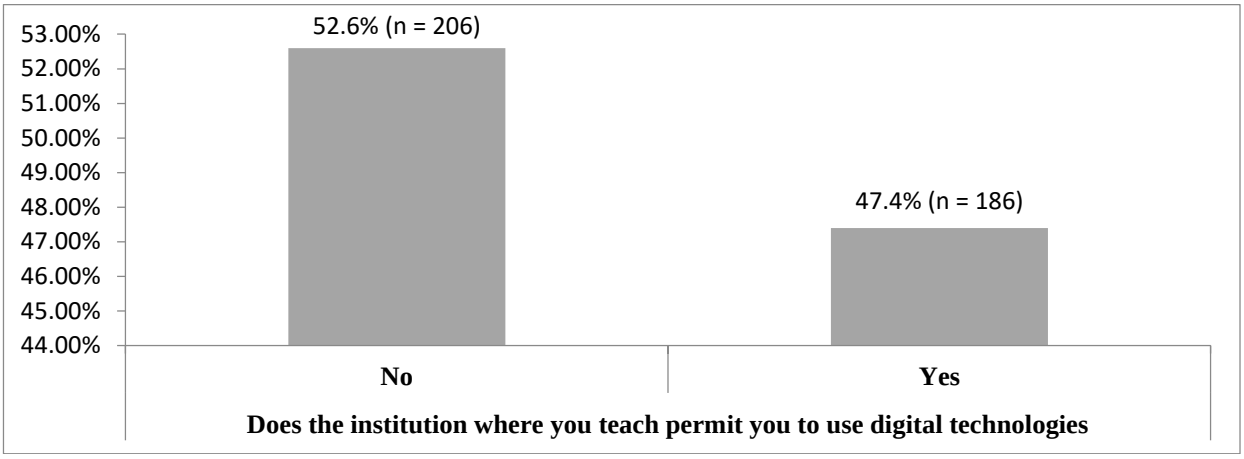

Figure 1: Digital technology policy in nursing and midwifery institutions (n = 392)

Figure 2 presents the digital technologies employed by the respondents and revealed variation in the use of digital technologies among the respondents. Computers and laptops were the most widely available technologies, reported by 92.5% of respondents, followed by projectors (79.6%). More than half of the respondents indicated the availability of mobile applications (54.8%), while fewer institutions reported access to e-learning management platforms (47.3%) and online assessment tools (39.8%). Tablets or iPads were available to only one-third of the respondents (33.3%). In contrast, interactive whiteboards, simulation software, and virtual reality and augmented reality technologies were completely unavailable.

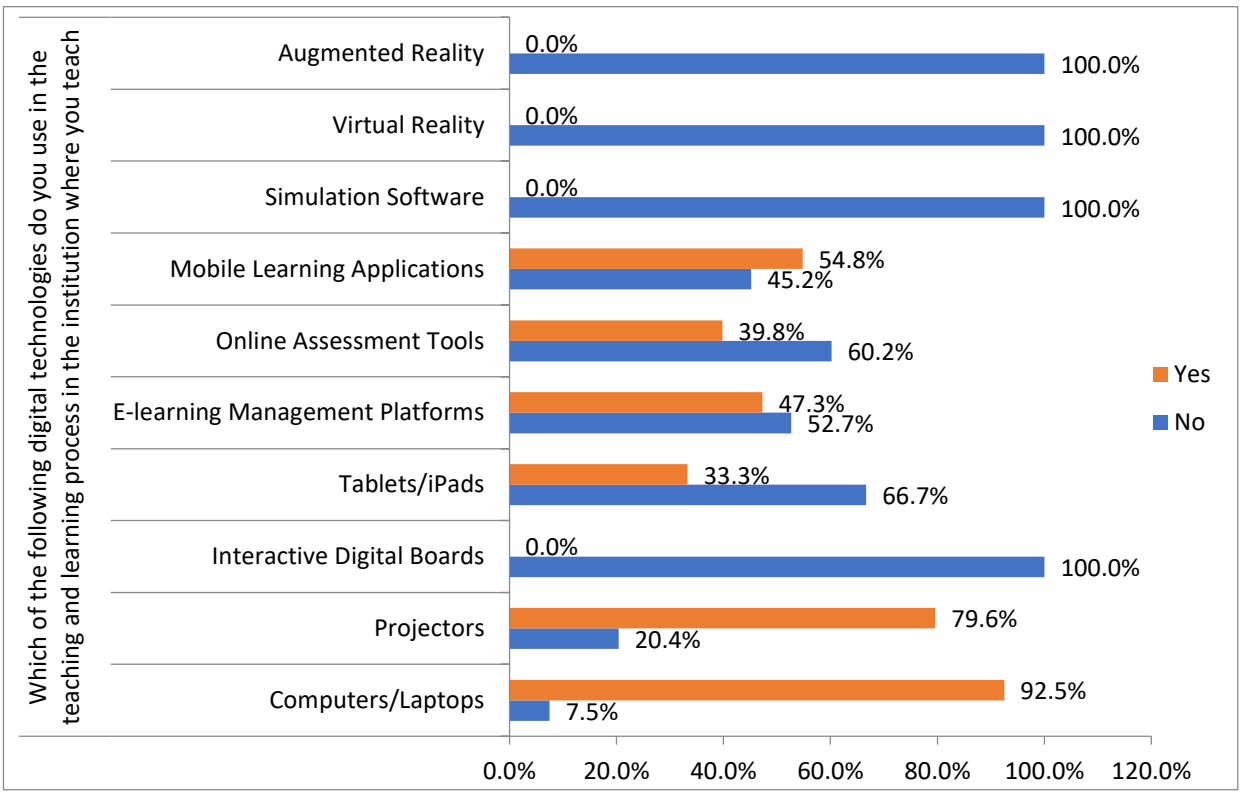

Figure 2: Digital technologies employed by the respondents (n = 392)

Figure 3 presents the frequency of use of the digital technologies and indicated that less than one-quarter of respondents (23.7%) reported often using digital technologies in their educational activities, while none of the educators reported consistent or routine use. A substantial proportion of respondents reported limited engagement, with 29.1% indicating rare use and 22.2% reporting that they never use digital technologies.

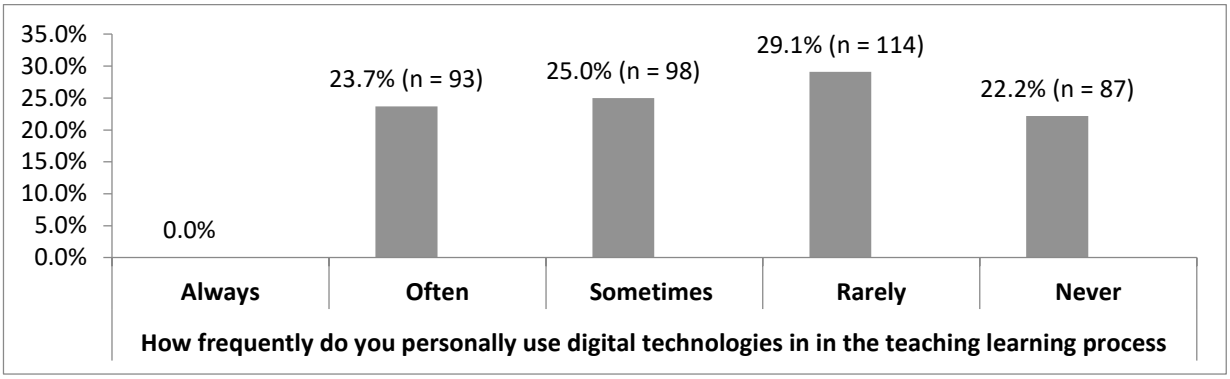

Figure 3: Frequency of use of digital technology by the respondents (n = 392)

Table 2 presents barriers to the barriers to digital technology integration and showed that multiple barriers hindered digital technology integration among educators. Lack of funding was the most frequently reported barrier (76.0%), followed by insufficient infrastructure (73.0%) and high cost of technology (71.9%). Inadequate training (68.4%) and limited technical support (64.8%) were also commonly identified challenges. Half of the respondents (50.0%) reported resistance to change as a barrier. In contrast, poor electricity supply was the least reported challenge, identified by only 20.9% of respondents.

Table 2: Barriers to digital technology integration (n = 392)

Item	f	%
(Multiple responses allowed)		
Lack of funding	298	76.0
Insufficient infrastructure	286	73.0
Limited technical support	254	64.8
Resistance to change	196	50.0
Inadequate training	268	68.4
High cost of technology	282	71.9
Poor electricity supply	82	20.9

% = percentage, f = frequency, n = sample size

Table 3 presents a chi-square analysis of association and revealed a significant association between type of institution and permission to use digital technologies in the educational process ($\chi^2 = 25.77$, $p < 0.001$). The respondents from University nursing programmes reported the highest level of permission for them to use digital technologies (69.0%). In contrast, most respondents from Schools of Nursing (57.7%) and Schools of Midwifery (62.9%) reported that they were not officially permitted to use digital technologies. These findings suggest that the universities are more supportive of digital technology integration than nursing and midwifery schools.

Table 3: A chi-square test of association between type of institution and permission to use digital technologies (n = 392)

	Permitted, n (%)	Not Permitted, n (%)	df	Chi square	*p value*
Type of Institution			2	25.77	< 0.001
School of Nursing	71 (42.3)	97 (57.7)			
School of Midwifery	46 (37.1)	78 (62.9)			
University Nursing Programme	69 (69.0)	31 (31.0)			

% = percentage, n = sample size, df = degree of freedom, p value < 0.05 = significant

Discussion

In general, the integrated findings highlight a fragmented and underdeveloped digital learning environment, characterised by weak institutional support, infrastructural challenges, and reliance on individual initiative rather than formalised digital education systems. In comparison with Abdalla (2023), the findings show a partial discrepancy. While Abdalla (2023) reported limited use of some digital tools, there was nonetheless substantial adoption of structured platforms, such as Moodle, WebCT, Skype, and Adobe Connect, suggesting a more organised digital learning environment than that observed in South-South Nigeria. Two key reasons may explain this discrepancy. First, institutional and national investment in digital infrastructure in Saudi Arabia is considerably stronger, enabling access to learning management systems and stable internet services. Second, formal institutional policies and administrative support appear more robust, allowing educators to integrate digital technologies beyond individual effort. In contrast, the present study revealed weak institutional permission and policy enforcement, resulting in fragmented and inconsistent use. Furthermore, Castro *et al*. (2022) identified unlimited use of digital technologies and adequate digital literacy and student engagement. This dissimilarity may be attributed to adequate faculty training and

pedagogical readiness, where tools are available. However, a notable discrepancy with the present study lies in the availability and institutionalisation of platforms such as Blackboard, Moodle, Zoom, and MS Teams in the Saudi context. This difference may be explained by better access to digital resources and institutional mandates supporting online teaching, whereas the Nigerian context relies heavily on individual educators' initiative in the absence of formalised digital education systems. The difference between the results in the present study and Abdalla (2023) and Castro *et al*. (2022) highlights challenges in digital integration in South-South Nigeria. The present study uniquely highlights the structural fragility and policy limitations within nursing and midwifery schools in South-South Nigeria, underscoring contextual disparities in institutional readiness and resource allocation.

The findings demonstrate uneven availability and predominantly basic use of digital technologies in nursing and midwifery institutions. Computers and laptops were the most widely available tools, followed by projectors. However, access to more structured digital learning systems was limited, with fewer institutions reporting the availability of e-learning platforms and online assessment tools. Remarkably, advanced educational technologies such as interactive whiteboards, simulation software, and virtual or augmented reality were completely absent, highlighting significant infrastructural gaps. Moreover, the use seemed to mirror availability as majority of the respondents further reported that they rarely used the digital technologies in their teaching and learning processes. The results of the present study differ markedly from those reported by Albloushi *et al.* (2024), Cassum *et al*. (2024), and Abdalla (2023), particularly in the range, sophistication, and institutionalisation of digital technologies used in nursing education. In contrast to the present study, where digital technology use was largely limited to basic tools such as computers, projectors, and mobile applications, Albloushi *et al*. (2024) reported extensive use of learning management systems (Blackboard, Google Classroom) and video conferencing platforms (Zoom). One major reason for this dissimilarity is stronger institutional and policy support for digital education in Saudi Arabia, where online learning infrastructures are formally embedded into nursing programmes. A second reason is greater investment in digital infrastructure and stable internet connectivity, which enables sustained use of advanced platforms that were entirely unavailable in the present study. Similarly, the findings of Cassum *et al*. (2024) in Pakistan revealed a broader and more interactive digital ecosystem, including tools such as Kahoot, Mentimeter, Padlet, MS Teams, and Zoom. This contrasts sharply with the present study's reliance on passive technologies. This discrepancy may be explained by curriculum-level integration of digital tools in Pakistan, where curriculum developers were actively involved, unlike the Nigerian context where integration depended largely on individual educator initiative. Additionally, institutional emphasis on pedagogical innovation appears stronger in Cassum *et al*.'s (2024) study, whereas the present study highlighted infrastructural constraints and limited access to structured platforms. Compared with Abdalla (2023), the present study shows substantially lower adoption of course management systems and video conferencing tools. This difference can be attributed to systematic faculty training programmes and institutional mandates for digital adoption in Saudi Arabia, which contrast with the fragmented and unsupported digital environment observed in South-South Nigeria. Furthermore, national digital education strategies and funding priorities likely contributed to higher adoption levels in Abdalla's study. The present study uniquely reflects a structurally constrained and under-resourced digital learning environment, underscoring significant contextual disparities in institutional readiness and educational investment.

The findings indicated that structural and financial constraints constitute the most significant barriers to digital technology integration in nursing and midwifery education. Lack of funding and insufficient infrastructure was the most frequently reported challenges and were consistently rated as very severe. Educators described inadequate physical facilities, unreliable electricity supply, and limited internet connectivity as persistent obstacles that disrupt teaching activities and hinder the consistent use of digital tools. These infrastructural deficiencies were compounded by the high cost of acquiring and maintaining digital devices, which restricted their availability and frequency of use across institutions. In addition to financial and infrastructural challenges, capacity-related barriers emerged as major constraints. Respondents reported insufficient training opportunities for educators, which limited confidence and competence in using digital technologies effectively. The absence of dedicated technical personnel further exacerbated these challenges, as institutions lacked the expertise required for system maintenance and timely troubleshooting. Although resistance to change among some educators was less frequently reported, it remained a moderate barrier, particularly where traditional teaching preferences discouraged wider adoption of digital approaches. Compared with Castro *et al*. (2022), the current findings differ in their limited emphasis on assessment difficulties and reduced educator–student interaction. Castro *et al*. (2022) highlighted challenges related to evaluating students' understanding and loss of face-to-face engagement, whereas the present study foregrounded infrastructural deficits such as unreliable electricity and poor internet access. A plausible explanation is contextual variation: institutions with relatively stable infrastructure, such as those in Saudi Arabia, may progress to higher-order pedagogical concerns, while resource-constrained settings prioritise basic access and functionality issues. In relation to Abdalla (2023), the discrepancy lies in the reported availability of digital platforms. Abdalla (2023) documented widespread use of learning management systems and communication tools, with barriers centred on digital literacy and inconsistent integration strategies. Conversely, the present study identified limited access to infrastructure and high costs as primary obstacles. This difference may be attributed to higher institutional investment and national e-learning policies in Saudi Arabia, which reduce access-related barriers but expose skill-based limitations. When compared with Cassum *et al*. (2024), both studies acknowledged technical challenges and training gaps; however, Cassum *et al*. (2024) additionally identified emotional disengagement and difficulties interpreting students' non-verbal cues. The absence of strong emotional themes in the present findings may reflect lower levels of sustained online teaching, limiting educators' exposure to prolonged virtual interaction challenges. Similarly, Albloushi *et al*. (2024) emphasised pedagogical and emotional barriers, including teaching clinical skills online and student disengagement. The

present study's stronger focus on funding and infrastructure suggests that educators may not yet be engaging deeply with advanced digital pedagogies due to unresolved foundational constraints. In a nutshell, these dissimilarities appear driven by contextual differences in digital maturity, institutional investment, and extent of online teaching exposure across study settings.

The present study demonstrated a statistically significant association between type of institution and institutional permission to use digital technologies in teaching. Educators working in universities offering nursing programmes were considerably more likely to report formal permission to use digital technologies than their counterparts in Schools of Nursing and Schools of Midwifery. This finding suggests that institutional context plays a decisive role in shaping policies and practices related to digital technology adoption in nursing and midwifery education. Possible reasons that explain this finding are the following: Firstly, universities offering nursing programmes typically operate within broader institutional frameworks that prioritise digitalisation, research, and innovation. Such institutions are more likely to have established policies, governance structures, and quality assurance mechanisms that formally endorse the use of digital technologies in teaching and learning. Secondly, universities often have better access to funding, information technology infrastructure, and technical support services than standalone nursing and midwifery schools, making administrators more willing to permit and support digital technology use. This finding contrasts with several previous studies, including Abdalla (2023), Castro *et al*. (2022), Albloushi *et al*. (2024), and Cassum *et al*. (2024), which generally reported widespread institutional acceptance of digital technologies across nursing education settings. In those studies, educators commonly described digital technology use as institutionally supported or even mandated, particularly in university-based programmes. One plausible reason for this discrepancy is contextual variation across countries. Studies conducted in Saudi Arabia and Pakistan often reflect stronger national investments in higher education digital infrastructure and clearer institutional digital policies than those observed in the present study context. Another reason may relate to institutional diversity within the current sample, which included a substantial proportion of standalone nursing and midwifery schools that may be more tightly regulated, resource-constrained, and slower to formalise digital education policies compared to university-based nursing programmes.

Conclusion

This study demonstrated that digital technology integration among educators in nursing and midwifery schools in South-South Nigeria remains limited. Institutional policies regarding digital technology use were inconsistent. Major barriers included inadequate funding, poor infrastructure, high technology costs, insufficient training, and limited technical support. Strengthening institutional policies, improving infrastructure, and investing in educator capacity building are essential to enhancing effective digital technology integration in nursing and midwifery education.

Conflict of Interest: The authors declare no financial or personal conflicts of interest that may have influenced this study.

Acknowledgments: The authors appreciate the participation of the respondents throughout this study.

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