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A National Assessment of the Availability, Utilisation and Impact of Digital Learning Resources Among Nigerian Medical Students: A Cross-sectional Study

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Abstract

Background:

Access to educational resources that support academic development is integral to high quality medical education. Despite increasing digitalisation, disparities in access persist across several Low- and Middle-Income settings. There is no national-level evidence on medical students' access to digital educational resources in Nigeria. This study therefore aimed to assess the availability of, and access to essential digital tools and academic resources among undergraduate medical students across Nigeria.

Methods:

A descriptive cross-sectional study was conducted using an online survey administered to medical students from purposively selected accredited medical schools across Nigeria. One private, one state-owned, and one federal medical school were selected from each geopolitical zone. The survey was open to students in all years of study. Data were analysed using descriptive statistics, Chi-square tests, and binary logistic regression. Ethical approval was obtained from the Health Research and Ethics Committee of Jos University Teaching Hospital, and informed consent was obtained from all participants.

Findings:

A total of 784 medical students from 15 medical schools participated. Only 41.5% reported access to personalised institutional email accounts, of whom 71.1% used them to access academic resources. Institutional access to lecture recordings, online courses, and simulation laboratories was reported by 51.5%, 32.8%, and 23.2% of respondents, respectively. Only 19.0% perceived themselves as adequately equipped to compete globally with the available digital academic resources. Access to online courses ($p = 0.001$), lecture recordings ($p = 0.003$), and simulation laboratories ($p < 0.001$) were significantly associated with improved perceived global competitiveness.

Conclusion:

Despite widespread ownership of internet-enabled devices, substantial gaps remain in access to essential institutional digital resources. Strengthening digital infrastructure and expanding internet services are critical to enhancing the quality and global relevance of medical education in Nigeria. This study presents the first nationwide assessment of access to digital tools and educational resources among medical students in Nigeria.

Background

The importance of digital resources in medical education has grown substantially in recent years, particularly following the COVID-19 pandemic, which disrupted conventional in-person teaching and accelerated the adoption of technology-enabled learning approaches worldwide (1, 2). Medical schools increasingly relied on virtual teaching platforms, digital content delivery, and remote access to learning materials to sustain training during this period. This shift has persisted beyond the pandemic, reinforcing the central role of digital infrastructure in the delivery of undergraduate medical education (3, 4). In contemporary medical training environments, a wide range of digital tools such as personal computing devices, internet connectivity, e-learning platforms, online courses, simulation technologies, and recorded lectures are essential for flexible, self-directed competency-based learning, skill acquisition and engagement with evolving medical knowledge (3, 5–7).

Despite this transition, access to essential digital tools and resources is not uniform across educational settings. In many contexts, particularly in resource-constrained environments, students may face limitations, such as broadband connectivity, functional simulation laboratories (8–10). In Nigeria, isolated institutional studies have highlighted infrastructural challenges within some tertiary institutions, including gaps in digital capacity and access to academic resources (9, 10). However, these studies are often limited in scope and do not provide a comprehensive national picture.

There remains a paucity of nationwide data examining the extent to which undergraduate medical students in Nigeria have access to key digital learning tools. Generating robust evidence in this area is essential to inform policy development, guide institutional investment, and strengthen the quality of medical education. Therefore, this study aims to assess the availability and access to essential digital tools and academic resources among undergraduate medical students across Nigeria, providing nationally representative data to support evidence-based improvements in medical education systems.

Methods

Study Design

This study was a descriptive cross-sectional study which employed the use of online forms targeting undergraduate medical students (pre-clinical and clinical) across all 45 medical schools in Nigeria based on the accreditation status defined by the Medical and Dental Council of Nigeria MDCN (11). We reported our study using the Checklist for Reporting Results of Internet E-Surveys (CHERRIES) (**Appendix 1**) (12).

Study Setting

Nigeria, located in West Africa, is broadly divided into the Northwest, Northeast, North-central, Southwest, Southeast and South-south geopolitical zones. Each geopolitical zone has five to six states located within it, and is characterised by different sociocultural properties (13). The country encourages

public and private sector operations. Medical schools can be classified based on their geopolitical zone location, and by the type of ownership: federal-owned, state-owned and privately-owned universities (13).

Sample size and sampling

The minimum sample size was calculated using a finite population correction for an estimated population of approximately 14,000 undergraduate medical students in Nigeria (13), assuming a 95% confidence level and a 5% margin of error, yielding a minimum required sample size of 383 participants. The sample size was adjusted using an anticipated response rate of 60%, resulting in a target sample size of 613 students.

A purposive sample of medical schools was selected to capture inputs across different ownership types and geopolitical zones. One federal government-owned, one state government-owned, and one private medical school were selected from each geopolitical zone where available. However, because some ownership types were not represented in certain regions, a total of 15 medical schools were included in the study. Within each institution, total sampling was utilised.

Inclusion and exclusion criteria and survey distribution

All registered undergraduate students within the selected schools were included in the study, while non-consenting students were excluded. The survey was distributed via student associations and class WhatsApp (Meta USA, 2025) platforms to reach participants. For each school, class representatives from all classes, from Year 1 to the Final Year, distributed the questionnaires to members of their respective classes. This was done to ensure that each class was represented in all selected schools (11).

Study Tools

A face-validated, semi-structured online questionnaire was developed using Google docs (Google USA, 2025), which was distributed via official class WhatsApp groups and mailing lists. This questionnaire (**Appendix 2**) was developed by a team of medical educators and students and collected information on the access of students to digital tools and academic resources, and the effectiveness of the use of these resources as experienced by Nigerian medical students. We utilised a pilot tested the tool using 5% of the expected sample size with medical students at the Nigerian Medical Students Association. Pilot test results were not included in the final analysis. This was done to test the validity and identify any errors before the distribution of the questionnaires. Data were collected from September 2025 to November 2025 (3 months), and iterative meetings held to monitor the progress of data collection.

Ethical Consideration

Ethical clearance was obtained from the Health Research and Ethical Committee of the Jos University Teaching Hospital *(JUTH/DCS/IREC/127/XXXI/3019)* (**Appendix 3**). This study was carried out according to the principles of the Declaration of Helsinki (14) Informed consent was obtained from each participant before commencing the survey. They were informed the estimated duration for completing the survey, and were assured of the confidentiality and anonymity of their responses.

Data management and analysis

Data was analysed using IBM Statistical Package for Social Sciences, SPSS (SPSS Inc. Armonk, NY: IBM Corp) Version 26 statistical software. Descriptive data was summarised using frequencies and percentages and visualised using frequency tables and appropriate charts. Chi-square was used to compare exposure variables (e.g., Institution type, Class, Sex) and outcome variables (such as; Access to Personalised institutional e-mails, Ability to navigate digital resources, Availability of e-learning services). Binary regression was employed in comparing risk factors while controlling for confounding factors. A p.value of < 0.05 was considered as statistically significant.

Result

A total of 784 undergraduate medical students were recruited from 15 accredited medical schools across Nigeria's six geopolitical zones. Six of these schools were federal institutions, five were owned by the state government, and four were privately owned. The geographical distribution of the sampled institutions is as shown in Fig. 1. Of the total respondents, 365 (46.6%) were enrolled at federal institutions, 405 (51.7%) were males, and 374 (47.7%) were females. The majority of respondents were within 18–30 years of age (83.8%).

Access to Digital Academic Resources

Smartphones were the most commonly used devices for accessing digital academic resources (719, 91.7%), followed by laptops (315, 40.2%), tablets (123, 15.7%), and desktop computers (15, 1.9%). More students from private universities used tablets and laptops (59, 37.3% and 92, 58.2%), respectively; they also had the lowest proportion with access to smartphones (122, 77.2%) when compared with their counterparts in federal and state schools. The majority of these students used more than one device for academic purposes. (Fig. 2)

Overall, 325 (49%) had a personalised institutional email address, and only 231 (29.5%) used their email for academic purposes. Access varied significantly by geopolitical zone ($p < 0.001$), with the highest proportion observed in the southwest (100, 68%). Institutional ownership was also associated with email access ($p = 0.001$), with private universities reporting higher availability (39.2%). Pre-clinical students had significantly greater access compared with clinical students (33.0% vs 23.5%, $p = 0.005$) (Table 1).

Table 1
Access to Functional Personalised Institutional E-Mail Addresses Used for Academic Purposes

Parameter	Functional Personal Institutional E-Mails		
	No	**Yes**	**p (< 0.05)**
Sex, n (%)			
Male	281 (69.4%)	124 (30.6%)	0.698
Female	268 (71.7)	106 (28.3)	
Geopolitical Zone, n (%)			
North-Central	127 (66.5)	64 (33.5)	< 0.001
North-East	44 (64.7)	24 (35.3)	
North-West	88 (93.6)	6 (6.4)	
South-East	144 (86.7)	22 (13.3)	
South-South	103 (87.3)	15 (12.7)	
South-West	47 (32.0)	100 (68.0)	
Institutional Type, n (%)			
Federal	255 (69.9)	110 (30.1)	0.001
State	202 (77.4)	59 (22.6)	
Private	96 (60.8)	62 (39.2)	
Year of Study, n (%)			
Pre-Clinical (1st -3rd Year)	329 (67.0)	162 (33.0)	0.005
Clinical (4th -6th Year)	224 (76.5)	69 (23.5)	
Total	**553 (70.5)**	**231 (29.5)**	

Institutional provision of other digital learning resources was limited. A total of 404 (51.5%) students reported access to lecture recordings, 257 (32.8%) to online courses, and only 182 (23.2%) to simulation laboratories.

Access to e-learning platforms was significantly higher in schools in the Northeast and Southwest ($p = 0.007$), also significantly higher in Federal and Private Institutions ($p < 0.001$), and among students in earlier classes ($p < 0.001$).

Students in the Southwest had significantly higher access to online courses, courtesy of their institutions ($p < 0.001$). Students in the Northeast had a significantly higher availability of simulation labs for educational purposes ($p < 0.001$). (Table 2).

Table 2
Access to Other Digital Academic Tools and Resources

	Lecture Records		Online Courses		Simulation Labs	
	Yes	**p (< 0.05)**	**Yes**	**p (< 0.05)**	**Yes**	**p (< 0.05)**
Geopolitical Zone, n (%)						
North-Central	107 (56.0)	0.007	52 (27.2)	< 0.001	34 (17.8)	< 0.001
North-East	45 (66.2)		18 (26.5)		33 (48.5)	
North-West	41 (43.6)		30 (31.9)		26 (27.7)	
South-East	74 (44.6)		47 (28.3)		32 (19.3)	
South-South	54 (45.8)		31 (26.3)		21 (17.8)	
South-West	83 (56.5)		79 (53.7)		36 (24.5)	
Institutional Type, n (%)						
Federal	195 (53.4)	< 0.001	130 (35.6)	0.265	80 (21.9)	0.507
State	110 (42.1)		81 (31.0)		60 (23.0)	
Private	99 (62.7)		46 (29.1)		42 (26.6)	
Year of Study, n (%)						
100 Level / First Year	58 (41.4)	< 0.001	32 (22.9)	0.014	23 (16.4)	0.015
200 Level / Second Year	110 (65.9)		53 (31.7)		35 (21.0)	
300 Level / Third Year	103 (56.0)		69 (37.5)		41 (22.3)	
400 Level / Fourth Year	82 (46.1)		54 (30.3)		53 (29.8)	
500 Level / Fifth Year	40 (46.5)		35 (40.7)		18 (20.9)	
600 Level / Final Year	11 (37.9)		14 (48.3)		12 (41.4)	
Total, n (%)	**404 (51.5)**		**257 (32.8)**		**182 (23.2)**	

A total of 106 (13.5%) had good to excellent internet service, 254 (32.4%) had average internet access and 424 (55.1%) had poor internet service. Students in state-owned universities were significantly more

likely to report poorer internet access compared with their counterparts in federal and private institutions ($p < 0.001$). (**Appendix 4**)

Perceived ability to navigate online academic resources differed by sex, with male students reporting significantly higher confidence than females ($p = 0.004$). No significant differences were observed across age groups, geopolitical zones, or year of study ($p > 0.05$ for all). However, students in federal and state institutions reported greater confidence in navigating digital resources compared with those in private universities ($p = 0.019$). (**Appendix 4**)

Barriers to Digital Tools and Resources

The most commonly reported barriers to accessing digital academic resources were high subscription costs (460, 58.7%), poor internet connectivity (431, 55.0%), and lack of institutional provision (422, 53.8%). (**Appendix 5**)

Perceived Impact of Academic Tools and Resources on Learning

A majority of respondents (635, 81%) reported feeling inadequately equipped to compete with international peers due to limited access to digital academic resources. Perceived preparedness differed significantly by institutional type ($p = 0.028$), with students in private universities reporting higher confidence compared with those in federal and state institutions (25.9% vs 17.3% and 16.1%, respectively) (Fig. 3).

In addition, 564 (72%) of students noted that the access to digital resources had a direct impact on their learning experience. (**Appendix 6**)

A bi-variate analysis showed that Students aged 30 and below were twice likely of feeling competent to compete globally ($p = 0.046$). Students with access with online courses, e-learning platforms were twice as likely to feel ready to compete globally ($p < 0.001$ each), and those with access to simulation labs were three times as likely ($p < 0.001$). (Table 3)

On multivariate analysis, access to key digital tools was independently associated with higher perceived global competitiveness. Students with access to lecture recordings (aOR 1.9, $p = 0.003$), and simulation laboratories (aOR 2.9, $p < 0.001$) were significantly more likely to report feeling equipped to compete globally. However, students' access to online courses significantly reduced their perception of competing globally (aOR 0.5, $p = 0.001$). (Table 3).

Table 3
Multivariate Analysis Comparing Nigerian Medical Students' Preparedness for Competing with Global Peers

Parameter	Equipped to Compete with Global Peers		OR (p < 0.05)	aOR (95% CI)	p < 0.05
	Yes	No			
Sex, n (%)					
Female	61 (16.3)	313 (83.7)	0.74 (0.283)	1.4 (1.0–2.0)	0.071
Male	84 (20.7)	321 (79.3)			
Age, n (%)					
30 and below	142 (18.5)	627 (81.5)	2.03 (0.046) *	2.3 (0.2–18.1)	0.697
Greater than 30	1 (10.0)	9 (90.0)			
Class, n (%)					
Pre-Clinical (100–300 Level)	89 (18.1)	402 (81.9)	0.92 (0.644)	0.9 (0.6–1.4)	0.654
Clinical (400–600 Level)	57 (19.5)	236 (80.5)			
Region, n (%)					
North	63 (17.8)	290 (82.2)	0.91 (0.614)	0.8 (0.5–1.2)	0.319
South	83 (19.3)	348 (80.7)			
Access to Online Courses, n (%)					
Yes	75 (29.2)	182 (70.8)	2.65 (< 0.001) *	0.5 (0.3–0.7)	0.001*
No	71 (13.5)	456 (86.5)			
Access to E-Learning Platforms, n (%)					
Yes	101 (25.0)	303 (75.0)	2.48 (< 0.001) *	1.9 (1.2–2.8)	0.003*
No	45 (11.8)	335 (88.2)			

aOR: Adjusted Odd's Ratio, CI: Confidence Interval

Parameter	Equipped to Compete with Global Peers		OR (p < 0.05)	aOR (95% CI)	p < 0.05
	Yes	No			
Sex, n (%)					
Access to Simulation Labs, n (%)					
Yes	65 (35.7)	117 (64.3)	3.57 (< 0.001) *	2.9 (1.9–4.4)	< 0.001*
No	81 (13.5)	521 (86.5)			
aOR: Adjusted Odd's Ratio, CI: Confidence Interval					

Discussion

This study provides the first comprehensive national assessments of the availability, utilisation and perceived impact of digital learning resources among undergraduate medical students in Nigeria. The findings reveal a paradoxical picture of digital readiness amidst infrastructural limitations. While most students owned internet-enabled devices, particularly smartphones, and recognised the importance of digital resources in their learning, access to institutionally provided digital infrastructure remained limited. Significant disparities were observed across institution types and geographical regions. For instance, there was an unfair advantage that students in the Southwestern and North-central schools had over their counterparts in other zones with access to personalised emails. While access to digital resources was independently associated with students' perceived preparedness to compete with international peers. Collectively, these findings suggest that Nigerian medical students are increasingly prepared to engage with digital education, but institutional and systemic barriers continue to constrain this.

Digital readiness exists, but institutional digital infrastructure remains underdeveloped

One of the most important findings of this study was the disconnect between students' ownership of digital devices and the availability of institutional digital learning resources. Although over 90% of respondents reported using smartphones for academic purposes, less than half have personalised institutional email accounts and less than a third actively used it, while access to lecture recordings, online courses and simulation laboratories remained limited. This pattern mirrors observations across several Low- and Middle-Income Countries (LMICs), where the rapid adoption of personal digital technologies has often outpaced institutional digital transformation (15–19).

Institutional email access may appear to be a simple administrative resource useful as a portal for students, but it serves as a gateway to academic databases, online libraries, cloud-based learning platforms, research collaboration opportunities and professional communication networks. In many High-Income Countries (HICs), personalised institutional accounts are routinely provided to all students and serve as the foundation of integrated digital learning ecosystems that include learning management systems, virtual classrooms, institutional repositories and scholarly databases (20). The finding that fewer than one-third of Nigerian medical students actively use institutional email accounts therefore reflects broader deficiencies in institutional digital infrastructure rather than merely communication preferences.

Importantly, most students who had access to institutional email accounts reported using them for academic purposes, highlighting a strong willingness to engage with digital educational opportunities when they are available. This suggests that the primary challenge is not student motivation or digital literacy, but the limited provision of institutional digital resources. The particularly low use of digital resources observed in state-owned institutions and in some geopolitical zones further suggests the need for targeted institutional investment to reduce inequities in access.

The digital divide in Nigerian medical training

The study also identified substantial disparities in access to digital resources across geopolitical zones and institution types. Students in private universities reported greater access to laptops, tablets and institutional email accounts, while students in state-owned universities were significantly more likely to report poor internet connectivity. Regional differences were similarly evident, with students in the South-West reporting better access to institutional email services and online courses, while those in the North-East reported greater availability of simulation laboratories. These findings align with broader evidence from LMICs showing that educational opportunities are often shaped by institutional funding, technological infrastructure, governance arrangements and regional socioeconomic development (15–19). Variations in broadband penetration, electricity supply, information technology capacity and institutional investment likely contribute to the differences observed across regions and institution types (21). Such disparities risk creating a tiered system of medical education in which students' access to digital learning opportunities depends not only on academic merit but also on where they study.

This issue has implications for educational equity and workforce development. As digital technologies become increasingly embedded within healthcare delivery, research and professional education, unequal access to digital learning environments may contribute to widening competency gaps among graduates (22). Addressing these inequities should therefore be considered an educational priority as well as a workforce development strategy (18, 19).

Structural barriers, rather than a lack of willingness, limit digital learning

Another key finding was that the principal barriers to digital resource utilisation were high subscription costs, poor internet connectivity and inadequate institutional provision. More than half of the participants reported poor internet access, while cost and lack of institutional support emerged as the most frequently reported obstacles. These findings suggest that barriers to digital education in Nigeria are predominantly structural and financial rather than behavioural.

Consistent with global literature, poor bandwidth, limited internet access and high data costs continue to hinder students' utilisation of digital learning tools and resources (8, 23). Similar challenges have been reported among medical students in Uganda, Kenya, South Africa and other resource-constrained settings, where inadequate digital infrastructure limits participation in online learning despite high levels of interest among students (18, 24–27). Comparable findings have also been reported from countries such as Iran and Peru (28, 29), although the extent of infrastructural limitations remains substantially lower than that observed in many HICs (7, 8, 30).

The persistence of these barriers despite the accelerated digital transformation triggered by the COVID-19 pandemic suggests that emergency adoption of online learning was not consistently accompanied by sustained investments in infrastructure (31). Many universities rapidly adopted digital teaching approaches during the pandemic, yet long-term investments in broadband access, learning management systems, cloud-based services and educational technology support appear to have lagged behind (31). This may partly explain why widespread ownership of smartphones (7, 32) has not translated into widespread access to high-quality digital educational experiences.

Addressing these challenges will require coordinated action from universities, government agencies, telecommunications providers and regulatory bodies. Potential solutions include subsidised educational data packages, institution-wide subscriptions to academic platforms, campus broadband expansion, zero-rated access to educational websites and public-private partnerships aimed at strengthening digital infrastructure within medical schools.

Digital resources are associated with perceptions of global competitiveness and educational preparedness

Perhaps the most important finding of this study was the strong relationship between access to digital learning resources and students’ perceived preparedness to compete globally. Four out of every five respondents felt inadequately equipped to compete with international peers because of limitations in digital resources and infrastructure. Furthermore, nearly three-quarters believed that improved access to digital resources would positively influence their learning experience.

Importantly, multivariable analysis demonstrated that access to e-learning platforms and simulation laboratories was independently associated with greater perceived global competitiveness. Students with access to simulation laboratories were almost three times more likely to feel prepared to compete with international peers, making simulation access the strongest predictor identified in this study.

These findings are consistent with growing international evidence demonstrating that digital and simulation-based educational approaches enhance learner engagement, self-directed learning, clinical reasoning and confidence (19, 33–39). Lecture recordings have become a routine component of undergraduate medical education in many countries, with studies from Uganda demonstrating improvements in learning flexibility and comprehension (24), while research from India has reported improved academic performance following the incorporation of video-based learning approaches (34). Similarly, studies from Australia have shown widespread utilisation and acceptance of lecture recordings among medical students (35).

Simulation-based education has become a cornerstone of contemporary medical training in many HICs, providing opportunities for deliberate practice in safe learning environments before patient encounters. Beyond procedural competence, simulation training has been shown to strengthen teamwork, communication, leadership and decision-making skills (36–38). The relatively low availability of simulation laboratories observed in this study, therefore, represents a significant educational gap. While establishing sophisticated simulation centres may be challenging in resource-constrained settings, lower-cost simulation models, virtual simulation platforms, and regional simulation hubs may provide scalable alternatives (40).

Taken together, these findings suggest that digital resources are not merely technological conveniences but educational assets that influence students' confidence, preparedness and ability to participate in an increasingly globalised healthcare workforce. The widespread perception of inadequate global competitiveness observed in this study may therefore reflect genuine concerns regarding unequal access to the educational resources that are increasingly standard in medical schools globally.

Implications for policy and medical education reform

The findings of this study indicate that improving digital medical education in Nigeria requires less emphasis on student willingness and more emphasis on institutional and policy investment. Nigerian medical students appear ready to engage with digital learning, as evidenced by widespread device ownership, positive perceptions of digital learning and substantial utilisation of available resources. The challenge lies in ensuring equitable access to high-quality digital infrastructure and educational technologies.

Universities should prioritise the provision of reliable internet connectivity, learning management systems and access to digital academic resources. Structured digital literacy training and information technology competencies should be incorporated into undergraduate medical curricula. Partnerships with educational technology organisations, telecommunications providers and professional bodies may also help expand access to simulation laboratories, online learning platforms and digital libraries. At a national level, regulators and policymakers should consider incorporating digital education standards into accreditation frameworks and increasing investment in educational technology infrastructure to ensure that students across all regions and institution types have equitable opportunities to benefit from digital learning.

Future research should focus on developing consensus-based minimum standards for digital learning infrastructure and educational resources in Nigerian medical schools, potentially through a Delphi process involving students, educators, regulators, and educational technology experts.

Strengths and Limitations

A major strength of this study is its national scope, including students from accredited medical schools across all six geopolitical zones and across federal, state, and private institutions. The large sample size and broad representation provide the most comprehensive assessment of digital learning resources among Nigerian medical students to date.

Several limitations should be considered. The cross-sectional design limits causal inference, although multivariable analyses were performed to account for potential confounding factors. Data were self-reported and may be subject to recall or social desirability bias; however, anonymous participation and pilot testing of the survey tool were employed to minimise these risks. Additionally, perceived global competitiveness was a subjective outcome and may not directly reflect objective educational performance. Nevertheless, students' perceptions remain important because they influence confidence, engagement, and readiness to participate in educational and professional opportunities. Future longitudinal and mixed-methods studies are needed to explore the relationship between digital resource availability and educational outcomes more comprehensively.

Conclusion

This study demonstrates that although Nigerian medical students possess substantial digital readiness through widespread ownership of internet-enabled devices, significant deficiencies remain in institutional digital infrastructure, with notable disparities across institution types and regions. Most students perceived these limitations as barriers to their global competitiveness, while access to online courses, e-learning platforms and simulation laboratories was strongly associated with improved preparedness. Strengthening institutional digital infrastructure and expanding access to affordable internet services represent critical steps towards improving the quality, equity and global relevance of undergraduate medical education in Nigeria.

Abbreviations

MDCN Medical and Dental Council of Nigeria

CHERRIES Checklist for Reporting Results of Internet E-Surveys

HICs High-Income Countries

LMICs Low- and Middle-Income Countries

Declarations

Ethical Approval and consent to Participate: Ethical clearance was obtained from the Health Research and Ethical Committee of the Jos University Teaching Hospital *(JUTH/DCS/IREC/127/XXXI/3019)* (***Appendix 3***). This study was carried out according to the principles of the Declaration of Helsinki. Informed consent was obtained from each participant before commencing the survey

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Figures

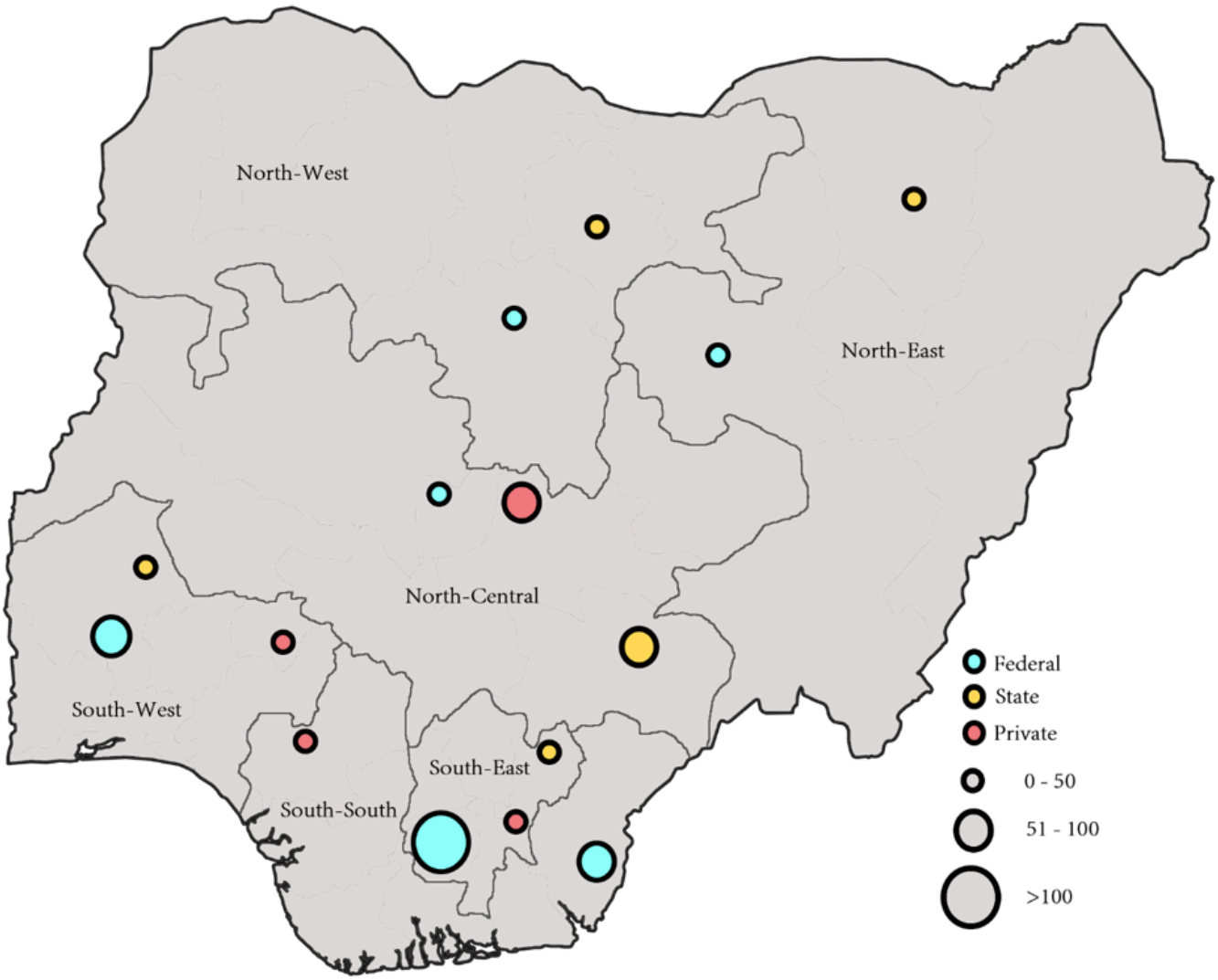


Figure 1

Geographical mapping of sampled schools across Nigeria

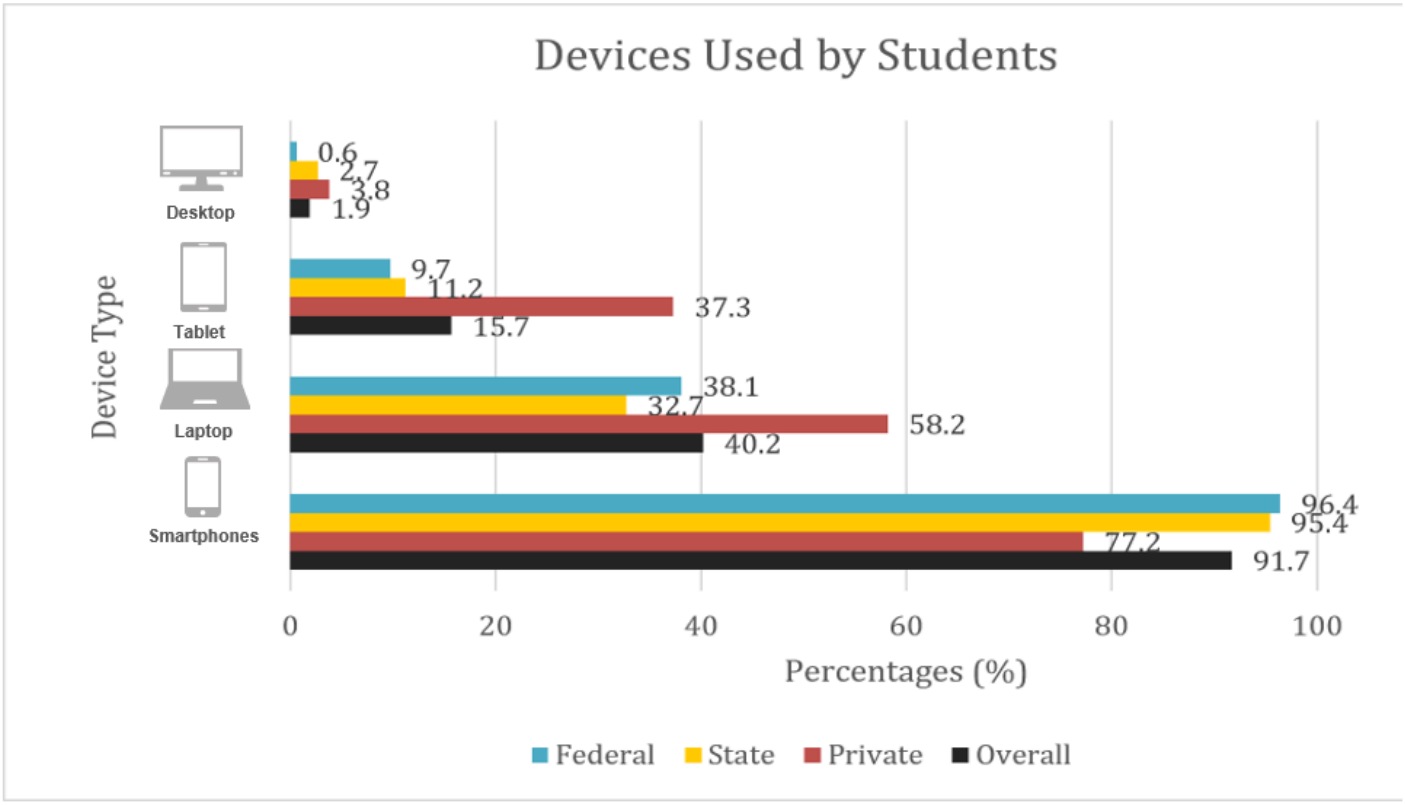


Figure 2

Devices used by Medical Students in Accessing Digital Academic Tools and Resources and the Percentage of Students Using these Devices Based on Institution Type.

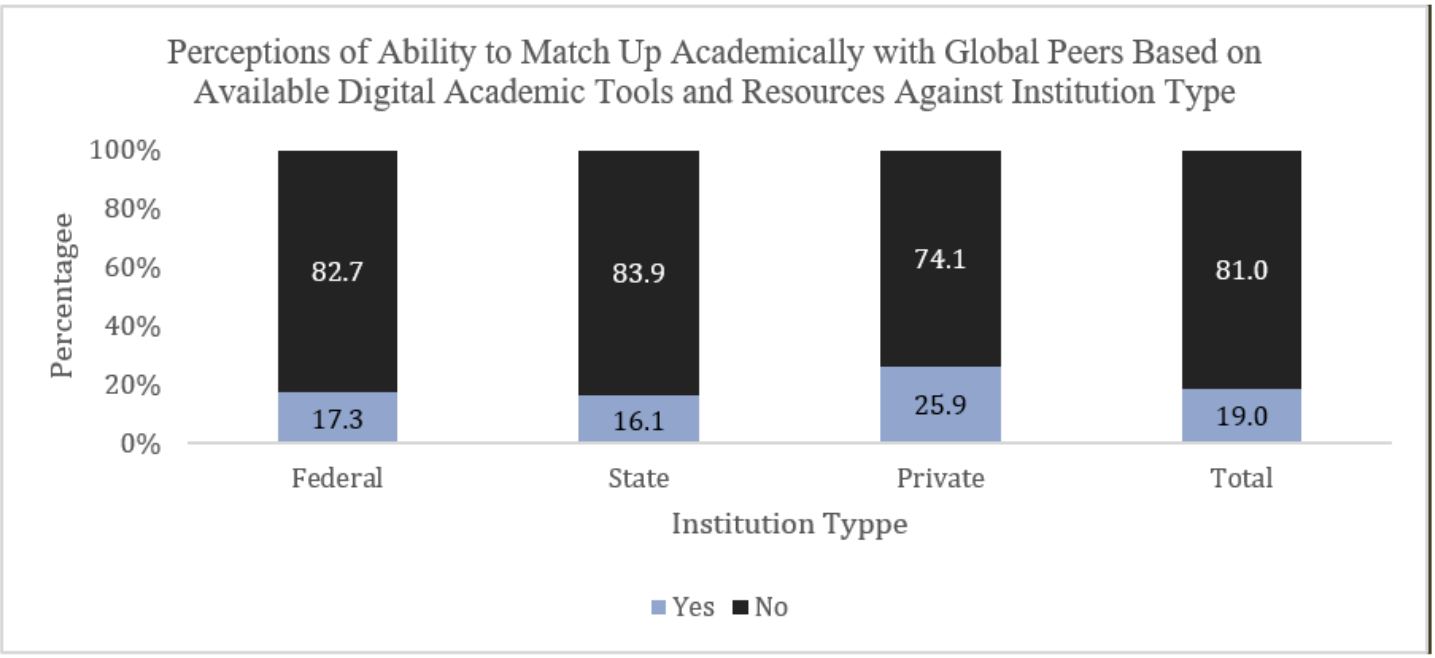


Figure 3

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- Appendix1ChecklistforReportingResultsofInternetESurveys.pdf
- Appendix2MedicalStudentsResourceSurveyGoogleForms.pdf
- Appendix3EthicalPermission.jpeg
- Appendix4Table.pdf
- Appendix5Figure.pdf
- Appendix6Figure.pdf