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# WEST AFRICAN JOURNAL OF MEDICINE


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WEST AFRICAN JOURNAL OF MEDICINE

ORIGINAL ARTICLE

# Knowledge, Perceptions and Levels of Utilisation of E-Learning among Medical Students in Nigeria

## *Connaissances, Perceptions et Niveaux D'utilisation de L'apprentissage en Ligne chez les Étudiants en Médecine au Nigeria*

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**ABSTRACT**

**BACKGROUND:** Globally, electronic learning (e-learning) is being embraced in all spheres, including the field of Medicine, where it has an engrained role in both medical education and practice.

**OBJECTIVES:** The study aimed to assess the knowledge, perception, and factors influencing the utilisation of e-learning amongst medical students in Nigeria.

**METHODS:** It was a descriptive, cross-sectional survey. The study involved public and private medical schools across the six geopolitical zones of Nigeria. Five hundred and thirty (530) medical students responded to the online questionnaire (Google forms). Data were analyzed using SPSS version 23.0.

**RESULTS:** The mean age of the participants was 21.5 ± 3.1 years, with 60.8% being females. About three-fifths (59.5%) of the respondents were in public universities, while the remaining were in private universities. Nearly all the respondents (98.1%) were aware of e-learning. The majority believed that e-learning would be useful for lectures and seminars, but not for laboratory demonstrations, clinical demonstrations, and bedside teaching. Class of study ($p = 0.002$), school ownership ($p = 0.034$), institutions having e-learning platform ($p < 0.001$); having received e-learning training ($p < 0.001$)) and institution encouraging e-learning for students ($p < 0.001$) were significant predictors of utilization of e-learning. High cost and poor internet connectivity were the most cited disadvantages of e-learning.

**CONCLUSION:** This study showed that e-learning is well known among Nigerian medical students, although some had never utilized it. The high financial costs, poor internet connectivity, and irregular electricity were among the major constraints to the utilization of e-learning. **WAJM 2023; 40(2): 161–168.**

**Keywords:** E-learning, Knowledge, Medical students, Nigeria, Utilisation.

**RÉSUMÉ**

**CONTEXTE:** Dans le monde entier, l'apprentissage électronique (e-learning) est adopté dans toutes les sphères, y compris dans le domaine de la médecine, où il joue un rôle important dans l'enseignement et la pratique de la médecine.

**OBJECTIFS:** L'étude visait à évaluer la connaissance, la perception et les facteurs influençant l'utilisation de l'apprentissage électronique chez les étudiants en médecine au Nigeria.

**MÉTHODES:** Il s'agissait d'une enquête descriptive et transversale. L'étude a impliqué des écoles de médecine publiques et privées dans les six zones géopolitiques du Nigeria. Cinq cent trente (530) étudiants en médecine ont répondu au questionnaire en ligne (Google forms). Les données ont été analysées à l'aide de SPSS version 23.0.

**RÉSULTATS:** L'âge moyen des participants était de 21,5 ± 3,1 ans, 60,8 % étant des femmes. Environ trois cinquièmes (59,5 %) des répondants étaient dans des universités publiques, tandis que les autres étaient dans des universités privées. Presque tous les répondants (98,1 %) connaissaient l'apprentissage en ligne. La majorité d'entre eux pensaient que l'apprentissage en ligne serait utile pour les cours magistraux et les séminaires, mais pas pour les démonstrations en laboratoire, les démonstrations cliniques et l'enseignement au chevet des patients. La classe d'étude ($p = 0,002$), la propriété de l'école ($p = 0,034$), les institutions disposant d'une plateforme d'apprentissage électronique ($p < 0,001$), ayant reçu une formation à l'apprentissage électronique ($p < 0,001$)) et les institutions encourageant l'apprentissage électronique pour les étudiants ($p < 0,001$) étaient des prédicteurs significatifs de l'utilisation de l'apprentissage électronique. Le coût élevé et la faible connectivité à internet étaient les inconvénients les plus cités de l'apprentissage en ligne.

**CONCLUSION:** Cette étude a montré que l'apprentissage en ligne est bien connu parmi étudiants en médecine nigérians, même si certains ne l'ont jamais utilisé. Les coûts financiers élevés, la mauvaise connectivité à internet et l'irrégularité de l'électricité sont parmi les principales contraintes à l'utilisation de l'apprentissage en ligne. **WAJM 2023; 40(2): 161–168.**

**Mots Clés:** Apprentissage en ligne, Connaissances, Étudiants en médecine, Nigeria, Utilisation.

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## INTRODUCTION

The advent of the computer and the internet has revolutionalised every sector globally. Globally, electronic learning (e-learning) is being embraced in all spheres, including the field of Medicine. E-learning has an engrained role in both medical education and practice.[1–3] E-learning is defined as "a means of education that incorporates electronic equipment and tools and the interactivity that occurs between these and the people involved in the educational process, including the instructors and learners".[4] It is indeed a means to enhance the efficacy of learning.[5] E-learning processes and applications include internet-based learning, computer-based learning, digital collaboration, and virtual classrooms. Delivery media adopted in the dissemination of information include the internet, intranet/extranet, audio or video tape, and satellite television. The learning process may be self-paced, instructor-led, or a combination of both to deliver optimal content.[6,7]

E-learning is indeed changing and modifying the way education runs in Universities, with even primary and secondary schools taking the cue.[8] The benefits of e-learning are inexhaustible and they include global penetration, broadening of learning scope, better understanding and comprehension, simultaneous learning opportunities, ease of learning, and facilitation of learning.[9] As expected, barriers such as burdensome nature for some users, need for computer literacy, internet cost, and availability of e-learning facilities abound.[10] Although e-learning originated from developed countries and is now well established, it is extending to developing nations in Sub-Saharan Africa, including Nigeria.[9,11]

The Institute of Educational Studies in Canada in their research showed that learners tend to adopt a more active attitude towards learning when they have access to online articles, journals, electronic books, interactive exercises, discussion panels, and videos.[5,12] Various applications of e-learning in medical training include an audio-visual demonstration of diagnostics, procedures and intervention techniques, online case studies and patient logs, clinical decision support systems, medical video games, virtual patients, e-books, e-atlases, and so on.[13]

Nigeria currently has 37 fully accredited medical schools involved in the undergraduate training of medical doctors.[14] The classic medical school structure in Nigeria, which usually lasts 6 years, revolves around the traditional classroom approach, physical presence in clinics, as well as ward rounds and teaching sessions, with minimal e-communication.[9] Various courses are taken during the training, broadly classified into Basic Medical, Pre-clinical and Clinical courses. Due to the elaborate curriculum of medical school, medical students barely have sufficient time or opportunities to be adequately exposed to all varieties of clinical cases.[1] With these challenges, e-learning may help to optimize medical training.[1]

Disruptions in the learning chain severely impede the overall outcome of the medical training. The 'lockdown' occasioned by the Coronavirus disease (COVID-19) pandemic has led the educational sector of many countries to resort to e-learning, especially online lectures, as a means of seeing to the continuation of learning. This study aimed to assess the knowledge, perception, and level of utilisation of e-learning amongst medical students in Nigeria.

## SUBJECTS AND METHODS

### Study Design

This was a descriptive, cross-sectional survey carried out among medical students in private, and government-owned training institutions in the six geopolitical zones of Nigeria. According to the Medical and Dental Council of Nigeria, there are 37 fully accredited medical schools comprising 16 Federal, 15 State, and six privately-owned.[14] The geopolitical distribution of the schools is nine, seven, and 10 in the South-South, South-East, and South-West zones respectively. In the North, there were five medical schools in the North-Central, four in the North-West, and two in the North-East.

### Sample Size Determination

The minimum sample size was determined using the Kish formula[15] as follows:

$n = Z^2pq/d^2$ {where n = sample size, Z = critical value (1.96 for 95% confidence level), p = proportion, q = 1–p, d = absolute precision}. The minimum sample size was estimated to be 384, assuming absolute precision of 5% and taking p as 50%, assuming that half of the Nigerian medical students utilise e-learning.

### Sampling Technique and Recruitment of Participants

A convenience sampling technique was used to recruit study participants. The study was questionnaire-based; participants were requested to fill the questionnaires online, via Google forms. Consenting students from the first year (100 level) to the final year (600 level) of the study were recruited over seven months between October 2020 and April 2021. The Immediate Past President and the incumbent President of the Nigerian Medical Students Association (NIMSA) were contacted, and they assisted in sharing the link to the online questionnaire with the Presidents of the various Chapters of NIMSA in the respective medical schools. Students were also contacted directly by the researchers when possible. The link was shared via dedicated WhatsApp platforms (association and class groups) and email messages. The questionnaire contained socio-demographic characteristics and also assessed the knowledge (8 questions), perception (5 questions), individual preparedness (10 questions), and level of utilisation of e-learning (11 questions) amongst medical students. The questionnaire was developed by the researchers and reviewed by medical education experts.

### Ethical Considerations

Ethical clearance was obtained from Babcock University Health Research and Ethics Committee (BUHREC 322/20), Ilishan Remo, Ogun State, Nigeria. Participants were given information about the study and its importance and were assured of confidentiality regarding the information supplied. Informed consent was obtained from each of the participants before they could proceed to fill out the questionnaire. Participation

was voluntary and the study did not harm the participants.

**Data Analysis**

The collected data were exported from Google forms and entered into IBM SPSS for Windows version 23 (Armonk, NY), with which statistical analysis was carried out. Categorical variables were reported using frequency distribution tables, bar charts, and a pie chart, while continuous variables were reported using descriptive statistics such as mean or median as appropriate. Composite variables (aggregate scores) for knowledge and perception of e-learning were computed from items on the questionnaire. Every correct knowledge was scored as 1 and wrong knowledge was scored as 0. The mean knowledge score of respondents was calculated as 5.93 (approximated to 6). Average knowledge of at least 6 (mean score) was considered good knowledge of e-learning and below 6 was considered as poor knowledge. For perception, strongly agreed with the use of e-learning for the various aspects of medical teaching was scored 5 while strongly disagreed was scored 1. The mean perception score was calculated to be 20. A perception of 20 (mean score) and above was considered a good perception and below 20 was considered a poor perception. Utilization was assessed by asking for those who had utilized/received any form of teaching through e-learning. Chi-square was used to test for association between categorical variables while logistic regression was used to determine predictors of utilization of e-learning. Statistical significance was set at $p < 0.05$.

**RESULTS**

A total of 530 individuals participated in the study, with a mean age of 21.47 ± 3.1 years. Most (57.7%) respondents were between the ages of 20 and 24 years. There was a female preponderance with three-fifths (60.8%) of the respondents being females. Over half of the study participants were of the Yoruba ethnicity (54.5%), followed by Igbo (18.5%) and Hausa (5.3%). Other ethnicities constituted 21.7%. As shown in Table 1, over two-thirds of the respondents were schooling in the South-west zone of Nigeria. Only 471 of the 530 respondents indicated the type of school ownership. Of these, 59.5% were in public universities (Federal and State). Thirty-nine (7.4%) respondents had a first degree before starting medical school.

**Table 1: Characteristics of Study Participants**

| Variable | Frequency | Percentage (%) |
|---|---|---|
| **Level of Study** | | |
| 100 level | 25 | 4.7 |
| 200 level | 94 | 17.7 |
| 300 level | 59 | 11.1 |
| 400 level | 111 | 20.9 |
| 500 level | 150 | 28.3 |
| 600 level | 91 | 17.2 |
| **Geo-political Zones** | | |
| South-west | 401 | 75.7 |
| South-east | 9 | 1.7 |
| South-south | 26 | 4.9 |
| North-central | 73 | 13.8 |
| North-west | 20 | 3.8 |
| North-east | 1 | 0.2 |
| **School Ownership** | | |
| Private | 191 | 40.6 |
| Public (State-owned) | 151 | 32.1 |
| Public (Federal-owned) | 129 | 27.4 |

**Knowledge of E-learning**

Nearly all the respondents (98.1%) had heard of e-learning before the study. Most participants heard about e-learning from the media (78.9%), school (76.1%), friends (46%), and parents (19.7%). In concordance, 99.6% of the students correctly identified the full meaning of e-learning as "Electronic-learning" and 99.2% were aware that e-learning involves the use of web/internet-based platforms. Similarly, a majority (79.2%) of the respondents knew that e-learning could be applied to a physical classroom or clinical setting, while 13.4% thought otherwise and 7.4% simply did not know. Most (80.6%) of the respondents knew that synchronous e-learning involves carrying a whole class along during sessions, though 2.3% thought otherwise and 17.2% did not know. A lower percentage (57.7%) however knew about asynchronous e-learning and how it offers an opportunity for individualized learning, while 5.1% thought otherwise and 37.2% did not know. More than three-quarters (77.9%) of the respondents agreed that blended learning combines online education resources with traditional place-based classroom methods, whereas 1.9% did not agree and 20.2% did not know.

**Perception of E-learning**

The perceived advantages of e-learning include the fact that learners could be at different locations, it does not require a physical meeting, the timing of classes can be more flexible, disruption to the curriculum can be minimized, and it is highly effective, amongst others as shown in Figure 1. Almost half (46.8%) of the respondents believed that e-learning posed no benefit to medical training in Nigeria. Most (77.9%) of the respondents believed that some aspects of medical education could be conducted remotely, especially the possibility of core lectures and seminars being done using E-learning. About half of the participants disagreed with the use of e-learning for lab demonstrations, clinical demonstrations, and bedside teaching as shown in Figure 2.

The results further showed that most respondents had a high level of confidence (extremely confident/very confident) in the use of word processing software (e.g., MS Word), presentation software, the internet, and video

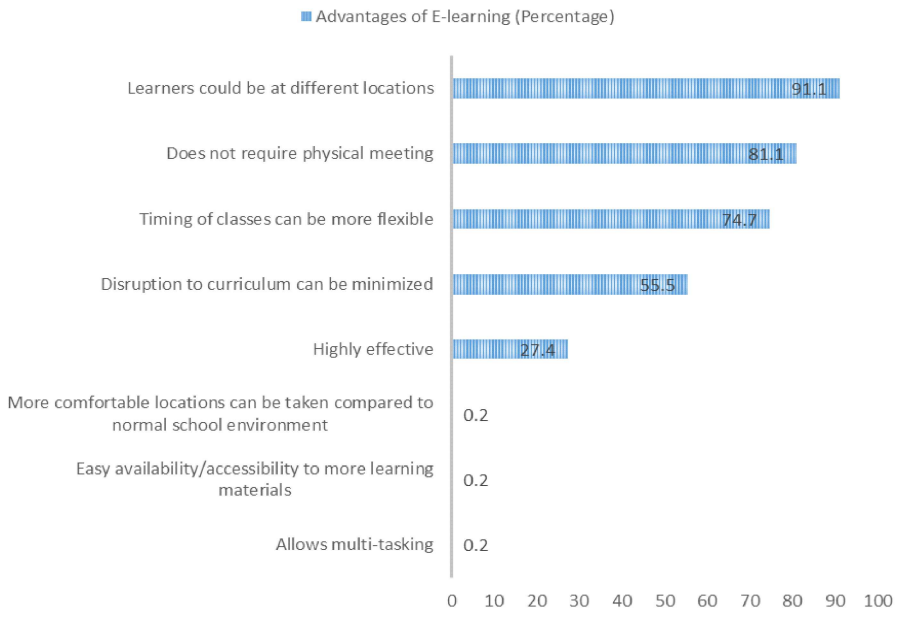



**Fig. 1: Advantages of E-Learning.**

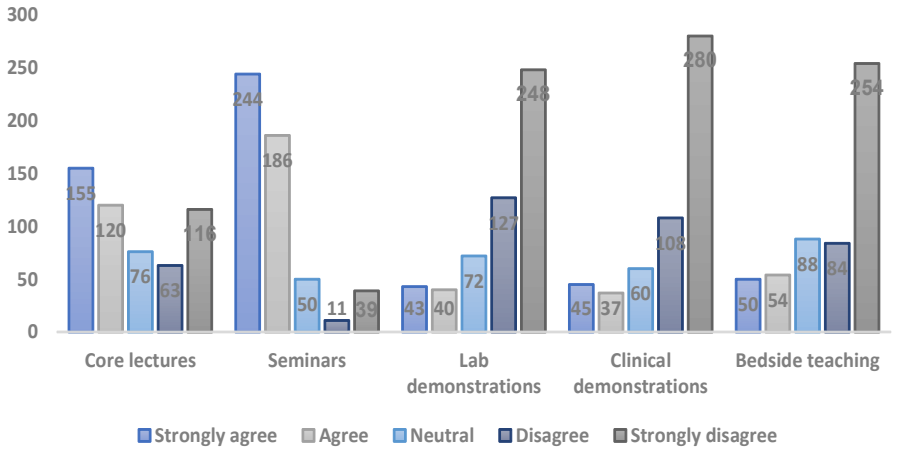



**Fig. 2: Participants' Perception of Aspects of Medical Education that can be delivered by E-Learning.**

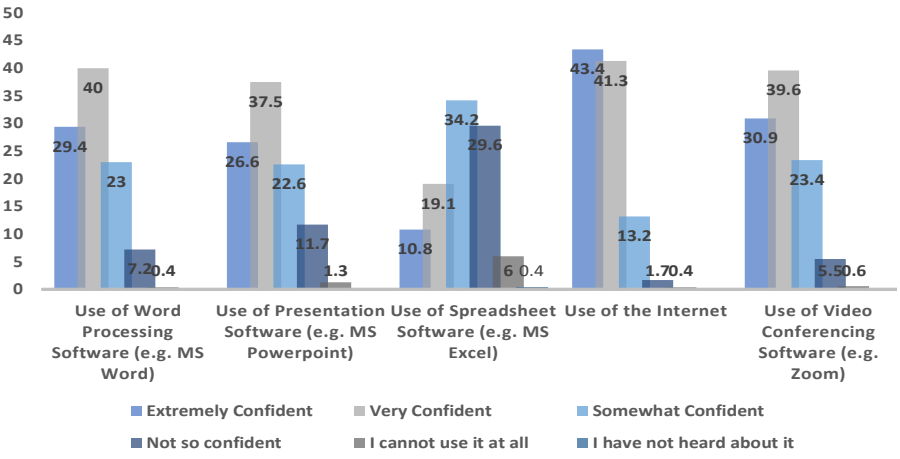



**Fig. 3: Level of Confidence in the use of E-Learning-Related Software.**

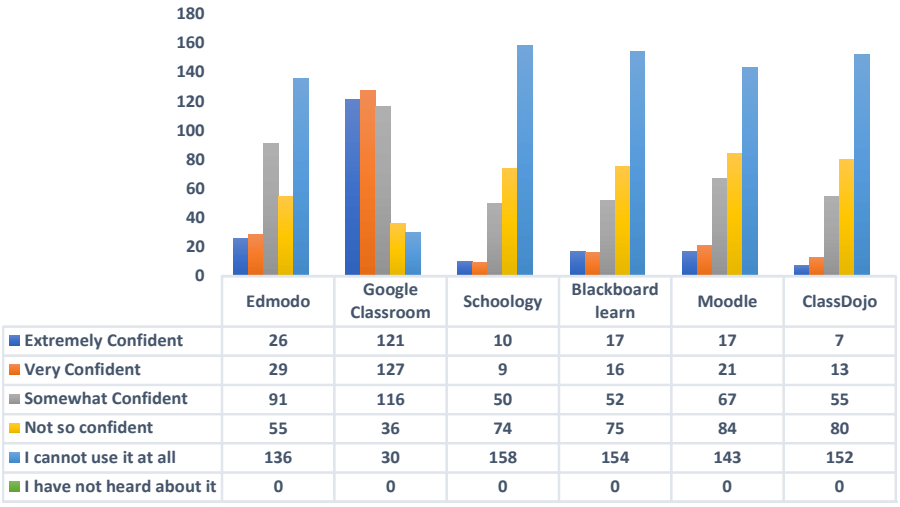
conferencing software. The participants were much less confident in the use of the Spreadsheet software compared to other software. The respective percentages are detailed in Figure 3.

Of all the learning management systems (LMS) that are commonly used for e-learning, Google Classroom was the best known among the study participants (81.7%). The level of confidence in the use of the various LMS varied across the different platforms, however, a majority of the respondents were most confident with the use of Google Classroom and Edmodo as shown in Figure 4. Other LMS known by the respondents includes Canvas, Brightspace, UNILAG LMS, Microsoft LMS, Liveboard, Lecturio, Udemy, and Coursera.

### Utilisation of E-learning

Four hundred and twenty-eight (80.8%) of the study participants had received online lecture(s) during their medical training. Utilisation of e-learning was significantly associated with having e-learning department in the institution ($p = 0.022$), having e-learning platform ($p < 0.001$), having ever received training on e-learning ($p < 0.001$), institutions encouraging e-learning for students ($p < 0.001$), class of study ($p < 0.001$) and school ownership ($p = 0.001$), as shown in Table 2. A higher proportion of students in the higher classes (Year 4–6) (85.5%) utilized e-learning compared to only 71.3% of those in the lower classes (Year 1–3). Similarly, a higher proportion of students in private institutions (86.4%) utilized e-learning as compared to 73.4% of students in public institutions. However, age of the students ($p = 0.56$), gender ($p = 0.262$), having personal laptop ($p = 0.194$), knowledge of e-learning ($p = 0.145$) and perception about e-learning ($p = 0.770$) all had no statistically significant association with utilization of e-learning.

Logistic regression (Table 3) shows that class of study (OR = 2.442; 95% CI = 1.407–4.238), school ownership (OR = 0.534; 95% CI = 0.299–0.593), institutions having e-learning platform (OR = 5.841; 95% CI = 3.094–11.029); having received e-learning training (OR = 6.205; 95% CI = 2.267–16.972) and institution encouraging e-learning for students (OR = 3.193;




| | Edmodo | Google Classroom | Schoology | Blackboard learn | Moodle | ClassDojo |
|---|---|---|---|---|---|---|
| Extremely Confident | 26 | 121 | 10 | 17 | 17 | 7 |
| Very Confident | 29 | 127 | 9 | 16 | 21 | 13 |
| Somewhat Confident | 91 | 116 | 50 | 52 | 67 | 55 |
| Not so confident | 55 | 36 | 74 | 75 | 84 | 80 |
| I cannot use it at all | 136 | 30 | 158 | 154 | 143 | 152 |
| I have not heard about it | 0 | 0 | 0 | 0 | 0 | 0 |

**Fig. 4: Level of Confidence in the use of Learning Management Systems.**

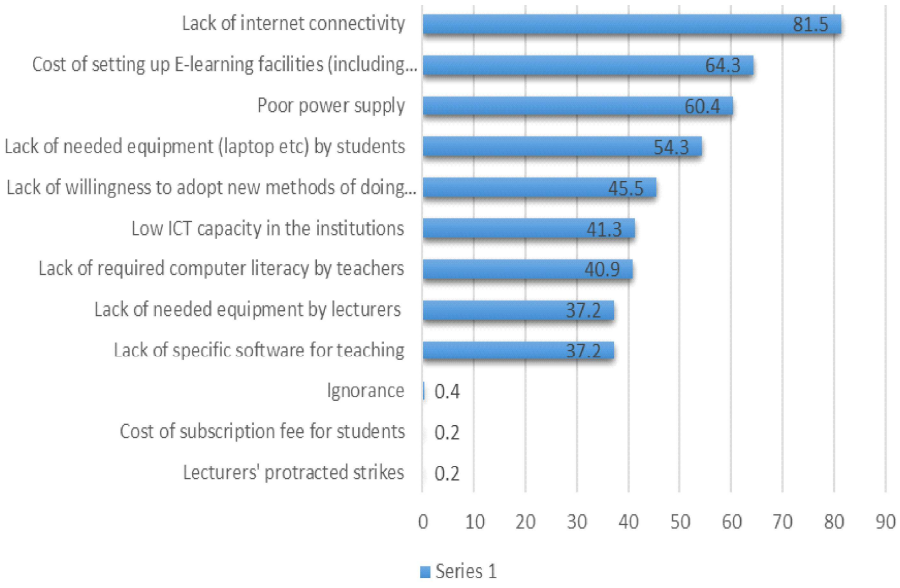



**Fig. 5: Perceived Barriers to Implementing E-Learning in Institutions.**

95% CI 1.698–6.004) remained significant predictors of utilization of e-learning.

With regards to access to uninterrupted institutional internet access, 25 (4.7%) participants found it extremely easy, while 41 (7.7%) found it very easy, 105 (19.8%) found it somewhat easy, 153 (28.9%) found it not so easy, 84 (15.8%) found it rather difficult while 122 (23.0%) responded that it was not available. Just about half of the participants (50.2%) reported having a dedicated e-learning department in their institution, while 54.3% believed that their institutions encouraged the use of e-learning to engage with medical students. Some of the perceived barriers to the implementation of e-learning in the institutions include lack of internet connectivity, poor power supply, high cost of setting up e-learning (including internet), lack of required equipment by students and lecturers, and low ICT capacity, among others (Figure 5).

## DISCUSSION

Historically, the greatest disruption of the educational systems reportedly occurred during the COVID-19 pandemic, with many institutions all over the world resorting to online learning as an alternative to the traditional learning systems.[16] This has no doubt significantly improved the awareness and utilisation of e-learning across all ages, particularly in developed countries where facilities are advanced and more readily available. Findings from this study revealed a high level of e-learning awareness among the sample of medical students, most of who became aware of e-learning through media, school, friends, and parents. Most of the study respondents also understood the basic principles of e-learning. This finding is in tandem with a previous study conducted in 12 universities across Nigeria, that reported a high level of e-learning awareness among students, staff, and the university administration.[17] Medical students in other parts of the world have also reported a high awareness of e-learning technologies.[18–20] This highlights the mainstream nature of the concept of e-learning and its functionality.

The most prevalent benefits of e-learning reported by our study participants were: learners could be at different locations, it does not require a physical meeting, the timing of classes can be more flexible and a reduction in disruptions to the curriculum. All of these perceived advantages became much more significant with the advent of the COVID-19 pandemic that forced learners at all levels (including medical students) to resort to total online learning or blended learning at the minimum.[21,22] The idea of integrating E-learning into medical education via blended learning however predates the COVID-19 pandemic,[23] though the necessity of it is more apparent today. The benefits of e-learning in ensuring the continuity of education around the world have been well documented.[22,24,25]

Our study participants also reported barriers to e-learning which were mostly related to financial costs in getting the required devices and subscribing to data plans, in addition to connectivity issues and other impediments. These barriers, particularly poor internet connectivity, seem to cut across countries around the world, as studies conducted in parts of Nigeria, Indonesia and India reported similar findings.[17,21,22,24,25] One common factor in the aforementioned

**Table 2: Participants' Characteristics and Bivariate Relationship with Utilisation of E-Learning**

| Variable | Utilization of E-learning | | | p-value |
|---|---|---|---|---|
| | No n (%) | Yes n (%) | Total n (%) | |
| **Age** | | | | |
| ≤20 | 43 (20.5) | 167 (79.5) | 210 (100.0) | |
| >20 | 59 (18.4) | 261 (81.6) | 320 (100.0) | 0.560 |
| **Gender** | | | | |
| Female | 57 (17.7) | 265 (82.3) | 322 (100.0) | |
| Male | 45 (21.6) | 163 (78.4) | 208 (100.0) | 0.262 |
| **Has personal laptop** | | | | |
| No | 36 (22.6) | 123 (77.4) | 159 (100.0) | |
| Yes | 66 (17.8) | 305 (82.2) | 371 (100.0) | 0.194 |
| **Has mobile phone with a front camera** | | | | |
| No | 0 (0.0) | 12 (100.0) | 12 (100.0) | |
| Yes | 102 (19.7) | 416 (80.3) | 518 (100.0) | 0.087 |
| **Knowledge** | | | | |
| Good | 78 (20.9) | 296 (79.1) | 374 (100.0) | |
| Poor | 24 (15.4) | 132 (84.6) | 156 (100.0) | 0.145 |
| **Perception** | | | | |
| Good | 57 (18.8) | 246 (81.2) | 303 (100.0) | |
| Poor | 45 (19.8) | 182 (80.2) | 227 (100.0) | 0.770 |
| **The institution has an e-learning platform** | | | | |
| No | 84 (40.8) | 122 (59.2) | 206 (100.0) | |
| Yes | 18 (5.6) | 306 (94.4) | 324 (100.0) | <0.001 |
| **Ever received training on e-learning** | | | | |
| No | 97 (25.1) | 290 (74.9) | 387 (100.0) | |
| Yes | 5 (3.5) | 138 (96.5) | 143 (100.0) | <0.001 |
| **The institution has an e-learning department** | | | | |
| No | 61 (23.2) | 202 (76.8) | 263 (100.0) | |
| Yes | 41 (15.4) | 226 (84.6) | 267 (100.0) | 0.022 |
| **The institution encourages e-learning for students** | | | | |
| No | 83 (34.3) | 159 (65.7) | 242 (100.0) | |
| Yes | 19 (6.6) | 269 (93.4) | 288 (100.0) | <0.001 |
| **Class** | | | | |
| Junior Student (Year 1–3) | 51 (28.7) | 127 (71.3 | 178 (100.0) | |
| Senior Student (Year 4–6) | 51 (14.5) | 301 (85.5) | 352 (100.0) | <0.001 |
| **Geo-political zone** | | | | |
| South | 83 (19.0) | 353 (81.0) | 436 (100.0) | |
| North | 19 (20.2) | 75 (79.8) | 94 (100.0) | 0.793 |
| **School ownership** | | | | |
| Private | 26 (13.6) | 165 (86.4) | 191 (100.0) | |
| Public | 74 (26.4) | 206 (73.4) | 280 (100.0) | 0.001 |

studies is the fact that they were done in developing nations. Furthermore, a study among medical and nursing undergraduates in Uganda reported better attitudes towards e-learning among individuals with better internet connectivity.[18] It is therefore important to note that if e-learning is to thrive in the future of education in developing nations, there is a need for stakeholders, including network providers and government regulators, to be proactive in making cheaper and better internet connectivity solutions. It is also germane that educationists and other relevant policymakers take note of some of the other drawbacks noted in this study and others, to improve the functionality of e-learning delivery, particularly as it relates to medical education.

Regarding the participants' perception of the parts of medical education that e-learning could be useful for, most of the students felt that the use of e-learning for lab demonstrations, clinical demonstrations, and bedside teaching would be inappropriate. Other researchers have reported similar findings among medical students.[21,24] The reason for this perception is not far-fetched – medical education requires a hands-on approach to clinical skills acquisition. However, the solution to this could be using e-learning as an adjunct to physical meetings (blended learning), rather than as a total replacement.

Regarding individual preparedness for e-learning, our study shows that all the students had a mobile phone, while most had a laptop. A study among Indian students affirmed that most students access e-learning content using their mobile phones, followed by their laptops in order of preference.[22] The ubiquitous presence of the smartphone in our society today, and the relatively lower cost to acquire it, make it a choice device for accessing e-learning platforms and content.[26] Researchers have however found that laptop ownership is a significant correlate to a positive attitude towards e-learning.[18] Our respondents further reported at least some proficiency/confidence in the use of the relevant software for e-learning including the internet, video conferencing, word processing, presentation, spreadsheet packages, and relevant LMS, particularly Google Classroom. In contrast, a study from Saudi Arabia indicated Blackboard as the most preferred LMS.[27] The preference for a particular LMS may be influenced by what the institution or teacher opts for. A functional level of proficiency in the use of this software is needed to maximize e-learning. However, only about a quarter of the respondents reported ever receiving training on the use of e-learning platforms. Training is needed for both staff and students so that they can utilize these platforms appropriately.

**Table 3: Predictors of Utilisation of E-Learning**

| Variable | Odd's Ratio | Confidence Interval | p-value |
|---|---|---|---|
| **Class** | | | |
| Junior Class (Year 1–3) | 1 | | |
| Senior Class (Year 4–6) | 2.442 | 1.407–4.238 | 0.002 |
| **School ownership** | | | |
| Private | 1 | | |
| Public | 0.534 | 0.299–0.593 | 0.034 |
| **The school has an e-learning platform** | | | |
| No | | | |
| Yes | 5.841 | 3.094–11.029 | <0.001 |
| **Ever received training on e-learning** | | | |
| No | | | |
| Yes | 6.205 | 2.267–16.972 | <0.001 |
| **The institution has an e-learning department** | | | |
| No | 0.786 | 0.445–1.388 | 0.406 |
| Yes | 1 | | |
| **The institution encourages e-learning for medical students** | | | |
| No | 1 | | |
| Yes | 3.193 | 1.698–6.004 | <0.001 |

This study shows that more students from private institutions had ever had online lectures, compared to those in state and federal universities. Possible reasons for this are variable and can range from lack of investment in the needed infrastructure, lack of willingness to adopt new technologies or incessant industrial action in the government-owned institutions. This is corroborated by a report from South-eastern Nigeria where most medical students responded that the institution lacked relevant technological support for e-learning.[9]

It was observed in this study that the type of school ownership, institutions having an e-learning platform, and institutions encouraging e-learning for students were significant predictors of the utilisation of e-learning. These, we believe, provide areas of focus for institutions, government, and other stakeholders, to improve the availability and utilisation of e-learning for medical undergraduate training.

Our study was limited by the fact that data collection was online rather than physical, thus limiting control over the selection of participants. Furthermore, an interviewer-based study design may be more revealing.

## CONCLUSION

This study showed that e-learning is well known among Nigerian medical students, although some had never utilised it. The high financial cost, poor internet connectivity, and irregular electricity were among the major constraints to the utilisation of e-learning. These imply that educational policy-makers at all levels in Nigeria need to address these problems to ensure the sustenance of e-learning and maximize its benefits, as the global education sector is unlikely to survive henceforth without e-learning.

**Declaration Of Interest**

None.

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