

DIGITAL INFRASTRUCTURE AS CORRELATES OF EQUITABLE ACCESS TO OPEN EDUCATIONAL RESOURCES IN FEDERAL UNIVERSITIES IN SOUTH EAST NIGERIA

Ngozi Ogechukwu Nwogwugwu, PhD, CLN

Confucius Institute Library
Nnamdi Azikiwe university, Awka
Anambra State, Nigeria
ogenwogwugwu@yahoo.com
07062067294

Anike, Angela Njideka, PhD, CLN

Festus Aghagbo Nwako Library
Nnamdi Azikiwe University, Awka
Anambra State, Nigeria
an.anike@unizik.edu.ng
08033536975

Abstract

This paper examined digital infrastructure as correlates of equitable access to open educational resources in Federal universities in South East Nigeria. Four research questions and four null hypotheses guided the study. This study adopted correlation survey research design. The population of the study comprised 161 librarians in the five federal universities in South-East Nigeria. The census sampling technique was adopted for the study since the number is within a manageable size. The sampling method was considered appropriate because it allows statistical enumeration and participation of all members of the population in the study. The instrument for data collection was a structured questionnaire developed by the researcher titled “Questionnaire on Digital Infrastructure” (QDI) and “Questionnaire on Equitable Access to Open Educational Resources” (QEAOER). The items for both instruments were measured using a 4-point Likert scale. The questionnaire was subjected to face validity to 2 experts from Department of Educational Foundations (Measurement and Evaluation Unit) of Nnamdi Azikiwe University, Awka. Cronbach Alpha was used to determine the internal consistency of QDI and QEAOER and coefficient values of 0.78 and 0.83 were obtained. Pearson Product Moment Correlation was used to answer the research questions, while linear regression was used to test the null hypotheses at a 0.05 alpha level. The finding revealed that there is a weak positive and non-significant relationship between internet connectivity, software applications and equitable access to open educational resources in federal universities in South-East, Nigeria. It was recommended amongst others that federal universities in South East Nigeria should establish well-equipped digital learning hubs and adopt device loan schemes that provide students particularly those from disadvantaged backgrounds access to laptops and tablets.

Keywords: Digital infrastructure, Equitable access, Open Educational Resources, Federal Universities

Introduction

Open Educational Resources (OERs) have emerged globally as a vital component of higher education, providing free and openly licensed learning materials that support teaching, learning, and research. In the Nigerian context, OERs include institutional repositories, electronic textbooks, lecture notes, and multimedia content made available through digital platforms. These resources are intended to foster inclusive and equitable access to knowledge by breaking down barriers associated with cost, licensing restrictions, and limited physical access to educational materials (Iheanyi, Orubebe & Oladokun, 2024). OER can include entire courses or programmes, course materials, modules, student guides, teaching notes, textbooks, research articles, videos, assessment tools and instruments, interactive materials such as simulations and role-plays, databases, software, apps (including mobile apps), and any other educationally useful materials (Zaid & Alabi, 2020).

The ideals of globalisation and the need to share resources, technical know-how, and competence form the foundation for OER. The development of ICT has not only enhanced global economic and social networking activities but also global collaborations and resource sharing (Cascio & Montealegre, 2016). Academic staff and postgraduate students have much to gain from OER, provided they can access the resources through the requisite technological infrastructure. They can also use these valuable resources to facilitate teaching, learning, and research activities. The primary objective of OER is to provide unrestricted access to educational resources globally without barriers, through the sharing of academic, educational, and scholastic publications for academics, researchers, and librarians at no cost (Hakim, 2017).

Nwaohiri (2021) reported that academic staff and librarians recognise the pedagogic and cost advantages of OER, yet actual use and contribution remain constrained by limited institutional strategies for OER curation and sustainability. For instance, in federal universities, there exists pockets of OER, mainly institutional repositories, lecture notes, and scanned theses. Presently, the most commonly accessible OER types across federal universities in the South-East are institutional repositories (theses, dissertations), lecture notes and PowerPoint slides posted on departmental pages, and selected open textbooks or journal articles available through university library portals and national open-access initiatives (Zaid & Alabi, 2020). For example, evaluations of NOUN and other Nigerian institutions indicate that repositories and course documents are the common OER items universities use and share, as these require minimal bandwidth and no complex platforms. These resources are relatively low-cost to host and align with existing library practices.

Equitable access to educational resources refers to the principle that all learner should have fair opportunity to obtain the materials, support, and infrastructural needed to succeed academically, regardless of their individual or social circumstances. This means allocating resources based on students' diverse needs, rather than offering the same resources to everyone without regard to their differences. Equity goes beyond mere availability – it aims to remove systemic barriers to meaningful participation in education (UNESCO, 2026)

Despite these positive signs, important OER types remain weakly accessible or absent in many South-East federal universities. Rich media (video lectures, interactive simulations), integrated open courseware, and well-curated OER packages for whole

modules are scarce. Two principal constraints explain this: First, infrastructure deficits such as irregular power supply, limited campus bandwidth, and inconsistent internet access that make hosting and streaming multimedia difficult and, secondly institutional capacity such as limited funding for repository maintenance, and weak incentives for academics to create or adapt OER (Zaid & Alabi, 2020; Ekong & Essien, 2024). Additionally, despite the global momentum, the integration of OERs in federal universities in the South-East of Nigeria remain uneven. For instance, research shows that many students are not fully aware of the opportunities OERs provides, while others encounter difficulties in accessing them due to infrastructural challenges (Ekong & Essien, 2024). Institutions like the National Open University of Nigeria (NOUN), which also serves students in the South-East, have demonstrated the benefits of OERs in improving learning outcomes, but issues such as poor internet access, limited digital literacy, and weak institutional policies hindered their wider usage (Oluwayimika & Idoghor, 2023).

The current status of OERs in federal universities in South East Nigeria further underscores these concerns. Studies indicated that postgraduate students enjoy improved access to open-access resources only when supported by strong digital infrastructure. It is therefore important to note that ensuring equitable access to OERs in federal universities in South East, Nigeria, depends largely on the strength of their digital infrastructure. Onobrakpor, Ozioko, Effiong and Udofia (2023) argued that digital infrastructures are a special class of IT artefact: socio-technical systems of networked hardware, software, standards and institutional arrangements that enable multiple, distributed users to create, share and build on digital services. Operationally, digital infrastructure is defined as the ensemble of university network capacity (bandwidth and Quality of Service), power reliability, server/repository platforms, user devices, technical support services, and governing policies that together enable the discovery, access, streaming and reuse of open educational resources.

Digital infrastructure encompasses the collection of technological and support systems that enable the creation, dissemination, and utilization of digital educational resources. This includes reliable internet connectivity, appropriate hardware, software applications and ICT support services (Ohaire-Udebu & Chukwuemeka, 2024; Ow hoeke, Oparaku & Ordu, 2023). Reliable internet connectivity is the foundational condition for equitable OER access. Bandwidth, latency, and overall quality of service determine whether users can discover, download, stream or interact with OER. Low-bandwidth environments favour distribution of lightweight, text-based resources (PDFs, lecture slides, theses) but effectively preclude routine use of video lectures, streamed content, or interactive simulations that require sustained throughput and low latency

Closely related is hardware infrastructure; the servers, storage, network equipment, data-centres (or cloud subscriptions), and end-user devices (desktop PCs, laptops, tablets, smartphones). Hardware determines whether an institution can host institutional repositories, run content-delivery platforms, or cache large media for local access. Where universities lack reliable servers, use outdated network switches, or have few student/staff devices, even a campus with modest bandwidth cannot deliver OER at scale. Conversely, investments in resilient servers (or cloud hosting), campus Wi-Fi, and device provisioning broaden access and reduce dependence on costly mobile data for each user. Aydin (2021) and Salau, Adamu and Salami (2024) reported that hardware constraints including the capital and recurring costs of hosting and

maintenance are a principal bottleneck to scaling beyond PDFs to integrated OER packages.

Software applications and platforms form the layer that makes OER discoverable, reusable and pedagogically effective. This dimension includes learning management systems (LMSs), institutional repository software (e.g., DSpace), content-management systems, streaming platforms, metadata/cataloguing tools, and tools for licensing (Creative Commons workflows). Even with good connectivity and hardware, the absence of user-friendly repository software, poor metadata practices, or closed, poorly integrated LMSs prevents users from finding and reusing OER. The ability to search, preview, adapt and repackage OER is a software problem as much as a connectivity or hardware one. Salauet al (2024) argued that an OER practice point to a preponderance of ad-hoc departmental web pages and loosely organised repositories usable for simple file sharing but inadequate for rich, discoverable OER ecosystems that require LMS-integration, analytics, and version control

Finally, ICT support services; the human and organizational capacities that operate and sustain the technical stack are decisive for equitable OER access. Support services encompass IT units, librarians skilled in repository management, instructional designers, policy and legal support for licensing, and training programs that raise faculty competency in creating and reusing OER. Even high-quality connectivity, hardware and software will not deliver equitable benefits unless universities invest in staff who can maintain servers, curate content, run backups, troubleshoot user issues, and train academics to adopt open licensing and good pedagogical design. The study of Cappelli and Akkari (2024) emphasised that librarian and IT service capacity (and institutional policy) are the variables that predict whether OER activities remain fragmented or mature into sustainable institutional programmes.

When digital infrastructure across these four dimensions is robust and well-coordinated, equitable access to OER becomes viable. Students and lecturers can reliably retrieve, engage with, and apply OER in their academic work, regardless of location or socioeconomic differences. Conversely, Chinedu-Eze and Bello (2018) remarked that a weak infrastructure exacerbates disparities, limiting OER use to a privileged few with better access. This brings us to the central problem statement motivating the present study. While federal universities in South-East Nigeria may signal readiness for OER adoption, their digital infrastructure may not adequately support such initiatives, because of challenges such as inconsistent internet service, underpowered hardware, poorly integrated software platforms, and limited support services threaten the equitable deployment of OER (Ohaire-Udebu & Chukwuemeka, 2024). Therefore, this study filled that gap by examining the relationship between these digital infrastructure elements and equitable OER access in federal universities in South East Nigeria.

Objectives

The purpose of the study is to determine digital infrastructure as correlates of equitable access to open educational resources in federal universities in South-East, Nigeria. Specifically, the study seeks to determine the relationship between:

1. internet connectivity and equitable access to open educational resources in federal universities in South-East, Nigeria

2. hardware infrastructure and equitable access to open educational resources in federal universities in South-East, Nigeria
3. software applications and equitable access to open educational resources in federal universities in South-East, Nigeria
4. ICT support services and equitable access to open educational resources in federal universities in South-East, Nigeria

Research Questions

1. What is the relationship between internet connectivity and equitable access to open educational resources in federal universities in South-East, Nigeria?
2. What is the relationship between hardware infrastructure and equitable access to open educational resources in federal universities in South-East, Nigeria?
3. What is the relationship between software applications and equitable access to open educational resources in federal universities in South-East, Nigeria?
4. What is the relationship between ICT support services and equitable access to open educational resources in federal universities in South-East, Nigeria?

Hypotheses

The following null hypotheses were tested at 0.05 alpha level

1. There is no significant relationship between internet connectivity and equitable access to open educational resources in federal universities in South-East, Nigeria
2. There is no significant relationship between hardware infrastructure and equitable access to open educational resources in federal universities in South-East, Nigeria
3. There is no significant relationship between software applications and equitable access to open educational resources in federal universities in South-East, Nigeria
4. There is no significant relationship between ICT support services and equitable access to open educational resources in federal universities in South-East, Nigeria

Methods and Procedures

This study adopted a correlational survey research design. The population of the study comprised 161 librarians in the five federal universities in South-East Nigeria. These are University of Nigeria, Nsukka (35), Nnamdi Azikiwe University, Awka (56), Micheal Okpara University, Umudike (20), Federal University of Technology, Owerri (35) and Alex Ekwueme Federal University, Ndufu-Alike, Ikwo (15). The census sampling technique was adopted for the study since the number is within a manageable size. The sampling method was considered appropriate because it allows statistical enumeration and participation of all members of the population in the study.

The instrument for data collection was a structured questionnaire developed by the researcher. The first questionnaire is titled “Questionnaire on Digital Infrastructure” (QDI) and the second questionnaire is titled “Questionnaire on Equitable Access to Open Educational Resources” (QEAOER). The QDI is a research instrument designed to systematically measure an individual's or an organization's perception of and access to the core components of digital infrastructure necessary for effective participation in a digital environment. The QDI is a 35-item questionnaire sub-divided into four clusters: reliable internet connectivity, appropriate hardware, software applications and ICT support services used to measure.

Additionally, the second instrument titled “QEAOER” consisted of 12 items used to measure the perceived equity of OER adoption from the academic staff and PG student's perspective. The items for both instruments were measured using a 4-point Likert scale of Strongly Agree (4), Agree (3), Disagree (2), and Strongly Disagree (1). The questionnaire was subjected to face validity. Cronbach Alpha was used to determine the internal consistency of QDI and QEAOER and coefficient values of 0.78 and 0.83 were obtained. The researcher, with the assistance of trained research assistants, administered the questionnaires physically and electronically (Google Forms) to ensure wider coverage and higher response rates. Responses were derived from 362 respondents. Pearson Product Moment Correlation was used to answer the research questions posed for this study, while linear regression was used to test the null hypotheses at a 0.05 alpha level.

Results

Table 1: Linear regression on no significant relationship between internet connectivity and equitable access to open educational resources in federal universities in South-East, Nigeria

N	Pearson r	Df	Cal. T	p-value	α level	Remark
362	0.18	360	6.657	0.121	0.05	Not Significant

Table 1 shows that there is a weak positive relationship of 0.18 existing between internet connectivity and equitable access to open educational resources in federal universities in South-East, Nigeria. Table 1 also indicated that at 0.05 level of significance and 360 df, the calculated t 16.627 with p-value 0.121 which is greater than 0.05 ($t = 6.657$; $df = 360$; $p > 0.05$), the null hypothesis is not rejected. This means that there is no significant relationship between internet connectivity and equitable access to open educational resources in federal universities in South-East, Nigeria

Table 2: Linear regression on hardware infrastructure and equitable access to open educational resources in federal universities in South-East, Nigeria

N	Pearson r	Df	Cal. t	p-value	α level	Remark
362	0.75	360	7.439	0.000	0.05	Significant

Table 2 shows that there is a strong positive relationship of 0.85 existing between hardware infrastructure and equitable access to open educational resources in federal universities in South-East, Nigeria. Table 2 indicated that at 0.05 level of

significance and 360 df, the calculated t 7.439 with p -value 0.000 which is less than 0.05 ($t = 7.439$; df 360; $p < 0.05$), the null hypothesis is rejected. This means that there is a significant relationship between hardware infrastructure and equitable access to open educational resources in federal universities in South-East, Nigeria

Table 3: Linear regression on significant relationship between software applications and equitable access to open educational resources in federal universities in South-East, Nigeria

N	Pearson r	Df	Cal. t	p -value	α level	Remark
362	0.28	360	11.532	0.08	0.05	Not Significant

Table 3 shows that there is a weak positive relationship of 0.28 existing between software applications and equitable access to open educational resources in federal universities in South-East, Nigeria. Table 3 also indicated that at 0.05 level of significance and 360 df, the calculated t 11.532 with p -value 0.08 which is greater than 0.05 ($t = 11.532$; df 360; $p > 0.05$), the null hypothesis is not rejected. This means that there is no significant relationship between software applications and equitable access to open educational resources in federal universities in South-East, Nigeria

Table 4: Linear regression on significant relationship between ICT support services and equitable access to open educational resources in federal universities in South-East, Nigeria

N	Pearson r	Df	Cal. t	p -value	α level	Remark
362	0.58	360	11.188	0.16	0.05	Not Significant

Table 4 shows that there is a moderate positive relationship of 0.58 existing between ICT support services and equitable access to open educational resources in federal universities in South-East, Nigeria. Table 4 indicated that at 0.05 level of significance and 360 df, the calculated t 11.188 with p -value 0.16 which is greater than 0.05 ($t = 11.188$; df 360; $p > 0.05$), the null hypothesis is not rejected. This means that there is no significant relationship between ICT support services and equitable access to open educational resources in federal universities in South-East, Nigeria

Discussion of Findings

The finding in research question one revealed that there is a weak positive relationship between internet connectivity and equitable access to open educational resources in federal universities in South-East, Nigeria. The corresponding hypothesis revealed that there is no significant relationship between internet connectivity and equitable access to open educational resources in federal universities in South-East, Nigeria. This finding was in tandem with the finding of Apuke and Iyendo (2018) that everyday academic use of the internet depends heavily on mobile devices and that unreliable, slow, or irregular connectivity constrains how often and how deeply students can make

use of online resources. The finding of Salau et al (2024) agreed that many institutional OER initiatives were incomplete, poorly managed, or implemented as a tick-box response to policy pressure, and that ICT units commonly acted only as enablers rather than strategic drivers. The study argues that weak governance, lack of sustainable management and poor discoverability of OER on institutional platforms limit equitable access sometimes more than basic connectivity issues supporting the idea that connectivity alone may not strongly predict equitable OER access in the Nigerian federal university context. In contrast, the finding of Korkmaz, Erer and Erer (2022) disagreed that improvements in Internet access were associated with reductions in educational inequality that is, internet access had a significant, measurable role in mediating educational inequality at the country/region level.

The finding in research question two revealed that there is a strong positive relationship between hardware infrastructure and equitable access to open educational resources in federal universities in South-East, Nigeria. The corresponding hypothesis revealed that there is a significant relationship between hardware infrastructure and equitable access to open educational resources in federal universities in South-East, Nigeria. The finding of Adetimirin and Omogbhe (2018) agreed that robust hardware, such as computers and reliable internet-enabled devices, significantly enhances students' ability to access and utilize OER, thereby promoting equity in learning opportunities across diverse socioeconomic backgrounds. Similarly, Ngimwa and Wilson (2012) supported that investments in hardware infrastructure directly correlate with improved OER accessibility, reducing barriers for underserved students and fostering inclusive education. Mafenya (2020) highlighted how upgraded hardware systems in public universities lead to greater OER engagement, with statistical analyses confirming a positive association that mirrors the Nigerian scenario by enabling equitable distribution of educational materials.

The finding in research question three revealed that there is a weak positive relationship between software applications and equitable access to open educational resources in federal universities in South-East, Nigeria. The corresponding hypothesis revealed that there is no significant relationship between software applications and equitable access to open educational resources in federal universities in South-East, Nigeria. This finding supported that of Mtebe and Raisamo (2014) that low levels of user skill, limited familiarity with repositories, and weak institutional support frequently prevented instructors and students from exploiting available software tools. Salau et al (2024) agreed that shortcomings in OER management practice and platform usability (software configuration, poor metadata, lack of search features) impeded users' ability to find and reuse resources; institutional governance and librarians' active role were decisive.

The finding in research question four revealed that there is a moderate positive relationship between ICT support services and equitable access to open educational resources in federal universities in South-East, Nigeria. The corresponding hypothesis revealed that there is no significant relationship between ICT support services and equitable access to open educational resources in federal universities in South-East, Nigeria. This finding was in line with that of Bazrafshan, Karandish, Zarei, Dashtbozorgi and Cuevas (2023) that while ICT infrastructure positively influences OER awareness, unreliable internet connectivity and inadequate searching skills result in moderate utilization rates, with no significant overall impact on equitable access as high awareness (97.7% among students) does not translate into frequent

use due to these barriers. The finding of Mncube (2024) reported that ICT infrastructure supports partial acceptance of OER among staff, but technological problems and limited understanding lead to moderate engagement, without reporting significant statistical relationships that would enhance equitable access for students.

Conclusion

This study analysis provided valuable insights into how infrastructural and technological factors shape the inclusiveness of digital learning environments in higher education. Findings revealed a weak positive relationship between internet connectivity and equitable OER access, suggesting that access challenges persist despite widespread connectivity initiatives. Conversely, a strong positive relationship was observed between hardware infrastructure and equitable OER access, underscoring the critical role of reliable physical resources in supporting digital learning. Similarly, the weak positive relationship between software applications and equitable OER access highlights implementation and usability gaps. The moderate positive link between ICT support services and equitable access further indicates that ongoing technical assistance enhances digital resource utilization. Overall, the study concludes that achieving true equity in OER access requires a balanced integration of infrastructure, software, and support systems.

Recommendations

Based on the findings, the following recommendations were made:

1. To strengthen equitable access to Open Educational Resources (OER), Federal university management and relevant government agencies should adopt a hybrid policy that improves both affordability and reliability of Internet connectivity across campuses. Institutions should partner with major Internet Service Providers (ISPs) to provide subsidized broadband access and dedicated educational data packages for students and staff.
2. Federal universities in South East Nigeria should establish well-equipped digital learning hubs and adopt device loan schemes for students, particularly those from disadvantaged backgrounds access to laptops and tablets
3. To maximize the potential of software applications in promoting equitable OER access, universities should adopt interoperable, user-friendly platforms that integrate with existing learning management systems (LMS) and institutional repositories. This should be complemented with capacity-building programs that train academic and library staff on the effective use, tagging, and management of OER software tools.
4. Recognizing the moderate but meaningful role of ICT support services in promoting equitable OER access, Federal universities should institutionalize comprehensive support frameworks that address both technical and pedagogical needs. This includes establishing multi-tiered helpdesk systems, assigning faculty-based ICT support officers, and developing ongoing professional development programs for technical staff

References

- Adetimirin, A. E., & Omogbhe, G. O. (2018). Infrastructure as predictor of lecturers' ICT use for research in universities in Nigeria. *Journal of Library & Information Services in Distance Learning*, 12(3-4), 157-168. <https://doi.org/10.1080/1533290X.2018.1499243>
- Apuke, O. D. and Iyendo, T. O. (2018). University students' usage of the internet resources for research and learning: Forms of access and perceptions of utility. *Heliyon*, 4(12), 145-153.
- Aydin, H. (2021). A study of cloud computing adoption in universities as a transformative ICT infrastructure. *SAGE Open*, 11. <https://doi.org/10.1177/21582440211030280>
- Bazrafshan, M., Karandish, F., Zarei, Z., Dashtbozorgi, B., & Cuevas, A. G. (2023). Access and utilisation of open educational resources by academics and students at the local government training institute in Dodoma, Tanzania. *Library Philosophy and Practice, e-journal* 10587. <https://digitalcommons.unl.edu/libphilprac/10587>
- Cappelli, M. A., & Akkari, S. (2024). Academic ICT training in South Africa, Cameroon, and Nigeria: Effectiveness and lessons for capacity building. *Education and Information Technologies*. <https://doi.org/10.1007/s10639-024-13200-1>
- Cascio, W. F., & Montealegre, R. (2016). How technology is changing work and organizations. *Annual Review of Organizational Psychology and Organizational Behavior*, 3, 349–375. <https://doi.org/10.1146/annurev-orgpsych-041015-062352>.
- Chinedu-Eze, V. C., & Bello, A. O. (2018). The utilisation of e-learning facilities in the educational delivery system of Nigeria: a study of M-University. *International Journal of Educational Technology in Higher Education*, 15, Article 34. <https://doi.org/10.1186/s41239-018-0116-z>
- Ekong, M. O., & Essien, O. M. (2024). Evaluation of open educational resources in National Open University of Nigeria (NOUN) for improving students' learning outcomes in South-East, Nigeria. *Research Journal of Pure Science and Technology*, 7(5), 66–85.
- Hakim, S. (2017). Supporting access to open education resources and massive open online courses. *Journal/Article*. <https://doi.org/10.1177/2042753017692724>.
- Iheanyi, U. P., Orubebe, E. D., & Oladokun, B. D. (2024). Transforming education in Nigerian universities: The role of free and open-source software (FOSS) in teaching and learning. *Asian Review of Social Sciences*, 13(1), 39–47. <https://doi.org/10.70112/arss-2024.13.1.4239>
- Korkmaz, Ö., Erer, E., & Erer, D. (2022). Internet access and its role on educational inequality during the COVID-19 pandemic. *Telecommunications Policy*, 46(5), Article 102353. <https://doi.org/10.1016/j.telpol.2022.102353>.

- Mafenya, P. N. (2020). Exploring lecturers' readiness to adopt self-directed learning: The case of one South African university. *Journal of Education*, 80, 117-134. <https://doi.org/10.17159/2520-9868/i80a07>
- Mncube, L. S. (2024). ICT tools for open educational resources used in an open distance e-learning institution in the fourth industrial revolution era. *International Journal of Research-GRANTHAALAYAH*, 12(1), 1-18. <https://doi.org/10.29121/granthaalayah.v12.i1.2024.5485>
- Mtebe, J. S., & Raisamo, R. (2014). Investigating perceived barriers to the use of open educational resources in higher education in Tanzania. *International Review of Research in Open and Distributed Learning*, 15(2), 43–66. <https://doi.org/10.19173/irrodl.v15i2.1803>
- Ngimwa, P., & Wilson, T. (2012). An empirical investigation of the emergent issues in diffusion and adoption of OER in higher education institutions in Africa. *Research on OER for Development*. <https://doi.org/10.13140/RG.2.1.2969.9768>
- Nwaohiri, N. M. (2021). Open educational resources (OER) in Nigerian universities: Promotion and awareness opportunities for academic libraries for a path to higher education success. *Library Philosophy and Practice*, 5583. <https://digitalcommons.unl.edu/libphilprac/5583>
- Ohaire-Udebu, M. F., & Chukwuemeka, E. J. (2024). Roles of infrastructure and ICT facilities in enhancing curriculum implementation in Nigerian tertiary institutions. *British Journal of Contemporary Education*, 4(2), 1–10. <https://doi.org/10.52589/BJCE-C8D8CONZ>
- Oluwayimika, K., & Idoghor, U. (2023). Awareness and use of open educational resources and its benefits to university students. *Innovare Journal of Education*, 11(3), 32–35. <https://doi.org/10.22159/ijoe.2023v11i3.47718>
- Onobrakpor, U. D., Ozioko, R. E., Effiong, A. E., & Udofia, I. (2023). Open-access electronic-resources and extent of accessibility by postgraduate students of federal universities in South-South, Nigeria. *International Journal of Sustainability Management and Information Technologies*, 9(1), 1–6. <https://doi.org/10.11648/j.ijsmi.20230901.11>
- Owhoeke, N. G., Oparaku, O. C., & Ordu, B. C. N. (2023). Digital infrastructure and sustainable development of marketing education curriculum in tertiary institutions in Nigeria. *International Journal of Research and Scientific Innovation*, 10(6), 56–67. <https://doi.org/10.51244/IJRSI.2023.101006>
- Salau, S. A. (2024). Management of Open Educational Resources in academic libraries in Nigerian public universities. *Opis: Open Praxis / De Gruyter (Open Access)*. <https://doi.org/10.1515/opis-2024-0009>
- UNESCO Institute for Statistics (2025). Equity in Education. Retrieve from <https://www.unesco.org/en/query-list/e/equitable-education>

Zaid, Y. A., & Alabi, A. O. (2020). Sustaining Open Educational Resources (OER) initiatives in Nigerian universities. *The Journal of Open, Distance and e-Learning*.
<https://doi.org/10.1080/02680513.2020.1713738>