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IMPACT OF NEW DIGITAL INFRASTRUCTURES ON LECTURERS RESEARCH INVESTIGATION IN COLLEGES OF EDUCATION IN SOUTH-SOUTH GEO-POLITICAL ZONE, NIGERIA

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Abstract
Digital infrastructures advancements on lecturers' research investigation offer great opportunities for further development in research work not only on lecturers' research investigations but on all researchers. These digital infrastructures are critical for effective research particularly in Colleges of Education. The impact of these digital infrastructures on lecturers' research investigation is very vital in all areas of knowledge. They accelerate the research process and guarantee more reliable results. However, notwithstanding the importance and necessity of these digital infrastructures, most lecturers for some reasons are reluctant to adopt them in their research work. This study assessed the impact of new digital infrastructure on lecturers' research investigation in federal colleges of education in south-south geo-political zone, Nigeria despite this apathy by some lecturers. The study employed a descriptive research design. Four research questions and two hypotheses guided the study. Data were collected using a structured questionnaire. The population of the study comprised five hundred and forty-six (546) academic staff from three federal colleges of education in south-south Geo- political zone (Asaba- 211, Omoku- 217 and Obudu 118, Source: National Commission for Colleges of Education Abuja). The study sampled 150 lecturers from 5 departments across the three federal colleges of education in south – south geo-political zone of Nigeria using simple random sampling techniques.An instrument titled "New Digital Infrastructure on Lecturers Research Investigation (NDILRI)" was used for the study.The instrument was analysed using a four point Likert-type of response scale. It was face and content validated by two experts from department of psychology, Alvan Ikokwu federal university of education, Owerri, Imo State. They were requested to examine the instrument to ensure that the content and language of the instrument relate to the purpose of the study, research questions and hypotheses. Data collected were analysed using Cronbach Alpha to find the internal consistency of the instrument. The internal consistency estimate for the instrument was .84. The value was judged high enough to give confidence to the reliability of the instrument. In getting the questionnaire across to the respondents, the researchers employed the face to face method. The researchers and three research assistants that were trained and briefed visited the sampled schools and administered the questionnaire to the students. Data collected were analyzed using Statistical Package for Social Sciences (SPSS). Descriptive statistics of Means and standard deviation were used to answer the research questions. The findings of the study indicated that that new digital infrastructures impacts lecturers' research investigation in colleges of education in south-south geo-political zone, Nigeria. It was therefore recommended among others that federal colleges of education should organize regular workshops, seminars, and hands-on training programmes to enhance lecturers' digital literacy and competence in using emerging research tools, including AI, cloud computing, and data analysis platforms.

Keywords: **new digital infrastructure, lecturers, research investigation, Digital Tools**

Introduction

The world and its environment are filled with unknown and undiscovered facts. Man possesses the vital instinct of inquisitiveness which drives him to probe into the unknown in order to attain a better or full understanding of the unknown. This inquisitiveness pushes man to seek for more knowledge. The method which man employs to obtain knowledge, new facts and insights into the unknown is called research. Research according to Ezechukwu, Ihiegbulam, Nwaji, Ejimaji, Ojedapo & Ukofia (2020) is the search for knowledge, truth, similarities, relationships and finding solutions to problems through the systematic collection, analysis, and interpretation of data. Research, as Kpolovia (2010) defined it, is the logical, systematic and objective collection, analysis, synthesis, evaluation and recording of accurate and controlled observations for the development of generalisations, principles or theories that are ultimately aimed at description, prediction and control of natural phenomena to meet specific needs of man. Nwaorgu (2015) defined research as a systematic approach to the solution of educational problems. Therefore, research is an inquiry or investigation conducted by a person or persons in collaboration with a mentor or supervisors who must have made an original intellectual or creative contribution to the discipline. In this study, research is defined as a systematic and rigorous process of investigation and inquiry aimed at discovering, interpreting and revising knowledge on a particular topic or issue (Ugbagir, 2011). Research has been recognized as indispensable infrastructure or integral part of the new digital infrastructures which stand as vital academic resources that support lecturers in research activities.

Research digital infrastructures are facilities, resources and related services that are used by researchers to conduct top-level research in their respective fields and covers major scientific equipment and instruments. These include knowledge-based resources such as collections, archives or structures for scientific information; thus enabling Information and Communications Technology-based infrastructures, software and communication or any other entity of unique nature to achieve excellence in research. Digital infrastructures according to Ezechukwu, Ordua & Ojedapo (2024) refer to the underlying systems, networks and technologies that enable the creation, sharing and use of digital information and services. These infrastructures support various aspects of modern life, including networks: (internet, cloud computing); data storage (data bases, data centers); platforms (social media, online market places); devices (computers, smartphones). These infrastructures enable global connectivity, information sharing, online services and digital innovation. In essence, digital infrastructures support the digital economy, social interaction and modern life.

Digital infrastructure can be described as an electronic device, equipment or infrastructure used for the collection, processing, storage, retrieval or transfer of information and its associated services. It refers to the hardware or equipment, software applications and services associated with ICTs, including telecom networks. According to Ordua and Ezechukwu (2024), digital infrastructures are invaluable research tools used in research processes particularly in higher institutions where their applications are dominating research activities and researchers are increasingly realizing the importance of such resources (Hadagali, Kumbar, Nelogal & Bachalapur, 2012). Digital infrastructures provide accurate and timely information, especially for lecturers who depend greatly on digital infrastructures and digital resources for information to advance research and collaboration with other researchers around the world for intellectual growth (Ukpebor, 2012).

Educational researchers for long had been familiar with research infrastructures and what constitute them. Archives, museums, galleries and libraries had always housed collections of physical objects such as archaeological fragments; paintings or sculptures; inscriptions or manuscripts; books and journals, etc. The digital age is compelling researchers to introduce such physical collections onto the digital plane by digitisation and to construct new collections of digital tools as objects of research in education. With the coming of the digital age, researchers are extending their views on the nature of research objects, whether physical/analogue or digital. They are reinterpreting and redefining traditional or physical repositories and collections of research objects; they are reassessing the very nature and definition of research infrastructures. Consequently, the definition of research infrastructures in education according to Schulz, Isabwe & Reichert (2015) needs to encompass

both physical and digital research tools in order to facilitate new research in established subject areas and lead to the creation of new subject areas. Many definitions of research infrastructures have been formulated in recent years, Shelton, (2014) surveyed how discipline and institutional commitment shape university lecturers perceptions of technology. For Some researchers, it is the technical and operational framework that allows them to collaborate and share data and results; for some it is the content to which access is offered rather than the facilities around it and for some it is both.

The most common forms of research infrastructures found useful in education according to Cristina, M & J, G. (2020) can be identified as follows: Cloud infrastructures, Online libraries and repositories, Enabling Information and Communications Technology-based Infrastructures, Software and Communication, Citation management tools, Networks and Technologies that Enable the Creation, Digital Information and Services, Internet, Cloud Computing, Data Storage (Data Bases, Data Centers),Research blogging Platforms, Devices (Computers, Smartphones),Global Connectivity, Citation management tools, Research metrics and analytics platform, Archives or Structures for Scientific Information and e-bibliography database. These are collections of physical objects/installations/vessels/instruments that may be single-sited or hosted by more than one institution/ country. Ordua and Ezechukwu (2024) opined that digital data infrastructures comprised of single sited or interconnected data repositories, spread over several institutions/countries; E-infrastructures: networks and/or computing facilities spread over various institutions and/or countries. This forms the technical backbone of a given RI, and examples include GRID computing, cluster computing, cloud computing and the networks that connect them; Meta-infrastructures: conglomerates of independent RIs, residing in different institutions/countries with different data formats and data structures that are products of different activities, yet connected, using compatible metadata formats or processes, thus enabling access to different data archives.
Research infrastructures have revolutionized the field of research in all its disciplines, providing researchers with unprecedented tools and resources that have transformed the way they conduct their research, collaborate with other scientists and disseminate their results (George & Salado, 2014). Furthermore, the integration of research infrastructures in the lecturer's research process has allowed not only access to more information, but has also improved the efficiency of research itself by facilitating collaboration with other researchers, facilitating broader and faster communication in the analysis presentation and transfer of scientific results (Molano-Bernal et al., 2022).

The integration of digital infrastructures in educational research processes has greater benefits than those described so far. The application of digital infrastructures has also revolutionized research in all fields and provided researchers with unprecedented tools and resources that have transformed the way they conduct their research, collaborate with other scientists and disseminate their results (George &Salado, 2019). Furthermore, the application of new digital infrastructures in the lecturers' research process has allowed not only access to more information, but also to improve the efficiency of the research itself, facilitating collaboration with other researchers, and facilitating broader and faster communication.

Lecturers' use of digital infrastructures in their research processes has democratized access to an immense amount of research resources (Alvarado-Vélezi et al., 2023), whereby researchers now have the opportunity to access digital databases, scientific journals, digital libraries from anywhere in the world (Ocholla & Ocholla, 2020). Secondly, with the expansion in ICT, it has allowed the creation of new data analysis and processing soft wares (Candraningrat et al., 2021) and enabled faster and broader publication and dissemination of scientific findings (Molano-Bernal, et al., 2022). Finally, the use of digital infrastructures research has led to the strong emergence of management of e-bibliography database in the field of research (Ram & Paul, 2014).

Reports of many professional conferences have shown that most lecturers have difficulty integrating digital infrastructures and digital resources in their research process because they lack solid digital training and knowledge to function effectively at the Techno- pedagogical level demanded by their profession (Adetimirin, 2019). The reports also pointed out that poor motivation, poor and irregular funding, obsolete research infrastructures, shortage of qualified research personnel, general lack of research focus and poor linkage between researchers and the industrial sector, poor teacher preparation, lack of relevant material guides, lack of reliable education data for planning and non-implementation of research reports are also impediments to higher education in Nigeria. These constraints constitute serious limitations to the research capacity and research capability of higher institutions. The studies carried out on teaching digital competence in higher institutions highlighted that majority of these institutions are at low level (Dzikite et al., 2017), or at best intermediate (Cabero-Almenara et al., 2021), regardless of the area of knowledge to which the teaching staff belong (Guillén-Gámez et al., 2020). Most studies on digital competence focused on teaching, the main academic task of lecturers, leaving aside the in-depth analysis of research work. The result of the study of Umeh and Chukwu (2022) on the integration of digital infrastructures and digital resources in lecturers' research processes was low in all areas of knowledge. If lecturers use digital infrastructures and digital resources in their research work, they will accelerate scientific process and contribute in a relevant way to the generation of new knowledge. The finding of the study by Obinna (2021) on lecturers' effective use of available infrastructures and resources has a minimal impact on research processes. The findings of Uzoho and Agu (2020) attributed low impact to poor resource integration but the study of Onyema (2019) reported significant impacts in better-equipped institutions. Also, the finding of Uche and Okeke (2021) on factors that constitute serious limitations to the research capacity and capability of institutions noted lack of power supply, poor motivation, Time wastage etc., as problematic issues.

However, even when new digital infrastructures are available, the lecturer is required to be skilled not only in digital skills, but also in digital skills oriented towards research and transfer of scientific knowledge. Hence, this study investigated the impact of these new digital infrastructures on lecturers' research investigation in federal colleges of education in south-south geo-political zone, Nigeria.

Purpose of the Study

The general purpose of this study is to investigate the impact of new digital infrastructures on lecturers' research investigation in federal colleges of education in south-south geo-political zone, Nigeria.

Specifically, the study sought to:

1) identify the impact of new digital infrastructures on lecturers' research investigation in federal colleges of education in south-south geo-political zone, Nigeria.
2) establish the benefits of new digital infrastructures on lecturers' research investigation in federal colleges of education in south-south geo-political zone, Nigeria.
3) Enumerate factors that constitute serious limitations to research investigation in federal colleges of education in south-south geo-political zone, Nigeria.

Research Questions

In the light of the above, this study seeks to answer the following research questions:

1. What are the impacts of new digital infrastructures for lecturers' research investigation in federal colleges of education in south-south geo-political zone, Nigeria?
2. What are the benefits of the new digital infrastructures on lecturers' research investigation in federal colleges of education in south-south geo-political zone, Nigeria?
3. What are the factors that constitute serious limitations to research investigation in federal colleges of education in south-south geo-political zone, Nigeria?

Methods

This study investigated the impact of new digital infrastructure on lecturers' research investigation in federal colleges of education in south-south geo-political zone, Nigeria. The study employed a descriptive research design. According to Ezechukwu, Ihiegbulem, Nwaji, Ejimaji, Ojedapo and Ukofia (2020), survey research is used to gather different types of information for the purpose of describing and interpreting on-going processes, belief and prevailing practices. The study was carried out in south-south geo political zone of Nigeria. The population of the study comprised of five hundred and forty-six (546) academic staff from three federal colleges of education in south-south Geo- political zone (Asaba- 211, Omoku- 217 and Obudu 118, Source: National Commission for Colleges of Education Abuja). The study sampled 150 lecturers from 5 departments across the three federal colleges of education in south – south geo-political zone of Nigeria using simple random sampling techniques.Three research questions and one hypothesis guided the study.

Data were collected using a structured questionnaire titled "New Digital Infrastructure on Lecturers Research Investigation (NDILRI)" and was used for the study. "NDILRI" was structured questionnaire developed by the researchers based on the purposes of the study and consisted of thirty - item structured questionnaire to guide the study. NDILRI is made up of three sections A, B and C. Section A seeks the demographic data of the respondents. Section B and C contains the items which are arranged in clusters and reflects the research questions. The instrument was analysed using a four point Likert-type of response scale ranging from Very High Impact (4), High Impact (3), Low Impact (2) to Very Low Impact (I) to analyse research question one while Strongly Agree (4), Agree (3), Disagree (2) and Strongly Disagree (1) was used to analyse research questions two and three. In taking decisions, a mean value of 2.50 and above on any item statement is deemed agreed whereas 2.49 and below is deemed disagreed. The instrument was face and content validated by two experts from department of psychology, Alvan Ikokwu federal university of education, Owerri, Imo State. They were requested to examine the instrument to ensure that the content and language of the instrument relate to the purpose of the study, research questions and hypotheses. Data collected were analysed using Cronbach Alpha to find the internal consistency of the instrument. The internal consistency estimate for the instrument was 0.89. The value was judged high enough to give confidence to the reliability of the instrument. In getting the questionnaire across to the respondents, the researchers employed face to face method. The researchers and two research assistants that were trained and briefed visited the sampled schools and administered the questionnaire to students. Data collected were analysed using descriptive and inferential statistical tools. Means and standard deviation were used to provide answers to the research questions.

Results

Table 1: Mean and standard deviation on the new digital infrastructures for lecturers' research investigation

S/N	Item Statement	N	Mean	Std. Deviation	Decision
1	Cloud infrastructures.	150	2.7333	1.02758	Agreed
2	Online libraries and repositories	150	2.5533	1.09628	Agreed
3	Enabling Information and Communications Technology-based Infrastructures.	150	2.7533	1.06145	Agreed
4	Software and Communication.	150	2.7267	1.10458	Agreed
5	Citation management tools.	150	2.7200	1.04348	Agreed
6	Networks and Technologies that Enable the Creation.	150	2.8733	.94334	Agreed

7	Digital Information and Services.	150	2.7867	.99385	Agreed
8	Internet, Cloud Computing.	150	2.6733	1.10822	Agreed
9	Data Storage (Data Bases, Data Centers).	150	3.0267	.87429	Agreed
10	Research blogging Platforms.	150	2.8467	.96750	Agreed
11	Devices (Computers, Smartphones).	150	2.8733	1.01199	Agreed
12	Global Connectivity.	150	2.8867	.97991	Agreed
13	Citation management tools.	150	2.9400	.88409	Agreed
14	Research metrics and analytics platform.	150	2.7800	.98219	Agreed
15	Archives or Structures for Scientific Information.	150	2.7667	1.04539	Agreed
16	e-bibliography database	150	2.7400	1.03904	Agreed
	Cluster Mean	**150**	**2.7887**	**1.005**	**Agreed**

The result in table 1 shows the mean and standard deviation of the impacts of new digital infrastructures for lecturers' research investigation in federal colleges of education in south-south geo-political zone, Nigeria. The result shows that lectures had mean response ratings to items 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 and 16 with a cluster mean of 2.78 and standard deviation of 1.00, all above the benchmark mean of 2.50. This is an indication that all items 1-16 are the impacts of new digital infrastructures for lecturers' research investigation in federal colleges of education in south-south geo-political zone, Nigeria.

Table 2: Mean and standard deviation on benefits of the new digital infrastructures on lecturers' research investigation

S/N	Item Statement	N	Mean	Std. Deviation	Decision
1	Access to advanced tools.	150	2.3067	1.24753	Disagreed
2	Improved data management.	150	2.7133	1.20590	Agreed
3	Facilitate global collaborations and networking opportunities.	150	2.5000	1.21925	Agreed
4	Automate tasks reduce administrative burdens and focus on research.	150	2.9467	1.17460	Agreed
5	Leverage cloud computing, AI, and machine learning for rapid insights.	150	2.6800	1.20580	Agreed
6	Utilizes Al – powered writing tools and collaborative editing platforms.	150	2.8600	1.19299	Agreed
7	Tap into international datasets, research networks, and expertise.	150	2.7867	1.21283	Agreed

8	Effectively communicate research findings through interactive visualisations.	150	2.6600	1.26295	Agreed
9	Leverage AI – powered tools for data validations.	150	2.8400	1.18197	Agreed
10	Share research widely through open access platforms and social media.	150	2.9000	1.16866	Agreed
11	Improve research visibility and citation impact through digital presence.	150	2.6733	1.25049	Agreed
12	Inform policy and industry practices through data – driven insights.	150	2.7667	1.16675	Agreed
13	Stay updated with emerging digital tools and methodologies.	150	2.7333	1.23520	Agreed
14	Demonstrate research impact and expertise through digital portfolios.	150	2.8867	1.15588	Agreed
	Cluster Mean	**150**	**2.7292**	**1.2007**	**Agreed**

The result in table 2 shows the mean and standard deviation of the benefits of the new digital infrastructures on lecturers' research investigation in federal colleges of education in south-south geo-political zone, Nigeria. The result shows that lecturers had mean response ratings to items 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13 and 14 with a cluster mean of 2.72 and standard deviation of 1.20, all above the benchmark mean of 2.50. This is an indication that items 2-14 are the benefits of the new digital infrastructures on lecturers' research investigation in federal colleges of education in south-south geo-political zone, Nigeria, whereas item 1 is not since is below the benchmark of 2.50. This is an indication that access to advanced tools is not among the benefits of the new digital infrastructures on lecturers' research investigation in federal colleges of education in south-south geo-political zone, Nigeria.

Table 3: Mean and standard deviation of the factors that constitute serious limitations to research investigation

S/N	Item Statement	N	Mean	Std. Deviation	Decision
1	Insufficient training on new digital tools and platforms.	150	2.9933	1.07126	Agreed
2	Restricted access to digital resources, software or hardware..	150	3.1133	.99351	Agreed

The	3	Frequent technical problems, downtime or compatibility issues.	150	2.7000	1.18577	Agreed
	4	Data breaches, cyber security threats or inadequate data protection.	150	2.6000	1.24782	Agreed
	5	High costs of digital tools, software or maintenance.	150	3.1000	1.01499	Agreed
	6	Incompatibility with existing systems or software.	150	2.7667	1.15518	Agreed
	7	Inadequate technical support or maintenance services.	150	2.8133	1.17231	Agreed
	8	Resistance to adopting new digital tools or platforms.	150	2.5667	1.20076	Agreed
	9	Poor internet connectivity or inadequate bandwidth.	150	2.5200	1.26767	Agreed
	10	Challenges in managing and analyzing large datasets.	150	2.7400	1.18961	Agreed
		Cluster Mean	**150**	**2.7890**	**1.14500**	**Agreed**

result in table 3 shows the mean and standard deviation of the factors that constitute serious limitations to research investigation in federal colleges of education in south-south geo-political zone, Nigeria. The result shows that lectures had mean response ratings to items 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 with a cluster mean of 2.78 and standard deviation of 1.14, all above the benchmark mean of 2.50. This is an indication that all the factors in items 1-10 that constitute serious limitations to research investigation in federal colleges of education in south-south geo-political zone, Nigeria.

Discussion of Findings

New Digital Infrastructures for Lecturers' research investigation, in Federal Colleges of Education in South-South Geo-political Zone, Nigeria.

The finding of the study reveals that cloud infrastructures, online libraries and repositories, enabling information and communications technology-based infrastructures, software and communication, citation management tools, networks and technologies that enable the creation, digital information and services, internet, cloud computing, data storage (data bases, data centers), research blogging platforms and devices (computers, smartphones) are the impacts of new digital infrastructures for lecturers' research investigation in federal colleges of education in south-south geo-political zone, Nigeria. This result is possible because the rapid expansion of digital technologies has fundamentally transformed how lecturers conduct research. Access to cloud infrastructures and online repositories reduces geographical and financial barriers, enabling instant retrieval of scholarly materials. Likewise, ICT-based tools and citation management software streamline data organization, analysis, and referencing, thereby improving research efficiency and accuracy. Additionally, internet connectivity and mobile devices allow continuous engagement with global academic communities through research blogs and networks. In the South-South

geopolitical zone of Nigeria, increased investment in digital infrastructure and growing digital literacy among lecturers further enhance the adoption and integration of these technologies into research practices. This finding lend support to the work of Ibrahim (2024) who found that cloud computing enhances research activities by providing scalable storage, easy access to digital resources, and improved collaboration among researchers. It emphasized that cloud-based systems enable lecturers to access data, software, and academic materials anytime and anywhere, thereby increasing research efficiency and productivity. It also laid credence to the work Mabotha and Ngcamu (2025) who found that digital technologies including ICT infrastructure, online platforms, and data systems have transformed research practices in higher education by improving access to information, enhancing communication, and streamlining academic processes. It concluded that digital infrastructures significantly improve institutional performance and research output.

Benefits of New Digital Infrastructures on Lecturers' Research Investigation in Federal Colleges of Education in South-South Geo-political Zone, Nigeria

The finding of the study reveals that improved data management, global collaborations and networking opportunities, automate tasks reduce administrative burdens and focus on research, leverage cloud computing, AI, and machine learning for rapid insights, utilizes Al – powered writing tools and collaborative editing platforms, tap into international datasets, research networks and expertise, effectively communicate research findings through interactive visualizations, leverage AI – powered tools for data validations, share research widely through open access platforms and social media, improve research visibility and citation impact through digital presence, inform policy and industry practices through data – driven insights, stay updated with emerging digital tools and methodologies and demonstrate research impact and expertise through digital portfolios are the benefits of the new digital infrastructures on lecturers' research investigation whereas access to advanced tools is not among the benefits of the new digital infrastructures on lecturers' research investigation in federal colleges of education in south-south geo-political zone, Nigeria. This result is possible because digital infrastructures primarily enhance process efficiency, visibility, and collaboration rather than guaranteeing universal access to sophisticated tools. Lecturers benefit from improved data management, automation, AI-supported analysis, and global networking, which streamline research activities and increase output quality. Cloud computing and open-access platforms further promote dissemination and citation impact. However, access to advanced tools may remain limited due to funding constraints, inadequate institutional subscriptions, and infrastructural gaps common in federal colleges of education in South-South Nigeria. Thus, while digital systems optimize existing resources and practices, unequal access to cutting-edge technologies explains why advanced tools are not widely perceived as a benefit. This finding lend support to the work of Ocen, Elasu, Aarakit and Olupot (2025), who found that AI and digital infrastructures enhance research through **automation of tasks, data analysis, improved collaboration, and increased research productivity**. It also notes that while AI tools improve efficiency and insight generation, **institutional and infrastructural limitations restrict full access to advanced technologies** in many developing contexts. It also add credence to the work of Omarsaib, Mitha, Vahed and Mohamed (2025), who found that that digital and AI-driven systems support **global collaboration, data-driven research, and increased visibility of academic outputs.** However, it also emphasizes disparities in adoption, noting that **access to advanced tools is uneven due to resource constraints and infrastructure gaps**, particularly in developing regions.

Factors that Constitute Serious Limitations to New Digital Infrastructures on Lecturers' Research Investigation in Federal Colleges of Education in South-South Geo-political Zone, Nigeria

The finding of the study reveals that insufficient training on new digital tools and platforms, restricted access to digital resources, software or hardware, frequent technical problems, downtime or compatibility issues, data breaches, cyber security threats or inadequate data protection, high costs of digital tools, software or maintenance, incompatibility with existing systems or software, inadequate technical support or maintenance services, resistance to adopting new digital tools or platforms, poor internet connectivity or inadequate bandwidth and challenges in managing and analyzing large datasets. The result is possible because effective use of digital infrastructures depends on skills, access, and system reliability, which are often constrained in developing contexts like South-South Nigeria. Insufficient training limits lecturers' ability to utilize advanced tools, while restricted access to software and hardware reduces research capacity. Frequent technical issues, poor internet connectivity, and inadequate maintenance disrupt workflow and data processing. High costs of acquiring and sustaining digital systems further hinder adoption. Additionally, cyber security concerns and system incompatibility discourage usage, while resistance to change slows integration. Collectively, these structural, technical, and human factors create significant barriers to efficient and innovative research investigation. This finding lend support to the work of Akaeze and Akaeze (2024), who found that lecturers face **poor internet connectivity, limited access to technological resources, inadequate training, and weak institutional support**, all of which significantly hinder effective use of digital tools for teaching and research. This also aligns with the work of Nnaji et al. (2026), who found that **inadequate digital literacy, infrastructural deficits, and limited readiness for AI adoption** are major barriers to digital transformation in Nigerian higher institutions. It further highlighted gaps in technical capacity and institutional support systems.

Conclusion

Based on the results of the study, it is therefore concluded that new digital infrastructures impacts lecturers' research investigation in colleges of education in south-south geo-political zone, Nigeria.

Recommendations

The following recommendations were proffered based on the study's findings:

1. Federal colleges of education should organize regular workshops, seminars, and hands-on training programmes to enhance lecturers' digital literacy and competence in using emerging research tools, including AI, cloud computing, and data analysis platforms.
2. Government and institutional authorities should invest in reliable internet connectivity, updated hardware and software, and functional data management systems to minimize technical challenges and ensure seamless research activities.
3. Adequate funding should be allocated to provide access to digital resources, subscription-based databases, and technical support services, while also implementing policies that encourage the adoption and effective utilization of digital infrastructures for research.

References

Adetimirin, A. (2019). Female Lecturers' Perception of ICT Integration for Teaching and Learning in University of Ibadan, Nigeria. In M. Khosrow (Ed.), Gender and Diversity: Concepts, Methologies, Tools, and Applications (pp. 1624-1636). IGI Global. https://doi.org/104018/978-1-5225-6912- 1.ch084.

Akaeze, C. O., & Akaeze, N. S. (2024). Exploring the challenges of online learning in Nigerian higher education. *Frontiers of Contemporary Education, 5*(2), 1–10. https://doi.org/10.22158/fce.v5n2p1

Alvarado-Vélezi, J. A. Villacrés-Mallaii, M. B. (2023). Importancia y uso de las TIC para la investigación científica. Revista ConCiencia, 1(1), 1-14.

Cabero-Almenara, J., Guillén-Gámez, F. D., RuizPalmero, J., Palacios-Rodríguez, A. (2021). Digital competence of higher education professor according to DigCompEdu. Statistical research methods with ANOVA between fields of knowledge in different age ranges. *Education and Information Technologies*, 26(4), 4691-4708.

Candraningrat, I., Abundanti, N., Mujiati, N., & Erlangga, R. (2021). The role of financial technology on development of MSMEs. Accounting, 7(1), 225-230.

Dahal, N., Manandhar, N. K., Luitel, L., Luitel, B. C., Pant, B. P., & Shrestha, I. M. (2022). ICT tools for remote teaching and learning mathematics: A proposal for autonomy and engagements. Advances in Mobile Learning Educational Research, 2(1), 289–296

Dzikite, C., Nsubuga, Y. y Nkonki, V. (2017). Lecturers' Competencies in w{ Information and Communication Technology (ICT) for Effective Implementation of ICT-Integrated Teaching and Learning in Textiles and Clothing Degree Programmes. *International Journal of Educational Sciences*, 17(1-3), 61-68.

Ezechukwu, I.R, Ihiegbulem, O.T, Nwaji,O.J, Ejimaji,E.U, Ojedapo,D.O, and Ukofia,I.B.F. (2020). *Research methodology: tools and techniques*. Owerri: Cape publishers.

Ezechukwu, Ordua & Ojedapo (2024)

GeorgeCandraningrat, I., Abundanti, N., Mujiati, N., & Erlangga, R. (2021). The role of financial Technology on development of MSMEs. *Accounting*, 7(1), 225-230.

Guillén-Gámez, F. D., Ruiz-Palmero, J., SánchezRivas, E., y Colomo-Magaña, E. (2020). ICT resources for research: an ANOVA analysis on the digital research skills of higher education teachers comparing the areas of knowledge within each gender. *Education and information technologies*, 25(5), 4575-4589.

Hadagali, G. S., Kumbar,B. D., Nelogal, S. B. & Bachalapur, M. M. (2012). Use of electronic resources by post-graduate students in different universities of Karnataka State. *International Journal of Information Dissemination and Technology*, 2(3): 189-195.

Ibrahim, U. (2024). The role of cloud computing in transforming ICT infrastructure in educational institutions. International Journal of Applied and Scientific Research, 2(2), 213–226. https://doi.org/10.59890/ijasr.v2i2.1333

Kpolovie, P. J. (2010). *Advanced research methods*. Owerri: Spring Field Publishers Ltd.

Mabotha, P. A. P., & Ngcamu, B. S. (2025). Digital Transformation in the Higher Education Sector: A Systematic Literature Review. *Administrative Sciences*, *16*(1), 1. https://doi.org/10.3390/admsci16010001

Mosha, N. F. V., Chigwada, J., Ketchiwou, G. F., & Ngulube, P. (2026). A systematic review of artificial intelligence in higher education institutions (HEIs): Functionalities, challenges, and best practices. *Education Sciences, 16*(2), 185. https://doi.org/10.3390/educsci16020185

Molano-Bernal, L. C., Tibaduiza-Castañeda, L. P., Aguilera-Arango, G. A., Cañar-Serna, D. Y., Barberá-Tomas, J. D. (2022). Las TIC como herramientas para la transferencia de tecnología y gestión del conocimiento en el sector agropecuario. *Revista Científica Agroecosistemas*, 10(1), 88-95.

Nnaji, I. L., Ayanwale, M. A., Ukeje, I. O., Ekwunife, R. A., Igwe, C. M., Okwor, E. O., & Nwuzor, C. I. (2026). Enhancing governance and performance in Nigerian higher education through AI-driven digital transformation: Insights from stakeholder perspectives. *Social Sciences & Humanities Open, 13*, 102348. https://doi.org/10.1016/j.ssaho.2025.102348

Nwaorgu, (2015). Effects of dominant individual on budget implementation in Nigeria: A content analysis perspectives

Ocholla, D. N., & Ocholla, L. (2020). Readiness of academic libraries in South Africa to research, teaching and learning support in the Fourth Industrial Revolution. *Library Management*, 41(6/7), 355-368.

Ocen, S., Elasu, J., Aarakit, S. M., & Olupot, C. (2025). Artificial intelligence in higher education institutions: Review of innovations, opportunities and challenges. *Frontiers in Education, 10*, 1530247. https://doi.org/10.3389/feduc.2025.1530247

Onyema, T. (2019). Leveraging digital technologies for research innovation: A study of well-funded institutions in Nigeria. *Global Perspectives in Education*, 10(1), 56-70.

Ram, S., & Paul Anbu K, J. (2014). The use of bibliographic management software by Indian library and information science professionals. *Reference Services Review*, 42(3), 499-513.

Renée Schulz, Ghislain Maurice Isabwe, Frank Reichert (2015). Investigating teachers motivation to use ICT tools in higher education. 2015 Internet Technologies and Applications (ITA).

George, &Salado, A, (2019). The concept of problem complexity. *Procedia Computer Science* 2014:28:537-546.

Shelton, C. (2014). University lecturer' perceptions of the technology they use. Google Scholar. Https// scholar.google.co.uk

Ukpebor, C.O. (2012). Availability and use of electronic resources in African universities: The Nigerian perspective. PNLA Quarterly, 76(3): 190-199. Retrieved June 1, 2018, from www.pnla.org University of Calabar Graduate School (2014). The New Graduate School Digital Library (Flyer). Calabar: University of Calabar Graduate School.