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Perceived Impact of Digital Transformation on Human Resource and Information Management in Secondary Schools in North Central Nigeria

Prof. Margaret Uga Oluwole; Dr. Ezekiel Dondo Ivagher & Gloria Mwendaga Mnenga

**Department of Educational Foundations
Rev. Fr. Moses Orshio Adasu University, Makurdi, Nigeria**

ABSTRACT

This study investigated Perceived Impact of Digital Transformation on Human Resource and Information Management in Secondary Schools in North Central Nigeria. The study was guided by two research questions. Two hypotheses were formulated and tested at 0.05 level of significance. The study adopted a descriptive survey research design, the study population was 19,024 administrative personnel across 4,756 public secondary schools, from which a sample of 392 respondents was drawn from 98 schools. Data were collected using a structured questionnaire titled “*Digital Transformation and Management of Public Secondary School Questionnaire (DTMPS)*”, developed by the researcher and validated by three experts for clarity, relevance, and content accuracy. Reliability was confirmed through a trial test on 40 teachers, yielding a Cronbach Alpha coefficient of 0.81, indicating strong consistency. Data were analyzed using Mean and Standard Deviation to answer the research questions, while hypotheses were tested using Chi-square of goodness of fit at 0.05 level of significance. Findings revealed that digital transformation significantly impact staff professional development and record-keeping in secondary school. The study concluded that digital transformation has significant impact on human resource management of secondary schools in North-Central Nigeria. The study recommended among others that school administrators, professional development units, and teacher unions should organize innovative, sustainable digital learning initiatives, including webinars, virtual workshops, AI-driven instructional simulations, online courses, and interactive video tutorials, to enhance teachers’ professional competence, promote lifelong learning, and create a culture of continuous skills upgrading

Keywords: Digital Transformation, Human Resource, Information Management, staff professional development and Record-keeping

INTRODUCTION

The rapid advancement of digital technology has continued to reshape organizational operations across the world, with the education sector experiencing significant transformation in administrative practices, information management, and human resource development. Educational institutions globally are increasingly integrating digital technologies into their administrative systems to improve operational efficiency, service delivery, accountability, and institutional effectiveness (UNESCO, 2021). The emergence of the Fourth Industrial Revolution (4IR) has accelerated the adoption of digital innovations such as cloud computing, artificial intelligence, virtual learning platforms, big data systems, and automated information management technologies within educational institutions (Schwab, 2017). These technological advancements have transformed the manner in which schools manage personnel

development, institutional records, and student information systems, thereby enhancing decision-making processes and improving educational administration.

In developed countries, digital transformation has become a critical component of educational management because it promotes efficiency in staff training, facilitates electronic record management, and supports integrated student information systems capable of providing real-time educational data for effective decision-making (OECD, 2020). Digital technologies have enabled educational institutions to modernize administrative operations, reduce bureaucratic delays, improve data accessibility, and strengthen institutional coordination. Studies have shown that digitally transformed educational institutions often experience improved organizational performance, enhanced staff productivity, efficient information management, and better institutional planning (Johnson, Adams Becker, Cummins, Estrada, Freeman, & Hall, 2019).

Despite these global advancements, many developing countries, particularly those within Sub-Saharan Africa, continue to face significant challenges in adopting digital technologies in educational administration. Inadequate infrastructure, unstable power supply, insufficient technological facilities, poor internet connectivity, inadequate funding, and low digital competence among educational personnel have continued to hinder effective digital transformation in schools (World Bank, 2022; Agyeman, 2020). In Nigeria, many secondary schools still depend heavily on manual administrative systems for staff development, record management, and student information administration. This dependence on conventional administrative practices often results in inefficiency, delays, poor coordination, data inaccuracies, and weak institutional accountability (Eze & Uzoechi, 2020; Ojo, 2021). Secondary schools in North-Central Nigeria particularly reflect these challenges as many institutions still struggle with limited integration of digital technologies into their management processes.

Secondary education occupies a strategic position in Nigeria's educational system because it prepares learners for higher education, useful living, and national development. According to the Federal Ministry of Education (2013), secondary education is intended to equip learners with relevant knowledge, skills, values, and competencies necessary for societal participation and lifelong learning. The successful achievement of these educational objectives depends largely on effective school management and the efficient coordination of institutional resources. Management in education involves planning, organizing, directing, coordinating, and controlling human and material resources toward the realization of educational goals (Roberts, 2017). Oluwole and Ivagher (2016) further explained that secondary school management involves the effective coordination of teaching staff, non-teaching staff, students, facilities, and institutional resources to achieve the objectives of secondary education. Consequently, efficient management practices are essential for promoting organizational effectiveness, staff productivity, and educational quality within secondary schools.

One major dimension of school management that has become increasingly important in the digital era is staff professional development. Staff professional development refers to the continuous process of improving the knowledge, skills, competencies, and professional capabilities of teachers and school personnel to enhance their effectiveness and productivity. Oluwole, Agada, and Ivagher (2021) described staff development as a systematic process aimed at improving employees' job performance, increasing professional competence, and preparing personnel for future responsibilities. In educational institutions, continuous professional development enables teachers and administrators to adapt to emerging educational trends, innovative teaching methods, and technological advancements. The integration of digital technologies into staff professional development has expanded opportunities for online training, virtual workshops, webinars, e-learning platforms, and collaborative professional learning communities. Obi and Adeola (2022) observed that digital professional development platforms enhance teachers' competencies and improve instructional effectiveness by providing flexible and accessible learning opportunities.

However, many teachers and school administrators in North-Central Nigeria continue to experience limited access to quality professional development opportunities due to infrastructural deficiencies, inadequate funding, geographical barriers, and insufficient technological resources (Ayo & Onah, 2021).

Traditional staff development practices are often characterized by irregular workshops, limited training participation, inadequate follow-up mechanisms, and restricted access to contemporary educational innovations. The absence of effective digital professional development systems may limit educators' ability to effectively utilize modern technologies in teaching, learning, and school administration. Consequently, digital transformation presents an opportunity to improve staff professional development through technology-driven training systems that enhance professional competence and administrative effectiveness.

Another critical aspect of school management that can benefit significantly from digital transformation is record-keeping. Record-keeping involves the systematic collection, storage, maintenance, retrieval, and utilization of institutional information for administrative purposes and decision-making. Oluwole and Ivagher (2015) explained that school records include information relating to students, staff, school finances, facilities, academic activities, and institutional operations preserved for future reference and administrative use. Accurate and reliable records are essential for effective planning, accountability, policy implementation, and institutional coordination. Traditionally, many secondary schools in Nigeria rely on paper-based record systems that are often susceptible to loss, damage, duplication, manipulation, and retrieval difficulties. Nwachukwu (2022) noted that poor record management practices contribute significantly to administrative inefficiency and weak accountability in school administration.

Digital transformation offers opportunities for improving record-keeping systems through electronic databases, cloud storage technologies, automated documentation systems, and centralized information management platforms. Digitized record systems enhance data security, facilitate quick information retrieval, improve administrative accuracy, and support efficient institutional planning. Furthermore, digital record management systems reduce bureaucratic delays and strengthen transparency in school administration. Despite these potential benefits, many secondary schools in North-Central Nigeria still operate with outdated manual record systems that limit administrative efficiency and effective decision-making.

Although digital transformation has demonstrated significant potential for improving educational management globally, empirical evidence regarding its perceived impact on staff professional development and record-keeping systems in secondary schools within North-Central Nigeria remains limited. Existing studies have focused largely on instructional technologies and general ICT adoption, with limited attention given to digital transformation as an integrated administrative strategy for improving personnel development and educational information management systems. Against this background, this study investigated the perceived impact of digital transformation on staff professional development, record-keeping systems, and students' information management in secondary schools in North-Central Nigeria.

Statement of the Problem

Effective management is essential for achieving educational objectives in secondary schools through proper coordination of personnel and resources. However, despite global advancements in digital transformation, many secondary schools in North-Central Nigeria still rely on traditional administrative practices characterized by inadequate staff professional development and manual record-keeping. These challenges continue to undermine administrative efficiency, institutional coordination and educational effectiveness.

Staff professional development in many schools remains irregular and inadequate due to poor funding, infrastructural limitations and limited access to modern training opportunities, thereby restricting teachers' exposure to emerging educational technologies and innovative administrative practices (Ayo & Onah, 2021). Similarly, reliance on paper-based record systems has resulted in poor documentation, data loss, delayed information retrieval, and weak accountability, all of which hinder effective planning and decision-making (Nwachukwu, 2022). Although previous studies have examined staff development, record management, and educational administration, most have treated these variables separately and within traditional administrative contexts. Limited attention has been given to digital transformation as an integrated strategy for improving these interconnected aspects of school management, particularly in

North-Central Nigeria. Consequently, this study investigated the perceived impact of digital transformation on staff professional development and record-keeping systems in secondary schools in North-Central Nigeria.

Purpose of the Study

The main purpose of this study was to investigate the perceived impact of digital transformation on management of secondary schools in North-Central Nigeria. Specifically, the study sought to:

1. assess the perceived impact of digital transformation on staff professional development in secondary schools in North-Central Nigeria.
2. ascertain the perceived impact of digital transformation on record-keeping systems in secondary schools in North-Central Nigeria.

Research Questions

The following research questions guided the study:

1. What is the perceived impact of digital transformation on staff professional development in secondary schools in North-Central Nigeria?
2. What is the perceived impact of digital transformation on record-keeping systems in secondary schools in North-Central Nigeria?

Hypotheses

The following null hypotheses were tested at 0.05 level of significance:

1. There is no significant perceived impact of digital transformation on staff professional development in secondary schools in North-Central Nigeria.
2. There is no significant perceived impact of digital transformation on record-keeping systems in secondary schools in North-Central Nigeria.

METHODOLOGY

This study adopted a descriptive survey research design. A descriptive survey design is used for obtaining data on the opinions, attitudes, and perceptions of a given population without manipulating the study variables. The design was considered appropriate for this study because it enabled the researcher to collect data on the perceived impact of digital transformation on selected aspects of secondary school management in North-Central Nigeria in their natural setting.

The population of the study comprised 19,024 administrative personnel, specifically Principals, Vice Principals (Administration), Vice Principals (Academic), and Deans of Studies drawn from 4,756 public secondary schools across North-Central Nigeria. The North-Central geopolitical zone consists of Benue, Kogi, Kwara, Nasarawa, Niger, and Plateau States, including the Federal Capital Territory (FCT) Abuja, as documented in the Federal Ministry of Education Annual School Census Report (2024).

The sample size for the study was 392 respondents comprising Principals, Vice Principals (Administration), Vice Principals (Academic), and Deans of Studies selected from 98 public secondary schools across North-Central Nigeria. The sample size was determined using the Taro Yamane (1967) formula for determining sample size from a known population. A multi-stage sampling procedure was employed due to the large and geographically dispersed nature of the study population across the North-Central region.

The instrument used for data collection was a structured questionnaire titled “*Digital Transformation and Management of Public Secondary Schools Questionnaire (DTMPSQ)*” developed by the researcher. The instrument was structured into three clusters. Cluster A contained items on the perceived impact of digital transformation on staff professional development in secondary schools. Cluster B focused on the perceived impact of digital transformation on record-keeping systems in secondary schools, while Cluster C addressed items relating to the perceived impact of digital transformation on students’ information management systems in secondary schools. The questionnaire items were structured on a four-point Likert scale of Strongly Agree (4), Agree (3), Disagree (2), and Strongly Disagree (1).

To ensure face and content validity of the instrument, the questionnaire was presented to three experts, comprising one expert in Science and Mathematics Education and two experts in Educational

Management Unit of the Department of Educational Foundations, all from Rev. Fr. Moses Orshio Adasu University, Makurdi. The experts examined the instrument to ensure that the items were clear, relevant, unambiguous, and capable of measuring the objectives of the study. Their observations and corrections were used to improve the final version of the instrument.

To establish the reliability of the instrument, a trial test was conducted outside the study area using respondents with similar characteristics to those used for the main study. Data collected from the trial test were analyzed using Cronbach Alpha reliability coefficient to determine the internal consistency of the instrument. The reliability coefficients obtained were 0.87 for Cluster A, 0.94 for Cluster B, and 0.85 for Cluster C, while the overall reliability coefficient of the instrument was 0.87. These coefficients were considered high enough to establish the reliability of the instrument for the study.

The data collected were analyzed using Mean and Standard Deviation (SD) to answer the research questions. The decision level was determined by the use of criterion mean of 2.50 ($\frac{4+3+2=1}{4} = 2.50$). The hypotheses were tested using chi-square test of goodness of fit to test the hypotheses at 0.05 level of significance.

RESULTS

Response Rate

A total of 392 questionnaires were administered to teachers across the selected states. Out of this number, 381 questionnaires were properly completed and returned, while 11 questionnaires were not returned. The high response rate of 97.2% is considered statistically adequate and strengthens the reliability and validity of the study findings. A response rate above 70% is generally regarded as very good in survey research; therefore, the 97.2% rate obtained in this study indicates strong participant cooperation and reduces the likelihood of non-response bias.

Research Question 1: *How does digital transformation perceived impact staff professional development in secondary schools in North Central Nigeria?*

Table 1: Mean and Standard Deviation on Perceived Impact of Digital Transformation on Staff Professional Development in Secondary Schools

S/No	Item description	n	SA	A	D	SD	\bar{x}	σ	Remark
1	Webinars have increased opportunities for teachers' professional training.	381	121	127	74	59	2.81	1.05	Agreed
2	Online courses have enhanced the professional competence of teachers.	381	128	130	63	60	2.86	1.06	Agreed
3	Virtual workshops have made professional development more accessible.	381	123	120	76	62	2.80	1.07	Agreed
4	Instructional videos have improved teachers' knowledge of new instructional strategies.	381	117	115	84	65	2.75	1.07	Agreed
5	Google Classroom have enhanced peer learning and collaboration among teachers.	381	122	113	81	65	2.77	1.08	Agreed
Cluster mean and standard deviation							2.80	1.07	Agreed

The findings in Table 1 suggest that digital transformation has a positive impact on staff professional development in secondary schools in North-Central Nigeria. Item 16, with a mean score of 2.81, indicates that webinars have provided increased opportunities for teachers’ professional training. Item 17, with a mean of 2.86, shows that online courses have enhanced teachers’ professional competence. Item 18, with a mean score of 2.80, demonstrates that virtual workshops have made professional development more accessible to teachers. Item 19, with a mean of 2.75, highlights that instructional videos have improved teachers’ knowledge of new instructional strategies. Finally, Item 20, with a mean of 2.77, suggests that Google Classroom has facilitated peer learning and collaboration among teachers. The cluster mean of 2.80 confirms that digital transformation has a perceived significant positive impact on staff professional development in secondary schools in North Central Nigeria.

Research Question 2: *What is the perceived impact of digital transformation on record-keeping systems in secondary schools in North Central Nigeria?*

Table 2: Mean and Standard Deviation on Perceived Impact of Digital Transformation on Record-Keeping Systems in Secondary Schools

S/No	Item description	n	SA	A	D	SD	\bar{x}	σ	Remark
6	Education Management Information System have improved data storage and retrieval in schools.	381	121	110	85	65	2.75	1.08	Agreed
7	Online student records have reduced paperwork and manual errors.	381	121	113	80	67	2.76	1.08	Agreed
8	Google Drive have ensured better security of school records.	381	125	127	74	55	2.85	1.04	Agreed
9	Education Management Information System have facilitated easy tracking of students' academic progress.	381	118	120	81	62	2.77	1.06	Agreed
10	Result management software have enhanced efficiency in administrative tasks.	381	113	120	80	68	2.73	1.07	Agreed
Cluster mean and standard deviation							2.77	1.07	Agreed

The results in Table 2 indicate that digital transformation positively affects record-keeping systems in secondary schools in North-Central Nigeria. Item 21, with a mean score of 2.75, shows that the use of Education Management Information Systems (EMIS) has improved data storage and retrieval in schools. Item 22, with a mean of 2.76, suggests that online student records have minimized paperwork and reduced manual errors. Item 23, with a mean score of 2.85, highlights that Google Drive has enhanced the security of school records. Item 24, with a mean of 2.77, demonstrates that EMIS has facilitated easier tracking of students’ academic progress. Finally, Item 25, with a mean of 2.73, indicates that result management software has improved efficiency in administrative tasks. The cluster mean of 2.77 confirms that digital transformation has a perceived significant positive impact on record-keeping systems in secondary schools.

Hypothesis 1: Digital transformation has no significant perceived impact on staff professional development in secondary schools in North Central Nigeria.

Table 3: Chi-Square Analysis on Perceived Impact of Digital Transformation on Staff Professional Development in Secondary Schools

Responses	Observed Value	Expected value	df	χ^2	p	Remark
Strongly Disagree	62	95.25				
Disagree	76	95.25				
Agree	121	95.25	3	29.98	0.00	Significant
Strongly Agree	122	95.25				
Total	381					

Table 3 shows that the Chi-square (χ^2) value is 29.98, with a p-value of 0.00. Since the p-value is less than the alpha level of 0.05, the null hypothesis which states that digital transformation has no significant impact on staff professional development in secondary schools in North-Central Nigeria was rejected. This implies that digital transformation has a perceived significant positive impact on staff professional development in public secondary schools in North-Central Nigeria.

Hypothesis 2: Digital transformation has no significant perceived impact on record-keeping systems in secondary schools in North Central Nigeria.

Table 4: Chi-Square Analysis on Perceived Impact of Digital Transformation on Record-Keeping Systems in Secondary Schools

Responses	Observed Value	Expected value	df	χ^2	p	Remark
Strongly Disagree	63	95.25				
Disagree	80	95.25				
Agree	118	95.25	3	27.84	0.00	Significant
Strongly Agree	120	95.25				
Total	381					

Table 4 shows that the Chi-square (χ^2) value is 27.84, with a p-value of 0.00. Since the p-value is less than the alpha level of 0.05, the null hypothesis which states that digital transformation has no significant impact on record-keeping systems in secondary schools in North-Central Nigeria was rejected. This implies that digital transformation has a perceived significant positive impact on record-keeping systems in public secondary schools in North-Central Nigeria.

DISCUSSION OF FINDINGS

Based on the analyzed data the following findings are discussed:

The first finding revealed that digital transformation has a perceived significant positive impact on staff professional development in public secondary schools in North-Central Nigeria. This implies that the integration of digital tools such as webinars, online courses, virtual workshops, instructional videos, and collaborative learning platforms has improved teachers' access to professional development opportunities. Through these digital platforms, teachers are able to participate in self-paced learning programmes, acquire new instructional skills, and engage in continuous professional training that supports effective teaching and school administration. The finding further indicates that digital transformation has enhanced collaboration among educators, increased flexibility in training delivery, and reduced barriers associated with conventional professional development programmes. This finding is consistent with Adeyemi and Yusuf (2021), who found that digital transformation significantly improves teachers' access to professional development opportunities through online courses, webinars, and virtual training platforms, although challenges relating to digital literacy still exist. Similarly, Okeke and Ibrahim (2020) reported that teachers who regularly utilize digital learning platforms demonstrate greater professional growth, improved instructional strategies, and enhanced classroom management practices. Musa and Adewale (2022) also observed that schools with better ICT infrastructure and digitally competent teachers tend to provide more effective and accessible professional development opportunities. The positive impact observed in this study may therefore be attributed to the ability of digital transformation to facilitate

continuous learning, encourage collaboration, provide flexible training opportunities, and improve teachers' professional competencies necessary for effective school management and instructional delivery.

The second finding revealed that digital transformation has a perceived significant positive impact on record-keeping systems in public secondary schools in North-Central Nigeria. This indicates that the adoption of digital technologies such as Education Management Information Systems (EMIS), cloud storage facilities, online student records, Google Drive, and result management software has significantly improved the efficiency, accuracy, accessibility, and security of school records. The finding suggests that digital record systems have reduced administrative delays, minimized data loss, enhanced information retrieval processes, and improved accountability in school administration. The finding agrees with Adeyemi (2021), who found that digital record-keeping systems improve administrative efficiency, data accessibility, and accuracy in secondary school administration. Similarly, Bello and Yusuf (2020) observed that automated record systems facilitate faster data retrieval, improve institutional compliance, and strengthen decision-making processes within schools. Musa and Ibrahim (2019) further emphasized that adequate ICT infrastructure and personnel digital skills are essential for maximizing the benefits of electronic record management systems. The significant positive impact observed in this study may be attributed to the capacity of digital technologies to streamline documentation processes, reduce human errors, secure institutional records, and support evidence-based administrative decisions. Consequently, digital transformation appears to have strengthened accountability and improved operational efficiency in school management.

CONCLUSION AND RECOMMENDATIONS

Based on the findings, the study concluded that digital transformation has a significant positive impact on secondary school management in North-Central Nigeria. It enhances staff professional development by improving access to digital training opportunities, strengthens record-keeping systems through more efficient and secure data management, and improves students' information management systems by facilitating accurate, accessible, and reliable data processing. Overall, the study concludes that digital transformation improves administrative efficiency, accountability, and effectiveness in secondary school operations within the study area.

Based on the following of the study, the following recommendations were made;

1. School administrators, professional development units, and teacher unions should organize innovative, sustainable digital learning initiatives, including webinars, virtual workshops, AI-driven instructional simulations, online courses, and interactive video tutorials, to enhance teachers' professional competence, promote lifelong learning, and create a culture of continuous skills upgrading.
2. School administrators and ICT officers should implement resilient and scalable digital record-keeping systems, including Education Management Information Systems (EMIS), cloud-based storage, and blockchain-enabled record verification, to reduce paperwork, prevent errors, improve accessibility, and ensure the long-term security and integrity of administrative data.

REFERENCES

- Adebayo, Y., & Yusuf, M. (2022). School insecurity and educational administration in Nigeria: Emerging challenges and solutions. *Nigerian Journal of Educational Administration and Planning*, 22(1), 91–105.
- Adebayo, T., & Okonkwo, E. (2023). Administrative challenges and school effectiveness in public secondary schools in Nigeria. *International Journal of Educational Management and Policy Studies*, 15(2), 44–58.
- Adegbite, A., & Olaniyan, B. (2020). Security management and school safety in Nigerian secondary schools. *Journal of Educational Management and Development*, 8(2), 63–75.

- Adewale, T. (2021). Digital record-keeping and administrative efficiency in secondary schools. *African Journal of Educational Technology*, 7(3), 55–69.
- Adewale, T., & Akintunde, R. (2023). Financial accountability and digital financial systems in school administration. *African Journal of Educational Administration*, 11(1), 33–49.
- Adeyemi, K., & Yusuf, A. (2021). Digital transformation and teachers' professional development in Nigerian secondary schools. *International Journal of Educational Technology*, 9(2), 74–89.
- Agyeman, D. (2020). Digital transformation in African education systems: Challenges and prospects. *African Journal of Information Systems*, 12(4), 201–219.
- Amadi, E. (2019). Technology integration and organizational performance in educational institutions. *Nigerian Journal of Information and Communication Technology*, 7(1), 55–68.
- Ayo, C., & Onah, S. (2021). Professional development opportunities and digital learning among teachers in Nigeria. *Journal of Teacher Education and Practice*, 14(2), 115–129.
- Bello, S., & Yusuf, T. (2020). Automated student information systems and school administration in Nigeria. *Journal of Educational Technology and Management*, 6(2), 88–102.
- Chukwu, C., & Okafor, J. (2021). Digital security technologies and school safety management in Nigeria. *International Journal of Educational Security Studies*, 5(1), 18–32.
- Eze, C., & Kalu, D. (2022). Communication challenges in secondary school administration in Nigeria. *Journal of Educational Policy and Management*, 10(1), 57–71.
- Eze, U., & Uzoechi, B. (2020). Digital transformation and educational administration in Nigeria. *African Journal of Educational Technology*, 5(2), 101–117.
- Federal Ministry of Education. (2013). *National policy on education* (6th ed.). NERDC Press.
- Ibrahim, H., & Yusuf, A. (2022). Financial record keeping and accountability in secondary school administration in Nigeria. *Journal of Educational Finance and Management*, 4(2), 66–81.
- Johnson, L., Adams Becker, S., Cummins, M., Estrada, V., Freeman, A., & Hall, C. (2019). *NMC horizon report: 2019 higher education edition*. EDUCAUSE.
- Musa, A., & Adewale, S. (2022). ICT infrastructure and teachers' professional development in Nigerian schools. *Journal of Educational Development Studies*, 11(3), 112–126.
- Nwachukwu, E. (2022). Record keeping and administrative effectiveness in Nigerian secondary schools. *International Journal of School Administration*, 7(3), 98–112.
- Nwosu, I., & Adeyemi, O. (2023). Cybersecurity challenges in Nigerian educational institutions. *Journal of Digital Education and Security*, 6(1), 41–56.
- Ojo, A. (2021). Digital transformation and institutional performance in educational organizations. *Journal of Educational Innovation and Development*, 9(1), 72–86.
- Ojo, A., & Adekunle, M. (2022). Interconnectedness of educational management practices in Nigerian secondary schools. *Journal of Educational Administration and Planning*, 12(4), 143–159.
- OECD. (2020). *Education at a glance 2020: OECD indicators*. OECD Publishing.
- Okeke, M., & Ibrahim, A. (2020). Dimensions of effective school management in contemporary education systems. *International Journal of Educational Administration*, 15(2), 53–70.
- Oluwole, D., Agada, J., & Ivagher, E. (2021). Staff development programmes and teacher productivity in secondary schools. *Nigerian Journal of Educational Leadership*, 11(1), 62–78.
- Oluwole, D., & Ivagher, E. (2015). Record keeping and administrative effectiveness in secondary schools. *Journal of Educational Management Studies*, 4(2), 33–47.
- Roberts, M. (2017). *Principles of management and organizational coordination*. Pearson Education.
- Schwab, K. (2017). *The fourth industrial revolution*. Crown Business.
- UNESCO. (2021). *Reimagining our futures together: A new social contract for education*. UNESCO Publishing.
- World Bank. (2022). *Education technology and digital transformation in Sub-Saharan Africa*. World Bank Publications.
- Yusuf, A., & Afolabi, T. (2020). Digital communication technologies and school administration in Nigeria. *Journal of Educational Technology Systems*, 14(2), 83–97.