Managing Digitalisation of Secondary Education for Sustainable Development in Imo State, Nigeria

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ABSTRACT

This study examined how digitalisation of secondary education can be managed for sustainable development in Imo State, Nigeria. Two research questions and two hypotheses guided the study. A descriptive research design was adopted. The population comprised all the 296 principals in the 296 public senior secondary schools in Rivers State. Out of these principals, 170 are males while 126 are females. A sample of 133 principals (77 males and 56 females), representing 45% of the population was drawn using both the simple random sampling and proportionate stratified random sampling techniques. This was determined by the Taro Yamane Formula which gave a minimum sample of 109 principals. The instrument that was used for data collection was a researcher-based 16-item questionnaire entitled: "Managing Digitalisation of Secondary Education for Sustainable Development Questionnaire (MDSESDQ)." It was structured after the four-point Likert rating scale and duly validated by five experts. The internal consistency of the instrument was determined using Cronbach's Alpha. Reliability coefficients of 0.83 and 0.86 were obtained for the various sections of the instrument respectively, which showed that the instrument was reliable. Mean and standard deviation were used to answer the research questions while z-test was used in testing the null hypotheses at 0.05 level of significance. The findings of the study revealed, among others, that digitalisation of secondary education, which brings about change in learners' behaviour that will drive sustainable development depends largely on the ways principals manage the available digital learning facilities and harness the teachers towards integrating technological devices in the teaching-learning process. Based on the findings, it was recommended, among others, that the Imo State Ministry of Education should formulate policies that will guide digitalisation process, and also ensure that all the public secondary schools are equipped with digital learning facilities.

Keywords: managing, digitalisation, education sustainable and development.

INTRODUCTION

Digitalisation of the education system has become a global phenomenon after the Corona Virus Disease 2019 (COVID-19) that ravaged the entire world between 2019 and 2020. Ever since, technology has had positive impacts on education by transforming the process and introducing new pedagogies through digital learning. In underscoring this, Obanya (2014) maintained that in order to remain relevant in this competitive demanding world of knowledge economy, Nigerian secondary education curriculum needs to be restructured to meet the needs of the digital age. Similarly, Prensky (2001, as cited in Obasi and Adieme 2023) noted that the drastic changes in education place new demands on teachers, who are digital immigrants in the midsts of digital natives, to think creatively, innovatively, critically and above all, to gain digital competence in their instructional delivery. In recognition of the prominent role Information and Communication Technology (ICT) plays in advancing knowledge and skills necessary for functional education in this virtual world, the Federal Republic of Nigeria (2014) stipulates in her National Policy on Education, that modern technologies shall be

increasingly used and improved upon at all levels of the education system. Lending credence to this, the Federal Ministry of Education (2015) advocated for technology-driven classrooms in this 21st century. Thus, Nigerian secondary education system is expected to equip students with the prerequisite digital knowledge and skills needed to thrive in this technology-evolving world.

Secondary education in Nigeria is the bridge between primary and tertiary education, and it is aimed at preparing young school leavers for useful living in the society, as well as higher education for sustainable national development and global competitiveness. Considering the fundamental importance of secondary education in Nigeria, Nwideeduh and Adieme (2021), noted that it is a cornerstone for the empowerment of youths for socioeconomic development and self-reliance. Adedamola (2014) emphasised that the worth of development of any nation lies in the quality and skills of its human capital. Since human capital is an important drive of economic growth, secondary education is very critical for sustainable development. This 21st century which has been acknowledged as technology-driven era has paved way for introducing compulsory digital learning in our classrooms. Hence, secondary schools are expected to play a leading role in digitalisation of our society.

Digitalisation in education simply entails the process of converting or changing from analogue to digital in the education system. Gurpreet Singh (2012) defined digitalisation in education as the process of using computers, mobile devices, the Internet, software applications, and other digital technologies to teach students in the classroom. Bates (2015, as cited in Pettersson, 2021) described digitalisation as all technological devices used to support teaching and learning. In another dimension, Witten and David (2003, as cited in Isah and Ojetunde, 2019) viewed digitalisation as the process of converting printed materials to electronic formats where they can be stored, retrieved or manipulated by a computer. Thus, suffice it to say that digitalisation in education can be viewed as the use of hardware like: laptop and desktop computers, tablets, iPads, notepads, smart phones, among others, and the application of e-learning software packages such as digital learning channels – Zoom, Google Classroom, Microsoft Teams, among others, to facilitate the teaching-learning process.

Digitalisation process requires a systematic designing of digital platforms with educational resources that will facilitate teaching-learning process. Isah and Ojetunde (2019) posited that digitalisation of school activities requires a wide range of modern devices such as scanners which convert printed materials to a hyper text mark-up languages (HTML) for conversion of materials to file formats. According to Pettersson (2021), before digitalising the education system, factors that influence digitalisation and educational change in schools, including access to digital technologies, pedagogical digital competences of teachers, development of teaching-learning designs and organisational or institutional change must be put into consideration. Garry (2020) emphasised that digitalisation is not only about learning with digital technologies but also about how the digital facilities are managed to gain sustainability. However, digitalisation in education has its own pros and cons; therefore, managing it effectively will engender sustainability.

Management is the systematic planning, organising, coordinating and controlling of available human and material resources to efficiently and effectively achieve organisational goals. In school organisation, the management lies solely on the school administrators who manage the school and harness the human resource (teaching and non-teaching staff) in order to attain the educational objectives and goals. These school administrators are referred to as principals in Nigerian secondary schools. Ukala and Adieme (2022) posited that the principals are expected to possess the managerial skills – conceptual, human and technical, and keep abreast of the novel concepts, change and innovations in the education system. Nwideeduh and Adieme (2021) posited that school managers, as change agents are charged with the inundate tasks of adapting and adopting innovations that are geared at meeting the demands of globalisation and societal expectations of schools. For digitalisation to gain sustainability in secondary schools, the principals are expected to effectively manage the available digital learning platforms, facilities as well as teachers, who integrate the technologies in the teaching-learning process.

In managing digitalisation in secondary education system, technology-supported learning applications such as digital education platforms (DEPs), which are a collection of e-Learning software, are extremely needed for

online teaching and learning. Butler et al. (2020) posited that as part of the digital transformation of the education process, introduction and development of multimedia and computer-aided learning tools are prerequisites for creating digital educational environments such as blended learning classes, cloud technologies, among others. In a related study, Mpungose (2020) noted that South Africa has developed policies which mandate universities to provide both lecturers and students with free laptops and Wi-Fi access within their perimeters and residences in order to solve the existing social inequalities. The research findings of Eze et al. (2021) revealed that provisions of computers to teachers and students, solar-powered educational devices, pre-loaded offline academic resources and solar panels can enhance digitalised learning in Nigerian secondary schools. In another study,

Falasteen (2018) conducted a study on the implementation of digitalisation system in education in Palestine and found that having management plan helps principals to ensure that the digital facilities are always in good condition.

Digitalisation has transformed the approaches to classroom instruction; hence, there should be a paradigm shift from the traditional methods of teaching and learning to blended learning in order to make the students meet the challenges of a rapidly changing world. Obasi and Adieme (2023) posited that teachers who are critical variables in the education system must be constantly trained and retrained to integrate modern technologies in their instructional delivery so as to meet the learning needs and styles of students. In corroboration, Obanya (2014) pointed out that teachers require exposure to some technology-pedagogical knowledge and skills that will make them competent to transfer the kind of digital skills that today's graduates need to succeed, lead and contribute to nation building. In a related study, Hakansson and Pettersson (2019) argued that digitalisation that is not rooted in pedagogical objects and methods can fail to transform practice and enhance students' learning. Ghavifekr and Sani (2015) observed that before the Malaysian Government introduced digitalisation into the secondary education system, several workshops were organised to train teachers to become computer literates and competent in using the digital tools in the classrooms. Thus, if teachers are not effectively managed, digitalisation initiatives may not gain sustainability in secondary schools.

Teachers' digital competencies are critical aspects of the teaching-learning process. Similarly, a study that was conducted by Pettersson (2021) in upper secondary schools in Northern Sweden, vividly illustrated the digitalisation concept, where teachers use their computers to browse the Internet to research for their lesson notes, exchange their books with digital learning materials and also present lessons using PowerPoint and projectors. Abdurashidova et al. (2023) conducted a work on impact of digitalisation on education, and discovered that a successful digital transformation requires that schools increase their digital capacity levels by establishing the necessary *culture, policies, infrastructure as well as digital competence of teachers to support the effective integration of technology in teaching and learning process.* Sabola (2017) noted that technology is rapidly changing and educational stakeholders are expecting teachers to have the necessary skills to compete in a digital-age economy. Obanya (2014) pointed out that nobody uses yesterday's tool for today's business and expects to be in business tomorrow. Hence, teachers must require exposure to some technology-pedagogical knowledge and skills that will make them competent to transfer the kind of knowledge that today's learners need to succeed, lead and contribute to sustainable development.

Sustainable development is defined as the development pattern which encourages and addresses the plethora problems of the present, and also makes adequate plans for meeting future generation's needs (Nwideeduh & Adieme, 2017). Emeka-Nwokeji (2015) noted that the concept of sustainable development, which integrates the three pillars of economic growth, social development and protection of the environment, includes a long-term perspective to ensure the well-being of future as well as present generations. To support this assertion, Ilomaki and Lakkala (2018) emphasised that education is expected to provide learners with competencies they need at the present and in the future to be able to apply digital technologies and modern pedagogical methods. Similarly, the ongoing United Nations' Sustainable Development Goal 4 aims at quality education; hence, the emergence of digital technologies is instrumental for achieving the goal on or before the time bound of 2030. Since education is the fastest route to drive sustainable development, ensuring high quality integration of technology in the education system is required to help build a digital society. Thus, effective management of

the available digital learning platforms and harnessing teachers towards the utilisation will go a long way to ensuring sustainability in the education system.

Statement of the Problem

Digitalisation has been an important driver of change in the education system after the COVID-19 pandemic that wreaked havoc in the whole world. With the rate at which technology evolves in this knowledge-based society, Nigerian schools, particularly, secondary schools are under pressure to embrace digitalisation so as to meet the demands for qualitative education and needs of the digital age. In order to adapt to the changing context, the Federal Republic of Nigeria introduced ICT Policy to support the adoption of digital technologies in the education system, as well as teach it as a subject. In underpinning this, the Imo State Government has been making concerted efforts to equip the public secondary schools with computers that will enhance administrative works as well as the teaching-learning process. In spite of the adoption of digital technologies in the education system, it appears digitalisation has not gained sustainability as teachers still adhere to the unconventional methods of teaching and learning.

More worrisome is the fact that the students, who are digital natives, are not being exposed to digital learning as their counterparts in good private schools and developed countries. This is evidenced in the recently released 2024 Joint Admissions and Matriculation Board (JAMB) examination results where it was observed that students in private schools scored above 300 marks while those in public schools were playing around and below 200 marks! These raise the question: how can the classrooms be digitalised to meet the learning needs of students in this interconnected-networked evolving world? This unanswered question underscored this study.

Aim and Objectives of the Study

The aim of this study was to examine how digitalisation of secondary education can be managed for sustainable development in Imo State, Nigeria. Specifically, the study sought to:

1. find out ways digital learning facilities can be managed for sustainable development in secondary schools in Imo State; and

2. ascertain ways teachers' digital competencies can be managed for sustainable development in secondary schools in Imo State.

Research Questions

The following research questions guided the study:

1. What are the ways digital learning facilities can be managed for sustainable development in secondary schools in Imo State?

2. In what ways can teachers' digital competencies be managed for sustainable development in secondary schools in Imo State?

Hypotheses

The following null hypotheses were formulated at 0.05 alpha level:

Ho_1 There is no significant difference between the mean ratings of male and female principals on ways digital learning facilities can be managed for sustainable development in secondary schools in Imo State.

Ho_2 There is no significant difference between the mean ratings of male and female principals on ways teachers' digital competencies can be managed for sustainable development in secondary schools in Imo State.

METHODOLOGY

This study adopted a descriptive research design. The population of the study comprised all the 296 principals in the 296 public senior secondary schools in Imo State. Out of these principals, 170 are males while 126 are females (Secondary Education Management Board, Owerri, Imo State, 2023). A sample of 133 principals (77 males and 56 females), representing 45% of the population was drawn using both the simple random sampling and proportionate stratified random sampling techniques. This was determined by the Taro Yamane Formula which gave a minimum sample of 109 principals. The instrument that was used for data collection was a researcher-based 16-item questionnaire entitled: "Managing Digitalisation of Secondary Education for Sustainable Development Questionnaire (MDSESDQ)." The questionnaire was structured after the four-point Likert rating scale of Strongly Agree, Agree, Disagree and Strongly Disagree with weights of: 4, 3, 2 and 1 respectively. The instrument was duly validated by five experts in Test and Measurement Department, Curriculum Studies and Technology Department and Educational Management Department of Faculty of Education, University of Port Harcourt.

The internal consistency reliability coefficient of 0.85 for (MDSESDQ) was computed using Cronbach's Alpha. The subscales' reliability for managing digital learning facilities and teachers' digital competencies are 0.83 and 0.86 respectively; hence, they were adjudged to be reliable for the field of study. Mean and standard deviation were used to answer the research questions. Any mean score from 2.50 and above was agreed upon, and the mean below 2.50 was disagreed upon. z-test was used in testing the null hypotheses of no significant difference. The acceptance or rejection of the hypotheses was based on the critical value of z-test, which is ±1.96 at 0.05 level of significance.

RESULTS

Question 1: What are the ways digital learning facilities can be managed for sustainable development in secondary schools in Imo State?

Table 1: Mean Scores and Standard Deviations on the Opinions of Male and Female Principals on Ways Digital Learning Facilities can be Managed for Sustainable Development in Secondary Schools in Imo State

S/N	Ways Digital Learning Facilities can be Managed Include:	Male Principals = 77		Female Principals = 56			
		$_1$	SD_1	$_2$	SD_2	$_{12}$	Decision
1.	Having a management plan that covers instructional strategies including electricity supply.	3.13	0.79	3.15	0.92	3.14	Agreed
2.	Establishing user policy guidelines on expected behaviour when using digital learning devices.	3.18	0.78	3.12	0.93	3.15	Agreed
3.	Planning the school time-table in such a way every class will have access to the available digital learning facilities.	3.10	0.79	3,06	0.94	3.08	Agreed
4.	Ensuring that the websites, learning platforms, software applications, among others are well-secured to avoid being hacked.	3.15	0.79	3.12	0.93	3.14	Agreed
5.	Organising relevant resource materials that are converted into digital learning materials using scanners.	2.87	0.82	2.84	0.97	2.78	Agreed
6.	Maintaining enabling environments for integration of digital learning facilities.	3.10	0.79	3.05	0.94	3.08	Agreed

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7.	Ensuring that teachers regularly access the digital education platforms during instructional delivery.	2.76	0.83	2.79	0.97	2.78	Agreed
8.	Actively monitoring the use of the available digital learning facilities.	3.09	0.79	3.07	0.93	3.08	Agreed
9.	Ensuring that any bad computer-aided tools, wires, Internet connectivity, etc are fixed.	3.12	0.79	2.94	0.95	3.03	Agreed
	Aggregate Mean/SD	**3.06**	**0.80**	**3.02**	**0.94**	**3.04**	

Table 1 shows the mean responses of male and female principals on ways digital learning facilities can be managed for sustainable development in secondary schools in Imo State. Both male and female principals agreed on all the items.

Question 2: In what ways can teachers' digital competencies be managed for sustainable development in secondary schools in Imo State?

Table 2: Mean Scores and Standard Deviations on the Opinions of Male and Female Principals on Ways Teachers' Digital Competencies can be Managed for Sustainable Development in Secondary Schools in Imo State?

S/N	**Ways Teachers' Digital Competencies can be Managed Include:**	**Male Principals = 77**		**Female Principals = 56**			
		$_1$	SD_1	$_2$	SD_2	$_{12}$	**Decision**
10.	Training teachers on how to use digital learning tools to teach in the classroom.	2.85	0.82	2.76	0.98	2.81	Agreed
11.	Encouraging teachers to use word processing software to type their lesson notes.	3.01	0.80	3.08	0.93	3.05	Agreed
12.	Guiding teachers on how to present their lessons using PowerPoint.	2.99	0.80	2.83	0.97	2.91	Agreed
13.	Exposing teachers to using their smart phones to video real objects which they can use as teaching aids during instructional delivery.	2.97	0.81	2.92	0.95	2.95	Agreed
14.	Encouraging teachers to always surf the Internet to search open educational resources (OERs) before writing their lesson plans.	2.83	0.82	2.98	0.95	2.91	Agreed
15.	Organising workshops to demonstrate to teachers how interactive whiteboards can be used to make learning student-centred.	2.78	0.83	2.71	0.98	2.75	Agreed
16.	Motivating teachers to upgrade themselves by enrolling in computer-based tutorials where they can be taught the basics of computer literacy.	3.09	0.79	3.14	0.93	3.12	Agreed
	Aggregate Mean/ SD	**2.93**	**0.81**	**2.92**	**0.95**	**2.93**	

Table 2 displays the mean responses of male and female principals on ways teachers' digital competencies can be managed for sustainable development in secondary schools in Imo State. Both male and female principals agreed on all the items.

Table 3: Summary of z-test on the Difference between the Mean Ratings of Male and Female Principals on Ways Digital Learning Facilities can be Managed for Sustainable Development in Secondary Schools in Imo State

Status	N		SD	Df	z-cal	Critical Value	Remarks	Decision
Male Principals	77	3.06	0.80	131	0.26	±1.96	Not Significant	Failed to Reject
Female Principals	56	3.02	0.94					

P< 0.05

Table 3 reveals the summary of z-test analysis on the difference between the mean responses of male and female principals on ways digital learning facilities can be managed for sustainable development in secondary schools in Imo State. The result shows that z-calculated value of 0.26 is less than the z-critical value of ±1.96. Since the z-calculated value is less than the z-critical value, the null hypothesis failed to reject at 0.05 alpha level. Thus, there is no significant difference between the mean ratings of male and female principals on ways digital learning facilities can be managed for sustainable development in secondary schools in Imo State.

Table 4: Summary of z-test on the Difference between the Mean Ratings of Male and Female Principals on Ways Teachers' Digital Competencies can be Managed for Sustainable Development in Secondary Schools in Imo State

Status	N		SD	Df	z-cal	Critical Value	Remarks	Decision
Male Principals	77	2.93	0.81	131	0.07	±1.96	Not Significant	Failed to Reject
Female Principals	56	2.92	0.95					

P< 0.05

Table 4 shows the summary of z-test analysis on the difference between the mean responses of male and female principals on ways teachers' digital competencies can be managed for sustainable development in secondary schools in Imo State. The result shows that z-calculated value of 0.07 is less than the z-critical value of ±1.96. Since the z-calculated value is less than the z-critical value, the null hypothesis failed to reject at 0.05 alpha level. Thus, there is no significant difference between the mean ratings of male and female principals on ways teachers' digital competencies can be managed for sustainable development in secondary schools in Imo State.

DISCUSSION OF FINDINGS

The finding of this study revealed that ways digital learning facilities can be managed for sustainable development in secondary schools in Imo State include: having a management plan that covers instructional strategies including electricity supply; establishing user policy guidelines on expected behaviour when using digital learning devices; planning the school time-table in such a way every class will have access to the available digital learning facilities; ensuring that the websites, learning platforms, software applications, among others are well-secured to avoid being hacked; organising relevant resource materials that are converted into digital learning materials using scanners; maintaining enabling environments for integration of digital learning facilities; ensuring that teachers regularly access the digital education platforms during instructional delivery; actively monitoring the use of the available digital learning facilities and ensuring that any bad computer-aided tools, wires, Internet connectivity, etc are fixed. The implication of this study is that management is central to change and innovation. This finding is in agreement with Garry (2020); Pettersson (2021), who discovered in their various studies that digitalisation is not only about learning with digital technologies but also about how the digital facilities are managed to gain sustainability. It is also in consonance with Isah and Ojetunde (2019); Butler et al. (2020); Mpungose (2020), who observed that digitalisation of

school activities requires a wide range of computer-aided learning tools, Internet facilities, Wi-Fi access, among others that must be actively monitored and maintained.

Another finding of this study revealed that ways teachers' digital competencies can be managed for sustainable development in secondary schools in Imo State include: training teachers on how to use digital learning tools to teach in the classroom; encouraging teachers to use word processing software to type their lesson notes; guiding teachers on how to present their lessons using PowerPoint; exposing teachers to using their smart phones to video real objects which they can use as teaching aids during instructional delivery; encouraging teachers to always surf the Internet to search open educational resources (OERs) before writing their lesson plans; organising workshops to demonstrate to teachers how interactive whiteboards can be used to make learning student-centred; motivating teachers to upgrade themselves by enrolling in computer-based tutorials where they can be taught the basics of computer literacy. This implies that digitalisation of secondary education depends largely on the teachers who are key players of the transformational process. This finding agrees with Obasi and Adieme (2023), who posited that teachers who are critical variables in the education system must be constantly trained and retrained to integrate modern technologies in their instructional delivery so as to meet the learning needs and styles of students. The study is also in line with Hakansson and Pettersson (2019); Abdurashidova et al. (2023); Ghavifekr and Sani (2015), who revealed in their studies that digitalisation that is not rooted in technology-pedagogical knowledge and skills of teachers can fail to transform the education process.

CONCLUSION

From the findings of this study, it can be concluded that digitalisation of secondary education, which brings about change in learners' behaviour that will drive sustainable development depends largely on the ways principals manage the available digital learning facilities and harness the teachers towards integrating technological devices in the teaching-learning process. Hence, principals' managerial skills are very critical in meeting the needs of this digital age.

RECOMMENDATIONS

Based on the findings of this study, the following recommendations were made:

1. The Imo State Ministry of Education should formulate policies that will guide digitalisation process, and also ensure that all the public secondary schools are equipped with digital learning facilities.
2. Principals should endeavour to constantly train and retrain teachers on technology pedagogical knowledge and skills, so as to meet the students' learning needs in this digitalised world.

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