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Emerging Technologies required for Sustainable Development Goals (SDGs) in Secondary School Administration in Enugu State

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ABSTRACT

The study examined the emerging technologies required for Sustainable Development Goals (SDGs) in secondary school administration in Enugu State. This study was guided by two research questions and two hypotheses. The study adopted a descriptive survey research design. The population for the study was 8880 which comprised 295 principals and 8585 teachers. Proportionate sampling technique was used to draw a sample size of 888. The instrument for data collection was an 18-item structured questionnaire titled "Emerging Technologies Required for SDGs Questionnaire (ETRSDGsQ)". The instrument was validated by three research experts, two in Department of Educational Management and one in Measurement and Evaluation unit of Department of Mathematics and Computer Education, all from Faculty of Education, Enugu State University of Science and Technology (ESUT), Enugu. To ascertain the internal consistency of the instrument, Cronbach Alpha method was used to compute the internal consistency of the instrument. The computation yielded 0.81 and 0.79 for sections 1 and 2 respectively. The instrument had an overall reliability index of 0.80 which indicate that the instrument is reliable. The research questions were answered using mean and standard deviation while the hypotheses were tested with t-test statistic. The findings of the study revealed that educational technology and Information and Communication Technology tools are some of the emerging technologies required for Sustainable Development Goals (SDGs) in secondary school administration. Based on the findings, the study recommends that Enugu State government should provide comprehensive training to teachers, administrators, and other stakeholders on the effective use of the agreed-upon educational technology tools. This will ensure that they are proficient in utilizing the tools to address SDGs-related topics within the curriculum.

Keywords: Emerging Technologies, Sustainable Development Goals (SDGs), Administration

INTRODUCTION

The progress of each country is closely linked to the caliber of its educational framework, as learning serves as a guiding light that has consistently illuminated humanity's path towards self-improvement. According to Agugu and Bua (2019), education embodies virtue, with its core objective being the cultivation of ethics and the ability to contribute meaningfully to one's community. Regardless of whether referring to conventional or contemporary educational approaches, the ultimate goal remains consistent: to empower individuals to take charge of their lives positively and make valuable contributions to societal advancement (Agugu and Bua, 2019). The secondary school phase denotes the educational stage succeeding primary schooling. In Nigeria, secondary education follows primary education, as outlined by the Federal Republic of Nigeria (FRN, 2013). This level of education, which occurs prior to tertiary education, is a crucial component in fostering human capital development. Rivai (2017) asserted that the future quality of a nation's populace hinges

on the caliber, proficiency, ethics, and efficacy of its teachers.

A teacher embodies leadership qualities, embracing change while equipping future leaders with essential skills for their success. Teachers fulfill the academic needs of students in regular classrooms, delivering guidance within educational institutions (Okeke in Oluka, 2014). A teacher possesses official training in education and the ability to share knowledge, attitudes, and abilities with learners. The management of both educational and administrative aspects of secondary schools has traditionally been overseen by the principal (Uko, 2015). In essence, teachers and principals collaborate to construct a unified educational journey for students, pivotal in enhancing academic accomplishments, cultivating a positive school atmosphere, and ensuring overall school triumph.

Principals, as secondary school leaders, are responsible for supervising school activities. A principal is the highest-ranking executive within a secondary school. Egwu (2016) characterized the principal as a leader who strategizes, coordinates, and oversees school operations for optimal functioning. According to Obi in Ogbu (2014), the principal acts as a coordinator, orchestrating activities to ensure efficiency and effectiveness. The principal's role encompasses crafting a philosophy, guidelines, theories, principles, processes, and practices that can be universally applied to guarantee a successful educational experience. Achieving a fruitful educational process necessitates proficient administration, a role fulfilled by the principal.

The efficient management of public affairs is encompassed by administration. It serves as both an academic discipline and a practical field. Unachukwu & Okorji (2014) characterized administration as a social procedure focused on identifying, motivating, regulating, and uniting formally and informally organized human and material resources within a purpose-built integrated system to achieve established objectives. Administration involves guiding, directing, and overseeing the endeavors of a collective of individuals toward a shared aim, while facilitating the collaboration of human and material resources. It involves the skill to harmonize numerous and potentially conflicting social forces within a single entity, ensuring their cohesive operation (Jaiyeoba, 2015). The connection between administration and technology is progressively crucial as technology assumes a vital role in organizational and governmental functions. However, emerging technologies are imperative for effective administrative processes.

Emerging technologies refer to novel and potentially transformative innovations that have the capacity to significantly influence society, the economy, and industries. These often embody the most recent strides in science and technology. According to Kufeoglu (2022), emerging technologies encompass a range of innovations including educational technology, information and communication technology, nanotechnology, biotechnology, robotics, learning analytics, adaptive learning, mobile learning, immersive classrooms, and artificial intelligence. This study exclusively focuses on educational technology and Information and Communication Technology (ICTs). The researchers investigate the role of educational technology and information and communication technology (ICT) in furthering the objectives of Sustainable Development Goals within the realm of secondary school administration. Educational technology and information and communication technology (ICT) share a connection but possess distinct meanings.

Educational technology encompasses the utilization of technological resources, processes, and tools, including platforms like Learning Management Systems, Online Collaboration Tools, and Interactive Whiteboards, to enrich the methods of teaching and learning. It can be described as the systematic incorporation of scientific knowledge into practical educational tasks (Etesike, 2014). This involves adapting the scientific method to the realm of teaching and learning. Research conducted by Gabadeen, Alabi & Akinnubi (2015) found that the state of educational technology implementation in secondary schools is lacking. However, when the aforementioned educational technology resources are adequately provided and effectively employed in the teaching and learning processes, they have been proven to facilitate teaching and improve the learning experience (Etesike, 2014).

Additionally, evidence suggests that institutions equipped with robust ICT (Information and Communication Technology) resources tend to achieve superior educational outcomes compared to those with limited resources. The contemporary world is marked by transformative advancements driven by ICT (Oyebola, 2018; Okechukwu and Ukeh, 2022), resulting in a globalized and interconnected society. ICT encompasses the use of electronic devices and communication tools that enable individuals to engage in various instructional activities. ICT involves the use of computers, software, and electronic devices to perform functions like information conversion, storage, protection, processing, transmission, and retrieval (Khan, 2016). In the present-day educational landscape, effective learning involves the integration of smartphones, computers, and laptops – essential tools in 21st-century classroom settings (Onah, Ude & Obe, 2017).

A study by Maisamari, Adikwu, Ogwuche & Ikwoche (2018) highlighted a deficiency in the utilization of ICT to support teaching and learning. Egomo, Enyi & Tah (2012) asserted that the availability of ICT facilities is notably limited. According to Olakulehim as cited in Maisamari et al. (2018), applying ICTs offers benefits such as heightened motivation, better recall of previous learning, provision of novel instructional stimuli, activation of learner engagement, and systematic feedback on learning content. In essence, ICT tools like computers, laptops, and virtual machines can be employed to facilitate the learning of all subjects, contributing to the realization of Sustainable Development Goal (SDG) 4 – Quality Education.

The Sustainable Development Goals (SDGs), established in 2016 and set to be achieved by 2030, encompass a wide range of areas for advancement, including education from its grassroots. Comprising 17 interconnected objectives, the SDGs were adopted by the United Nations in 2015 as a universal appeal to eliminate poverty, safeguard the environment, and enhance overall quality of life by 2030. Specifically, SDG 4 aims to guarantee comprehensive, fair access to high-quality education and encourage continuous learning opportunities (National Teachers Institute (NTI), 2020). This fourth goal of the SDGs focuses on enhancing teaching and learning, contributing to advancements in secondary education.

The primary issue identified by researchers in Nigerian secondary education, particularly in Enugu State, is the potential gradual decline in teaching and learning resources, with insufficient attention from school principals and key stakeholders. This concerning situation has raised alarm among those invested in effective secondary education. Educators face numerous challenges in teaching, not solely due to the

growing student population but also due to inadequate and often poorly maintained educational technologies within schools. In light of the above discussion, this present study seeks to determine the emerging technologies necessary for the implementation of Sustainable Development Goals (SDGs) in the administration of secondary schools in Enugu State.

Statement of the Problem

The significance of emerging technologies in the progress of a nation cannot be overstated. Consequently, these technologies have become essential for enhancing the quality of education. Despite the notable importance given to emerging technologies, researchers have observed persistent issues regarding students' achievement and retention in specific subjects. These challenges have been linked to various factors, including the teaching and learning methods employed by both teachers and students.

Researchers noted a lack of effectiveness on the part of school principals in ensuring a productive teaching and learning environment, as well as achieving favorable WAEC/NECO results. These results are crucial in equipping secondary school graduates with the necessary skills for successful employment. However, the principals countered that they shouldn't shoulder all the blame, as the Enugu state government has not provided the necessary support to facilitate the achievement of Sustainable Development Goals (SDGs). The principals argued that essential resources for secondary school administration are severely insufficient, complicating the realization of educational objectives.

They further contended that vital elements for proficient administration, such as integrating emerging technologies like educational technology and information and communication technology tools into instructional methods, are not readily accessible to them. Consequently, they claimed that achieving desired educational outcomes has become challenging. The underperformance of students and staff, among other issues, prompted the researcher to investigate the role of emerging technologies required for achieving Sustainable Development Goals (SDGs) in secondary school administration in Enugu State.

Purpose of the Study

The purpose of the study was to ascertain the emerging technologies required for Sustainable Development Goals (SDGs) in secondary school administration in Enugu State. Specifically, the study sought to:

1. determine the educational technology tools required for Sustainable Development Goals (SDGs) in secondary school administration in Enugu State;
2. examine the information and communication technology tools required for Sustainable Development Goals (SDGs) in secondary school administration in Enugu State.

Research Questions

The following research questions guided the study:

1. What are the educational technology tools required for Sustainable Development Goals (SDGs) in secondary school administration in Enugu State?
2. What are the information and communication technology tools required for Sustainable Development Goals (SDGs) in secondary school administration in Enugu State?

Hypotheses

The following hypotheses guided this study and were tested at .05 level of significance:

H_{O1}: There is no significant difference between the mean ratings of principals and teachers on the

educational technology tools required for Sustainable Development Goals (SDGs) in secondary school administration in Enugu State.

H_{O1}: There is no significant difference between the mean ratings of principals and teachers on the information and communication technology tools required for Sustainable Development Goals (SDGs) in secondary school administration in Enugu State.

Methodology

The study adopted a descriptive survey research design. According to Nworgu (2015), descriptive survey research design is one which a group of people or items are studied by collecting and analyzing data from a few people or items regarded as being representative of the entire group. The population for the study was 8880 which comprised 295 principals and 8585 teachers. Proportionate sampling technique was used to draw a sample size of 888. The instrument for data collection was a structured questionnaire titled "Emerging Technologies Required for SDGs Questionnaire (ETRSDGsQ)". The instrument contained a total of 18 items that was structured by the researchers. The instrument was validated by three research experts, two in Department of Educational Management and one in Measurement and Evaluation unit of Department of Mathematics and Computer Education, all from Faculty of Education, Enugu State University of Science and Technology (ESUT), Enugu.

Forty (40) copies of the questionnaire were trial tested on 13 principals and 27 teachers in public secondary schools in Anambra State. To ascertain the internal consistency of the instrument, Cronbach Alpha method was used to compute the internal consistency of the instrument. The computation yielded 0.81 and 0.79 for sections 1 and 2 respectively. The instrument had an overall reliability index of 0.80 which indicates that the instrument is reliable. However, out of the 888 copies of questionnaire administered, the researchers with their four research assistants retrieved 794 copies (21 from principals and 773 from teachers) which resulted to 89.41% return rate. The research questions were answered using mean and standard deviation while the hypotheses were tested with t-test statistic. In rating the mean, each response option had a numerical value based on real limit of numbers: SA = 3.50-4.00; A = 2.50-3.49; D = 1.50-2.49; SD = 0.00-1.49. The interpretation of the test of hypotheses was based on the significance (sig.) values from the SPSS output. The null hypotheses would not be rejected when the probability values are greater than 0.05, but would be rejected when the probability values are less than 0.05.

Data Analysis and Results

Research Question 1: What are the educational technology tools required for Sustainable Development Goals (SDGs) in secondary school administration in Enugu State?

Table 1: Mean ratings of principals and teachers on the educational technology tools required for Sustainable Development Goals (SDGs)

	ITEMS	Principals 21			Teachers 773		
S/N	The following educational technology tools are required for SDGs:	$\overline{x}$	SD	Dec	$\overline{x}$	SD	Dec
1.	Google classroom.	2.55	.96	A	2.59	.91	A
2.	learning management system.	2.65	.86	A	2.62	.91	A
3.	information system.	2.50	.82	A	2.51	.92	A
4.	flipped classroom.	2.57	.90	A	2.59	.81	A
5.	virtual classroom.	2.57	.91	A	2.55	.91	A
6.	interactive whiteboard.	2.55	.98	A	2.54	.93	A
7.	quizlet.	2.50	.90	A	2.53	.93	A
8.	dreambox.	2.54	.89	A	2.55	.81	A
9.	smart sparrow.	2.59	.91	A	2.63	.82	A
	Cluster Mean/SD	**2.56**	**.90**	**A**	**2.57**	**.88**	**A**

Table 1 shows mean ratings and standard deviations of the responses on the educational technology tools required for Sustainable Development Goals (SDGs) in secondary school administration in Enugu State. The analysis showed that the respondents agreed on items 1-9 above as regards the educational technology required for secondary school administration. In the above table, the principals' means ranged from 2.50-2.65, while teachers' means ranged from 2.51–2.63 respectively. Table 1 has cluster means of 2.56 and 2.57 with standard deviations of .90 and .88 respectively for both principals and teachers. This signifies that the respondents agreed on the educational technology tools required for Sustainable Development Goals (SDGs) in secondary school administration in Enugu State.

Research Question 2: What are the information and communication technology tools required for Sustainable Development Goals (SDGs) in secondary school administration in Enugu State?

Table 2: Mean ratings of principals and teachers on the ICT tools required for SDGs in secondary school administration in Enugu State

	ITEMS	Principals 21			Teachers 773		
S/N	The following Information and Communication Technology tools are required for SDGs:	$\overline{x}$	SD	Dec	$\overline{x}$	SD	Dec
10.	spreadsheet.	3.02	.81	A	2.97	.82	A
11.	interactive teaching box.	3.00	.82	A	3.02	.81	A
12.	projector.	3.01	.82	A	3.02	.79	A
13.	spreadsheet.	3.05	.82	A	3.01	.84	A
14.	word processor.	3.03	.81	A	2.96	.82	A
15.	Microsoft PowerPoint.	2.94	.82	A	2.91	.80	A
16.	Computers.	3.04	.80	A	3.01	.81	A
17.	Internet.	3.02	.85	A	2.97	.80	A
18.	video games.	3.02	.79	A	2.99	.79	A
	Cluster Mean/SD	**3.01**	**.82**	**A**	**2.98**	**.81**	**A**

Table 2 shows mean ratings and standard deviations of the responses on the information and communication technology tools required for Sustainable Development Goals (SDGs) in secondary school administration in Enugu State. The data analyzed show that the respondents agreed on items 10-18 on Table 2. In the above table, the principals' means ranged from 2.94-3.04, while teachers' means ranged from 2.97–3.02 respectively. Table 2 has cluster means of 3.01 and 2.98 with standard deviations of .82 and .81 respectively. This implies that the respondents agreed on the ICT tools required for Sustainable Development Goals (SDGs) in secondary school administration in Enugu State.

Hypotheses

H_{O1}: There is no significant difference between the mean ratings of principals and teachers on the educational technology tools required for Sustainable Development Goals (SDGs) in secondary school administration in Enugu State.

Table 3: Summary of t-test analysis of the mean ratings of principals and teachers on the educational technology tools required for SDGs in secondary school administration in Enugu State

Group	n	$\overline{x}$	SD	df	P-value	Decision
Principals	21	2.56	.90	792	.101	Do not reject Ho_1
Teachers	773	2.57	.88			

Data on Table 3 show that at 792 degree of freedom, the p-value was .101 which is greater than 0.05 set for this study. The null hypothesis was, therefore, not rejected, which shows that there was no significant difference between the mean ratings of principals and teachers on the educational technology tools required for SDGs in secondary school administration in Enugu State.

H_{O2}: There is no significant difference between the mean ratings of principals and teachers on the information and communication technology tools required for Sustainable Development Goals (SDGs) in secondary school administration in Enugu State.

Table 4: Summary of t-test analysis of the mean ratings of principals and teachers on the ICT tools required for Sustainable Development Goals (SDGs) in secondary school administration in Enugu State

Group	n	$\overline{x}$	SD	df	P-value	Decision
Principals	21	3.01	.82	792	.098	Do not reject Ho_2
Teachers	773	2.98	.81			

Data on Table 4 show that at 792 degree of freedom, the p-value was .098 which is greater than 0.05 set for this study. The null hypothesis was, therefore, not rejected, which shows that there was no significant difference between the mean ratings of principals and teachers on the ICT tools required for Sustainable Development Goals (SDGs) in secondary school administration in Enugu State.

Discussion of Findings

The findings of the study showed that principals and teachers agreed that the educational technology tools captured in this study are required for secondary school administration. The finding is in line with Gabadeen, Alabi & Akinnubi (2015), who posited that there is need to incorporated latest educational technology tools in secondary school administration. Further finding shows that there was no significant difference between the mean ratings of principals and teachers on the educational technology tools required for Sustainable Development Goals (SDGs) in secondary school administration in Enugu State.

The finding of the study showed that principals and teachers agreed on the ICT

tools required for Sustainable Development Goals (SDGs) in secondary school administration in Enugu State. This finding is in line with Maisamari, Adikwu, Ogwuche & Ikwoche (2018), who posited that there is need for ICT tools to be utilized in order to improve the administration of secondary schools. Further finding shows that there was no significant difference between the mean ratings of principals and teachers on the information and communication tools required for Sustainable Development Goals (SDGs) in secondary school administration in Enugu State.

Conclusion

The integration of emerging technologies into secondary school administration in Enugu State is pivotal for achieving Sustainable Development Goals (SDGs) in the field of education. The transformative potential of educational technology and ICT tools cannot be overstated, as they offer innovative solutions to address key challenges and facilitate progress towards a sustainable and inclusive education system.

The Sustainable Development Goals provide a comprehensive framework to tackle global issues, including quality education, reduced inequalities, and sustainable communities. By harnessing the power of emerging technologies, such as interactive learning platforms, virtual classrooms, and data analytics, secondary schools in Enugu State can enhance the quality of education, promote equal access to learning resources, and better monitor student progress.

Recommendations

Based on the findings, the following recommendations were proffered:

1. Enugu State government should provide comprehensive training to teachers, administrators, and other stakeholders on the effective use of the agreed-upon educational technology tools. This will ensure that they are proficient in utilizing the tools to address SDGs-related topics within the curriculum.
2. Non-governmental organizations should organize workshops and training sessions for secondary school administrators in Enugu State to ensure proper understanding and utilization of the agreed-upon ICT tools. These workshops should focus on hands-on training, sharing best practices, and addressing any questions or challenges.

REFERENCES

Agugu, D.I. & Bua, F.T. (2019). Politics and its influence on staff employment in secondary schools in Nigeria. *Benue State University Journal of Educational Management*, 2(1); 36-41.

Egomo, J.E, Enyi, B.I. & Tah, M. (2012). Availability and utilization of ICT For effective instructional delivery in tertiary institutions in cross River State, Nigeria. *Global Advance Research Journal of Educational Research and Review*, 1(8) 190-195.

Egwu, S.O. (2016). Management strategies for conflict resolution in secondary schools in Ebonyi state, Nigeria. *UNIZIK Journal of Educational Management and Policy,* 1(1), 88-94.

Etesike, C.N. (2014). Availability and adequacy of educational technology resources in Colleges of Education in Enugu State: implications for bridging gaps in educational policies in Nigeria. *Knowledge Review*, 31(2), 1-11.

Federal Republic of Nigeria, (FRN, 2013). *National policy on education.* Lagos: NERDC.

Gabadeen, W.O., Alabi, A.T. & Akinnubi, O.P. (2015). Availability, accessibility and utilization of e-Learning technologies for sustainable secondary education in Federal Capital Territory, Abuja-

Nigeria. *Asia Pacific Journal of Education, Arts and Sciences,* 2(2), 1-8.

Jaiyeoba, A. O. (2015). School administration and supervision. In J.B. Babalola, A. O. Ayemi, S.O. Adedeji, A.A. Suleiman and M.O. Ariikewuyo (Eds) *Educational Management*: Thoughts and practice. Ibadan: Codat Publications.

Kufeoglu, S. (2022). *Emerging technologies. Value Creation for Sustainable Development*. Department of Engineering, University of Cambridge, Cambridge UK.

Maisamari, A.M., Adikwu, V.O., Ogwuche, C.O. & Ikwoche, F.I. (2018). Assessment of secondary school teachers' use of information and communication technology (ICT) in Anyingba Metropolis, Kogi State, Nigeria. *Journal of Education & Entrepreneurship, 5*(1), 32-47.

National Teachers Institute (2020). Information and Communication Technology Module for retraining of 2020 Basic Teachers in Jan.2021 in every state of the Federation. FME/NTI Kaduna, Sustainable Developmental Goals (SDGs) Project.

Nworgu, B.G. (2018). *Educational research, basic issues and methodology*. University Trust Publishers Nsukka, Nigeria.

Ogbu, J.O. (2014). *Principals' motivational strategies and teacher job satisfaction in Benue State.* Unpublished thesis, University of Nigeria Nsukka.

Okechukwu, O. & Ukeh, B.O. (2022). Awareness of cloud computing services in Tertiary Institutions in Enugu State. *International Technology Research Journal, 8(1):* 27-34.

Oluka, B.N. (2014). Instructional skill needs of teachers for inclusive classroom in primary schools in Ebonyi State. *Unpublished Thesis, Faculty of Education, University of Nigeria Nsukka.*

Onah, E.N., Ude, V.C. & Obe P.I. (2017). Level of utilization of e-learning in teaching and learning of selected programmes in Universities in Enugu State, Nigeria. *International Journal of Education A Publication of the Faculty of Education Godfrey-Okoye University Enugu; 2*(2), 247-262.

Oyebola, A. (2018). Effect of the use of multimedia on students' performance in secondary school mathematics. *Global Media Journal,* 16(30); 109.

Rivai, A. (2017). Personnel performance analysis: Leadership, work discipline, and organizational commitment: A study of KODAM transportation unit personnel I/Bukit Barinas. *Saudi Journal of Business and Management Studies*, *2*(11), 957–966.

Uko, E.S. (2015). Principalship and effective management of facilities in secondary schools in Cross River State, Nigeria. *International Journal of Academic Research and Reflection. 3*(1), 64-76.

Unachukwu, G.O. & Okorji, P.N. (2014). *Educational Management. A Skill building approach.* Anambra: Rex Charles & Patrick.