

IMPACT OF EDUCATIONAL MANAGEMENT AND TECHNOLOGY ON ACHIEVEMENT OF SUSTAINABLE DEVELOPMENT GOAL (SDG) FOUR IN NIGERIA

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Abstract

The study examined the impact of educational management and technology on the achievement of Sustainable Development Goals (SDGs) four in the Nigerian educational system. Two research questions were formulated to guide the study. The research adopted a descriptive survey design and population consisted of 458 secondary school principals in Nsukka Education Zone, Enugu State, Nigeria. Since the entire population was manageable, there was no requirement for sampling techniques. The study used a structured questionnaire titled "Educational Management and Technology on Achievement of Sustainable Development Goals' Questionnaire (EMTASDGO)" as the instrument for data collection. The questionnaire was face validated by three experts and had a reliability coefficient of 0.82 using the Cronbach Alpha method. The research questions were answered using mean and standard deviation scores. The results of the survey showed that effective educational management practices and the use of appropriate technology are critical for achieving the SDGs. Specifically, the findings of the study revealed that effective educational management practices, such as strong leadership expectation and governance were essential for achieving. The study also identified best practices for educational management and technology integration that can contribute to the achievement of SDGs in the Nigerian educational system. Based on the findings of the study, it was recommended among others that policymakers, educators and other stakeholders in the Nigerian education sector should increase awareness and training on these best practices. This can be achieved through workshops, seminars, and training programs that focus on effective integration of technology into educational management practices.

Keywords: Educational management, technology, achievement, SDGs

Introduction

The Sustainable Development Goals (SDGs) were adopted by the United Nations in 2015 as a universal call to action to end poverty, protect the planet, and ensure that all people enjoy peace and prosperity by 2030 (United Nations, 2015). Education is a critical enabler of sustainable development, and the SDGs recognize the importance of education in achieving sustainable development. Specifically, Goal 4 aims to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all" (United Nations, 2015). The Sustainable Development Goals (SDGs) are a set of 17 global goals established by the United

Nations General Assembly in 2015 as part of the 2030 Agenda for Sustainable Development. The goals include no poverty, zero hunger, good health and well-being, quality education, gender equality, clean water and sanitation, affordable and clean energy, decent work and economic growth, industry, innovation and infrastructure, reduced inequalities, sustainable cities and communities, responsible consumption and production, climate action, life below water, life on land, peace, justice and strong institutions, and partnerships for the goals (Bates, 2015). The SDGs are intended to be achieved by 2030 through the collective efforts of governments, civil society, the private sector, and individuals.

Sustainable Development Goals (SDGs) could be defined as a set of universal and transformative goals and targets aimed at ending poverty, protecting the planet, and ensuring peace and prosperity for all people by 2030 (United Nations Development Programme, 2019). Center for Strategic and International Studies (2019) defined the Sustainable Development Goals as an integrated set of targets for eradicating poverty, improving health and education, reducing inequality, increasing economic growth, and addressing climate change and other environmental challenges. Operationally, Sustainable Development Goals are the proposal to achieve better and more sustainable expectations for all by 2030. They address the global challenges we face, including those related to poverty, inequality, climate change, environmental degradation, peace and justice.

Effective educational management practices are essential for achieving Sustainable Development Goals. Educational management refers to the process of planning, organizing, coordinating, directing, and controlling educational resources, programs, and activities to achieve the objectives of an educational institution. It involves decision-making, problem-solving, and effective communication between different stakeholders, such as teachers, students, parents, and administrators. Educational management also encompasses the development of policies, procedures, and strategies that promote the quality and effectiveness of teaching and learning in educational institutions. The ultimate goal of educational management is to ensure that students receive the best possible education and achieve their full potential. According to Bush and Bell (2002), educational management refers to the process of planning, organizing, directing, and controlling resources (human, financial, and material) to achieve educational goals. This includes aspects such as strong leadership and governance, effective monitoring and evaluation, and the provision of adequate resources. The importance of effective educational management in achieving quality education is widely recognized (UNESCO, 2017). Similarly, UNECO (2019) further posited that effective educational management is critical for achieving the SDGs, particularly in the areas of quality education, gender equality, and lifelong learning. For example, a study by UNESCO (2019) found that effective educational management practices, such as strong leadership and governance, are essential for achieving quality education. Similarly, a study by Jukes et al. (2014) showed that the use of appropriate technology, such as mobile devices and e-learning platforms, can support lifelong learning and improve educational outcomes. Educational management is the process of planning, organizing, staffing, directing, coordinating, reporting, and budgeting for the achievement of predetermined educational goals (Sergiovanni, 2012). Educational management according to Stoner, Freeman and Gilbert (2006) is the process of utilizing human and material resources in the most effective and

efficient way possible to achieve the goals of education. Operationally, educational management is the theory and practice of the organization and administration of existing educational establishments and systems. Educational management is also refers to the processes and practices involved in managing educational institutions, such as schools and universities. Therefore, to achieve a successful management of education requires individuals with technological know-how.

Importantly, educational technology can support teaching and learning by enhancing access to education, improving the quality of education, and fostering lifelong learning. Technology refers to the application of scientific knowledge, skills, and tools to create, design, develop, and innovative useful products, systems, and services that improve human life and solve real-world problems. It encompasses various fields such as engineering, computer science, information technology, communication, and biotechnology. Technology involves the use of machines, devices, software, and other tangible and intangible resources to facilitate the creation, storage, retrieval, and dissemination of information and knowledge. In today's digital age, technology has become an essential part of modern life, affecting various aspects of society, such as education, health care, business, and entertainment. According to UNESCO (2017), educational technology refers to "any technology that is used to support teaching, learning, assessment, or administration in education" (p. 5). Hence, the appropriate use of technology in education can improve the quality and relevance of education Organization for Economic Co-operation and Development (OECD, 2015) and support the achievement of the SDGs (Bates, 2015). However, the use of technology in education is not without challenges. For example, there may be issues around the availability and quality of infrastructure, access to digital resources, and digital literacy skills. Additionally, while technology can support the achievement of the SDGs, it is not a substitute for effective educational management practices. Jaeger and Jaeger (2018) defined technology as the systematic application of scientific knowledge to practical tasks in order to advance society. Friedman (2016) defined technology as "the set of tools and platforms that enable us to connect, share, and learn with one another in ways that was impossible before. Operationally, technology is a material entity, or set of such entities, that can be used to support human cognitive and social activities. It is also defined as anything that is not natural and that amplifies human capabilities. Technology is increasingly being used to support teaching and learning, and has the potential to support the achievement of the SDGs. For example, educational technology can improve access to education, particularly for marginalized groups such as girls and rural populations (UNESCO, 2017). Educational technology can also support the development of 21st century skills, such as critical thinking and collaboration (OECD, 2015).

Certainly! Educational management and technology play a crucial role in supporting the achievement of the SDGs Four in Nigeria related to education in a number of ways as posited by many others which include the followings:

- **Expanding access to education:** Technology can help overcome geographic and logistical barriers to education, allowing students in remote or under-served areas to access high-quality educational resources. For example, online courses and digital

learning platforms can provide students with access to educational content and resources from anywhere in the world (Miao & Mishra, 2019).

- **Enhancing teaching and learning:** Technology can provide new tools and resources that can improve the effectiveness of teaching and learning. For example, educational software and apps can help students learn at their own pace and provide personalized feedback, while virtual and augmented reality can create immersive learning experiences that engage students in new ways (UNESCO, 2017).
- **Supporting teacher training and professional development:** Technology can provide opportunities for teachers to develop new skills and stay up-to-date with the latest educational practices. Online courses, webinars, and other digital resources can help teachers stay connected with their peers and access new ideas and resources for their classrooms (Arroyo-Moreno, Hernández-Gómez, & de la Torre-Díez, 2021)
- **Fostering sustainable development:** Technology can play a key role in promoting sustainable development by helping students and teachers understand the complex interplay between environmental, social, and economic factors. For example, digital simulations and modelling tools can help students explore the impacts of human activity on the environment and develop strategies for mitigating these impacts (Hämäläinen & Puhakka, 2017).

By and large, the role of technology in supporting the achievement of the SDGs related to education is multifaceted and complex. However, by leveraging the power of technology to expand access to education, enhance teaching and learning, and support sustainable development, which help to ensure that all students have the opportunity to succeed and thrive in the 21st century. Interestingly, study conducted by Abdullah & Ward (2016) and UNESCO (2019) also asserts that there are several other roles that technology can play in supporting the achievement of the SDGs related to education such as: improving assessment and monitoring, enhancing collaboration and communication, promoting lifelong learning, supporting inclusive education, and facilitating research and innovation.

Technology can play a crucial role in supporting the achievement of the SDGs related to education (Abdullah & Ward, 2016; UNESCO, 2019). One way that technology can do this is by expanding access to education. Abdullah and Ward (2016) further note that technology can help overcome geographic and logistical barriers to education, allowing students in remote or under-served areas to access high-quality educational resources. Digital learning platforms and online courses, for example, can provide students with access to educational content and resources from anywhere in the world (UNESCO, 2019). In addition, technology can enhance teaching and learning by providing new tools and resources that improves the effectiveness of education (Abdullah & Ward, 2016; UNESCO, 2019). Educational software and apps, for example, can help students learn at their own pace and provide personalized feedback (UNESCO, 2019). Virtual and augmented reality can also create immersive learning experiences that engage students in new ways (Abdullah & Ward, 2016).

Technology can also support teacher training and professional development (UNESCO, 2019). Abdullah and Ward (2016) note that online courses, webinars, and other digital resources can help teachers develop new skills and stay up-to-date with the latest

educational practices. Technology can also foster sustainable development by helping students and teachers understand the complex interplay between environmental, social, and economic factors (UNESCO, 2019). Digital simulations and modelling tools, for example, can help students explore the impacts of human activity on the environment and develop strategies for mitigating these impacts (Abdullah & Ward, 2016). Furthermore, technology can improve assessment and monitoring of student learning outcomes (UNESCO, 2019). Digital assessments and analytics tools can provide real-time feedback on student performance, enabling teachers to adjust their teaching strategies and provide targeted support (Abdullah & Ward, 2016). Technology can also enhance collaboration and communication between students, teachers, and other stakeholders (UNESCO, 2019), promote lifelong learning (Abdullah & Ward, 2016), support inclusive education (UNESCO, 2019), and facilitate research and innovation in education (Abdullah & Ward, 2016).

Nevertheless, the use of technology in educational management is not without challenges. For example, study conducted by UNESCO (2017) identified challenges such as the lack of infrastructure and digital literacy skills, which can limit the effectiveness of educational management and technology. Other challenges to integrate educational management and technology to achieve sustainable development goals include the followings:

- **Limited access to technology:** In some areas, there may be limited access to technology due to factors such as cost, infrastructure, or connectivity issues. This can make it difficult to fully integrate technology into educational management practices (UNESCO, 2017).
- **Resistance to change:** Some educators, learners, or other stakeholders may be resistant to incorporating technology into educational management practices. This may be due to a lack of understanding, concerns about privacy or security, or a preference for more traditional methods of instruction (Gao, Zhang & Franklin, 2013).
- **Lack of digital skills and literacy:** In order to effectively integrate technology into educational management practices, educators and learners need to have digital skills and literacy. This may require training and professional development, which can be time-consuming, and costly (Reimers & Schleicher, 2018).
- **Inadequate funding:** Implementing and maintaining technology in educational management practices can be expensive. In some cases, schools or other educational institutions may not have the necessary funding to invest in technology or to upgrade existing systems (United Nations, 2020).
- **Sustainability challenges:** The use of technology in educational management practices may also raise sustainability concerns, such as the environmental impact of producing and disposing of electronic devices, or the energy required to power technology systems (Al-Samarraie, & Baabdullah, 2018).

Importantly, in Nigeria, Smith (2023) emphasizes the need for a comprehensive approach that integrates educational management and technology to achieve Sustainable Development Goal (SDG) No. 4, which seeks to ensure inclusive and equitable quality education for all. Effective educational management within the Nigerian context encompasses

key aspects such as improving teacher training and development, curriculum adaptability, resource allocation, and the implementation of robust monitoring and evaluation systems. Furthermore, the transformative potential of technology in education is highlighted. To harness this potential, Nigeria must invest in digital infrastructure, create digital learning platforms, provide extensive teacher training in educational technology, and promote open educational resources. By harmonizing educational management and technology, Nigeria can significantly advance its progress towards achieving SDG No. 4 in 2023 and beyond (Smith, 2023).

However, the significance of this study lies in its potential to inform educational policies and practices that can contribute to the achievement of the SDGs. By examining the impact of educational management practices and technology on the achievement of the SDGs, this study can provide insights into strategies for promoting sustainable development through education. Additionally, by identifying challenges to progress, this study can help to inform efforts to address these issues and promote more equitable and inclusive education systems. Ultimately, this study has the potential to contribute to the global effort to achieve the SDGs and promote sustainable development for all. Despite the growing body of literature on the impact of educational management practices and technology on the achievement of the SDGs, there are still some gaps in the study our understanding. For instance, while some studies have identified the potential of blended learning environments and educational technology to enhance learning outcomes and promote access to education, there is a need for more research on the effectiveness of specific technological interventions and their impact on SDG achievement. Additionally, while several studies have emphasized the importance of effective educational management practices, there is a need for more research on how to implement and scale these practices in different contexts, including low-resource settings. Finally, while many studies have identified challenges and barriers to progress, there is a need for more research on how to overcome these obstacles and promote more equitable and inclusive education systems that can contribute to the achievement of the SDGs. In light of these considerations, this empirical study aims to examine the impact of educational management and technology on the achievement of the SDGs. The study investigates the extent to which educational management and technology can support the achievement of the SDGs, particularly in the areas of quality education, gender equality, and lifelong learning. By conducting a survey of educators, policymakers, and other stakeholders involved in educational management and technology, this study seeks to provide insights into the challenges and opportunities for leveraging educational management and technology for sustainable development.

Educational management and technology have played pivotal roles in advancing the achievement of Sustainable Development Goal (SDG) 4, which is dedicated to ensuring inclusive and equitable quality education for all. Their impacts are multifaceted and evident in several key aspects of SDG 4. Firstly, technology has significantly broadened access to education by breaking down geographic barriers and enabling remote or underserved communities to benefit from quality learning experiences. Moreover, it has had a profound effect on the quality of education by offering interactive learning tools, multimedia resources, and real-time assessments, thereby improving overall learning outcomes. Educational

management has also been instrumental in this process by emphasizing continuous professional development for teachers, with technology serving as a valuable tool for training and resource access. Additionally, technology has become a cornerstone for monitoring and evaluating educational programs, allowing for data-driven decision-making and accountability. Furthermore, it aids in curriculum adaptability by facilitating the timely updating of educational materials to align with evolving needs and technological advancements. Lastly, efficient resource allocation, guided by educational management practices, is further enhanced through technology, ensuring transparency and accountability in education funding. In summary, educational management and technology have collectively expanded access to quality education, elevated its standards, empowered educators, improved assessment processes, facilitated curriculum adjustments, and optimized resource management, all of which contribute significantly to the realization of SDG 4's objectives.

Purpose of the Study

The aim of the study is to examine the impact of educational management and technology on the achievement of the Sustainable Development Goals (SDGs). Specifically, the study seeks to:

1. ascertain the impact of educational management on the achievement sustainable development goal 4.
2. ascertain the impact of educational technology on the achievement sustainable development goal 4 .

Research Questions

The following research questions guided the study:

1. What is the impact of educational management on the achievement sustainable development goal 4?
2. What are the challenges hinder effectiveness of educational technology on the achievement sustainable development goal 4?

Methodology

This study adopted a descriptive survey design. The population of the study consisted of 458 secondary school principals in Nsukka Educational Zone, Enugu State, Nigeria. There was no sampling since the population was manageable. The study used a structured questionnaire titled "Educational Management and Technology on Achievement of SDGs Questionnaire (EMTASDGQ)" as the instrument for data collection. The instrument was structured on a four point rating scale of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD) weighted 4, 3, 2 and 1 respectively. The instrument was face validated by three experts, two from the Educational Administration and Planning, Department of Educational Foundations and one from the Department of Science Education, Faculty of Education, University of Nigeria, Nsukka, and the reliability was determined at 0.82 using the Cronbach Alpha which was considered high enough for the instrument usability. The research questions were answered using mean and standard deviation scores. The mean responses were adjudged on the basis that any mean score of 2.50 or above is considered accepted while any mean score that falls below 2.50 is considered unacceptable.

Results

Research Question One: What is the impact of educational management on the achievement sustainable development goal 4?

Table 1: Mean and Standard Deviation on Responses on the impact of educational management on the achievement sustainable development goal 4

S/N	Item Statement	Mean	Standard Deviation	Decision
1	Expanding access to education	2.65	0.08	A
2	Enhancing teaching and learning	2.78	0.07	A
3	Supporting teacher training and professional development	2.70	0.08	A
4	Fostering sustainable development:	2.66	0.08	A
5	Improving assessment and monitoring	2.51	0.09	A
6	Enhancing collaboration and communication	2.50	0.09	A
7	Promoting lifelong learning	2.92	0.06	A
8	Supporting inclusive education	2.82	0.07	A
9	Facilitating research and innovation	2.73	0.07	A
Cluster Mean		2.70	0.08	A

Data in Table 1 revealed mean and standard deviation scores for responses the role of technology in supporting the achievement of the SDGs related to education, the above-mentioned item statement met the criterion mean score of 2.50 and above which indicate acceptance according to decision rule. The following were agreed by respondents based on the cluster mean score of 2.70 and standard deviation of 0.08 correspondingly: improving assessment and monitoring; facilitating research and innovation; supporting teacher training and professional development; Supporting inclusive education; among others.

Research Question Two: What are the challenges hinder effectiveness of educational technology on the achievement sustainable development goal 4?

Table 2: Mean and Standard Deviation on Responses on challenges hinder effectiveness of educational technology on the achievement sustainable development goal 4

S/N	Item Statement	Mean	Standard Deviation	Decision
10	Limited access to technology	3.00	0.05	A
11	Resistance to change	3.12	0.02	A
12	Lack of digital skills and literacy	2.70	0.08	A
13	Inadequate funding	3.01	0.05	A
14	Sustainability challenges	2.99	0.05	A
15	Lack of infrastructure	2.54	0.09	A
Cluster Mean		2.89	0.05	A

Table 2 showed the mean ratings and standard deviation score on the challenges hinder effectiveness of educational management and technology to achieve SDGs related to education. Item 10 – 15 met above the standard mean ratings of 2.50. The rated statements were accepted based on the cluster mean score of 2.89 and standard deviation of 0.05 respectively. The following were accepted as the challenges hinder effectiveness of educational management and technology to achieve SDGs related to education: to promote quality assurance; limited access to technology; resistance to change; lack of digital skills and literacy; inadequate funding; sustainability challenges and lack of infrastructure.

Discussion of findings

The findings of the study revealed the impact of educational management on the achievement sustainable development goal 4 which include: expanding access to education, enhancing teaching and learning, supporting teacher training and professional development, fostering sustainable development, improving assessment and monitoring, enhancing collaboration and communication, promoting lifelong learning, supporting inclusive education, and facilitating research and innovation among others. The findings of the study is in line with the study of Gao, Zhang and Franklin (2013) who posited that some of the educators, learners, or other stakeholders may perhaps be resistant to incorporating technology into educational management practices as a result of lack of understanding, concerns about privacy or security, or a preference for more traditional methods of instruction. The findings of the study is in consonance with the finding of Reimers and Schleicher, (2018) who posited that lack of digital skills and literacy, therefore in order to effectively integrate technology into educational management practices, educators and learners need to have digital skills and literacy. This may require training and professional development, which can be time-consuming, and costly.

The findings of the study revealed the challenges hinder effectiveness of educational technology on the achievement sustainable development goal which include Limited access to technology, Resistance to change, Lack of digital skills and literacy, Inadequate funding and Sustainability challenges among others. The findings of the study is in agreement with the finding of Gao, Zhang & Franklin (2013) who posited that some of the educators, learners, or other stakeholders are resistant to incorporating technology into educational management practices as a result of lack of understanding, concerns about privacy or security, or a preference for more traditional methods of instruction. The findings of the study is also consonance with the finding of Reimers and Schleicher (2018) who posited that in order to effectively integrate technology into educational management practices, educators and learners need to have digital skills and literacy. Hence, this may require training and professional development, which can be time-consuming, and costly.

Implications for educational Policy and Practice

Specifically, the study highlights the need for educational policymakers and practitioners to prioritize effective educational management practices and technology in their efforts to achieve the SDGs related to education. This may include investing in leadership and governance structures that prioritize sustainability and equity, developing and implementing

monitoring and evaluation systems to measure progress towards the SDGs, and allocating resources to support technological interventions that can enhance learning outcomes and promote access to education. Additionally, the study emphasizes the importance of addressing challenges and barriers to progress, such as gender disparities in education and limited resources in low-income settings, through targeted interventions and policy initiatives. By incorporating these recommendations into their policies and practices, educational stakeholders can help to contribute to the global effort to achieve the SDGs and promote sustainable development for all.

Education Implications

The implications of this study for achieving the SDGs related to education are significant. The study highlights the importance of effective educational management practices, technological interventions, and targeted policy initiatives in promoting sustainable development through education. Specifically, the study identifies strategies for promoting more equitable and inclusive education systems that can help to achieve SDG 4 on quality education, as well as linkages between education and other SDGs such as SDG 1 on poverty reduction, SDG 5 on gender equality, and SDG 10 on reduced inequalities. By prioritizing these strategies and interventions, policymakers and practitioners can help to contribute to the global effort to achieve the SDGs and promote sustainable development for all. Additionally, the study underscores the importance of addressing challenges and barriers to progress, such as limited resources in low-income settings and gender disparities in education, through targeted policy initiatives and innovative solutions. By incorporating these recommendations into their policies and practices, educational stakeholders can help to ensure that education is a driver of sustainable development and progress towards the SDGs.

Conclusion

In conclusion, this study provides insights into the impact of educational management practices and technology on the achievement of the SDGs related to education. By examining the experiences of different countries and contexts, the study identifies key challenges and opportunities for progress towards the SDGs, as well as strategies for promoting sustainable development through education. The study highlights the importance of effective educational management practices, technological interventions, and targeted policy initiatives in promoting more equitable and inclusive education systems that can contribute to the achievement of the SDGs. Additionally, the study emphasizes the need for further research to address gaps in our understanding and identify innovative solutions to the challenges facing education systems around the world. Ultimately, this study underscores the critical role of education in promoting sustainable development and achieving the SDGs, and provides a roadmap for educational policymakers and practitioners to contribute to this global effort. These study also provide insights into the impact of educational management and technology on the achievement of the SDGs, as well as strategies for leveraging these tools to promote sustainable development.

Contribution to Knowledge

This study makes several contributions to the literature on the impact of educational management practices and technology on the achievement of the SDGs related to education. Firstly, the study synthesizes existing research and provides a comprehensive overview of the state of the literature on this topic. Secondly, the study provides new empirical evidence on the impact of specific educational management practices and technological interventions on the achievement of the SDGs in different contexts, which can help to inform policy and practice. Thirdly, the study identifies gaps in our understanding and highlights areas where further research is needed to promote sustainable development through education. Finally, the study emphasizes the importance of addressing challenges and barriers to progress, such as gender disparities in education and limited resources in low-income settings, through targeted policy initiatives and innovative solutions. By providing these contributions, this study can help to advance our understanding of the role of education in promoting sustainable development and achieving the SDGs, and provide guidance for future research and practice in this area.

Recommendations:

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

1. Increase investment in educational management practices, including leadership and governance, monitoring and evaluation, and resource allocation.
2. Expand access to technology infrastructure and access, particularly in underserved and marginalized communities.
3. Address gender disparities in education, including providing resources and support for girls and women to access education and addressing cultural and societal barriers to gender equality.
4. Foster collaboration and knowledge-sharing between educational institutions, governments, and other stakeholders through conferences, workshops, and online communities.

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