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Opinion

Addressing Out-of-School Children Problem in Nigeria Through Innovation and Technology

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Abstract

This paper discussed the roles of innovation and technology deployment in addressing the educational problem of out-of-school children in Nigeria. The paper is a review paper that depends on secondary data. Secondary data were employed in the paper. The data were collected from print and online publications. Content analysis was used to select and limit the literature to the minimum size. The paper concluded that innovation and technology can be effectively applied to solve the educational problem of out-of-school children in Nigeria. The paper noted that technology (artificial intelligence) can be used to gather data for planning, decision making and implementation of programmes that will help to solve out-of-school children's problems in Nigeria. Based on the findings, the paper recommends that the government should adopt innovation and technology in addressing the programme of out-of-school children in Nigeria. The government should invest heavily in artificial intelligence facilities to reach and provide quality education to the out-of-school children in Nigeria.

Keywords: *Innovation, Technology, Out of School Children.*

Introduction

In 2015, all United Nations Member States adopted the 2030 Agenda for Sustainable Development which outlines a blueprint to address global challenges across a broad range of themes including poverty, health, education, inequality, climate change, environmental degradation, peace and justice. Goal 4 of the 2030 Agenda for Sustainable Development, otherwise referred to as the United Nations Sustainable Development Goal 4, seeks to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. Unfortunately, approximately 263 million children remain out of school around the world. This number includes children who never started formal schooling and children who started school but later dropped out (United Nations Educational, Scientific and Cultural Organization, UNESCO, 2016 cited in Oyekan, Ayorinde, & Adenuga, 2023). The thinking of United Nations member states to ensure inclusive and equitable quality education is because the absence of an educated population is one of the missing links between developing countries and developed countries to achieve economic development (Ayeni, Abdullahi, & Andeshi, 2021).

Nigeria has the largest number of out-of-school children in the world (UNICEF, 2018). It is estimated that one in every five out-of-school children around the globe is in Nigeria. Even though basic education is legally free and compulsory in the country, about 10.5 million children aged 5 to 14 years are out of school. About 50 per cent of these children live in the northern region, known to be severely affected by the Boko Haram insurgency. In addition, only 61 per cent of children between the ages of 6 to 11 years attend primary school regularly (UNICEF, 2018 in Oyekan, Ayorinde, & Adenuga, 2023). The effect of insurgency on education is the reason why scholars have argued that the inability of the governance system or structure to perform its roles is also hurting the educational system (Ogunode, Ayeni, & Olorundare, 2024; Ayeni & Nwaorgu, 2018; Joseph, Cinjel & Ayeni, 2017).

The out-of-school children are a major educational problem facing Nigeria and other developing countries. To address these out-of-school children in Nigeria, the federal government and state governments have adopted different measures and strategies in the past and present. Some of the measures include the establishment of a commission to handle and

manage programmes on out-of-school children. There have been many interventions and collaborations from international institutions. To address the issue that is partly affecting education in Nigeria, it has been noted that "governments at all levels should guarantee adequate funding and the creation of municipal and city policing for the Safe School Initiative Programme" (Ogunode, Ayeni, & Daniel, 2024, p. 118). The call for effective policing of schools is because most of the school programmes of government are not yielding the maximum result as desired.

Recently, the former President of Nigeria, Chief Olusegun Obasanjo, as reported by Vanguard (2024) noted that artificial intelligence can be used as a tool to provide solutions for millions of out-of-school children in Nigeria. Other scholars have advised the Nigerian government to adopt innovation and deploy technology to address the problems of out-of-school children.

It is based on this that this paper seeks to examine the roles of innovation and technology in addressing the out-of-school children problem in Nigeria.

This paper seeks to provide the research question that says, what are the roles of innovation and technology in addressing the out-of-school children problem in Nigeria?

The research method employed for this study is the documentary research method, where secondary sources of data like journals, books and other online materials were sought through the Google Scholar search engine. A documentary research method is a non-positivist method of inquiry. Non-positivism is a method of carrying out research that tries to explain social phenomena with the aid of a research question, without necessarily testing hypotheses (Ayeni, Saman, & Sani, 2019).

Concept of Innovation

Innovation on the other hand is an aspect of educational change which involves the alteration of some aspects of educational programmes. Its basic aim is the renewal of inputs, processes and products of school organizations. The basic aim of innovation is the injection of new ideas and technology into the system of schooling as a means of bringing change to the educational system (Nwogu 2013). Innovation does not mean the same thing as creativity, change, improvement, product development or invention, but each of these activities may lead to innovation in the short term, innovations are not ends in themselves but means towards ends (Ebuara 2014). In the Nigerian educational system, innovation is a special kind of change which may involve renewing inputs and products. It means not only adapting to new conditions but creating new and better conditions (Okoko, 2022). Innovation is a product of infrastructural development that has intended and unintended benefits (Ayeni, Sani, Andeshi, Ibrahim & Adamu, 2020). Therefore, infrastructure also provides security, a development that means a condition of not being monetarily, sensitive, mentally and substantially threatened (Ayeni & Beji, 2018). Therefore, innovation can be seen as a means to an end.

Consequently, Fadipe and Adepoju, (2008) maintained that innovations are not ends in themselves but means towards an end. Innovation preset change, as innovation is synonymous with creative thinking and it is the result of this thinking that is being translated into change (Enefu, Okaforcha, & Achimugu, 2019). Bassey, (2008) described innovation as any idea, practice or material artefact perceived to be new by the relevant unit of adoption. Coming from a business angle, Elsewhere, Robbin and Coulter (1998) viewed innovation as a process of taking a creative idea and turning it into a useful product, service or method of operation. They concluded that all innovations start as an idea, after which some of them reach the level of overt and tangible expression through the implementation process. It is imperative to state here that innovation does not mean the same thing as creativity, change, improvement, product, development and invention. Rather, each of these activities may lead to innovation.

Innovation in education has to do with doing things differently and coming up with a process and product that yields an educational value. It also deals with seeking knowledge to support new and unique ideas in instructional techniques and strategies and remove outdated thinking that cannot support global changes. In educational innovation, methods and strategies of teaching and learning are challenged to support the success of teachers and students. Innovation in education is not merely technology (tangible innovation) but also the use of technology to empower students to become lifelong learners as well as achieve better educational outcomes (intangible technology). The students are compelled to use critical thinking and creativity to solve problems in education and real life. It equally means keeping oneself educated about new trends and technology in education. It makes education delivery effective, efficient and productive. Innovators look beyond the current method of doing work and develop a novel idea that helps do a job in a new way to maximize educational outcomes. Through innovation, students' competencies are developed to enable them to reflect on actions that may affect economic, social and environmental issues locally and internationally. Life skills can be developed with innovation capable of addressing several sustainable development goals (Oluwuo, 2021).

Innovation in education is not a specific term with fixed definitions. The spirit of innovation education is openness to looking with fresh eyes at problems and to address them in different, new ways. It is recognition that we do not have all the answers and are open to new approaches to improve such as methods of knowledge transfer with innovative teaching strategies (Thompson, 2024). Innovation in education can be:
1. Recognizing that students are better served by a flipped education where they watch lectures at home and complete assignments in the classroom.
2. Introducing more technology in the classroom to create a blended classroom where students experience technology as they would in the real world.
3. Providing greater ways to facilitate clearer and better communication between school districts' parents with powerful video tools (Thompson, 2024).

Examples of education innovation include:
Project-Based Learning- Help students identify a real-world problem and develop a solution for it. Introduce a PBL unit as part of a larger lesson where students can exercise their creative thinking, problem-solving, and collaboration with other students (Ariza & Olatunde-Aiyedun, 2023).

Blended Learning – Blend learning combines online learning with traditional classroom learning. Students must become comfortable with online tools and using the internet to contribute to their learning. A blended learning approach gives students the ability to discover how best to use tools that they will rely heavily on in their professional lives (Olatunde-Aiyedun & Adams, 2022). This is why it has been noted that infrastructure can empower people (Ayeni, 2017).

EdTech – Educational technology (edtech) typically refers to any software, application or service developed to enhance education. We must be careful not to go too far into the deep end but introducing technology in the classroom is important. Innovative classroom technologies often mirror the innovations outside of education. So, the more students engage with technologies in the classroom, the better prepared they will be to engage with and through technology in the workplace (Thompson, 2024; Ekpo & Aiyedun, 2020).

From the above, innovation in education is the process of providing alternative means of solving educational problems in simple and more reliable ways. Innovation in education refers to practical ways of solving a real educational problem using new approaches, and simple methods to realize the objectives of education.

Concept of Technology

Technology is viewed as the application of knowledge for the development and improvement of human life. It is the science of mechanical and industrial arts which involves the application of science in solving human problems (Suleiman, Fagbemi, Oyebani & Suleiman, 2018). Zakariyya & Bello (2018) and Adeniran & Odebode (2018), defined technology as the application of knowledge obtained from scientific discovery for the development and improvement of human life. It is the mechanical and industrial arts which involve the application of science and mathematics in solving human problems. All the definitions seem to be pointing to the development and improvement of human life. According to Alabede (2017), technology is a systematic approach to applying scientific or another organized knowledge to a particular task. It is about product and process. The process is the application, while the product is the outcome of the application, which includes hardware and software materials. Technology is the practical application of knowledge especially in a particular area to achieve some results Technology simply means the practical application of scientific or other knowledge and is a major source of economic expansion. Technology therefore has economic, social, ethical and aesthetic dimensions which depend on the use to which it is put, where it is used and the circumstances that prevail at the time it is used. For example, education technology is used to help students apply scientific knowledge and concepts to better their environment, to use their brain and hands, make work easier, help them develop positive attitudes towards work and productivity and to encourage critical thinking and creativity among them. Science, technology and mathematical knowledge are related in nature (Sulai & Sulai, n.d).

Concept of Out-of-School Children

According to the United Nations, out-of-school children refer to children who are yet to be enrolled in any formal education, excluding pre-primary education. The age range for out-of-school children is 6-11 years. Out-of-school children are school-age children who are supposed to be in schools but are not in schools due to parental and governmental failures to provide accessible quality education for them. Out-of-school children are young children in the age group of 1 to 12 who are roaming the street without access to a functional educational system (Ojelade, Aiyedun & Aregebesola, 2019). Out-of-school children are the children whom the government and the parents have failed to provide quality basic education for. The term "out-of-school children" is a non-attendance of the school of school-age children for some established factors (Ogunode, Chinwuba & Ayoko, 2022). The prevalence of out-of-school children makes one think of the leadership failure in Nigeria. Thus, it has been noted that leaders can either enhance national development or

retard development (Asaju & Ayeni, 2020). The attitude of political leadership in Nigeria is the causal variable of the type of education the country is having.

Innovation and Technology and Out-of-School Children in Nigeria

Innovation in education is one of the strategies that can be used to solve the numerous educational problems in Nigeria, especially the out-of-school children. Innovation in the management of out-of-school children in Nigeria will help to plan well for the effective implementation of out-of-school children programmes. Innovation in the programme will lead to innovative financing of the programme.

The innovation plan for out-of-school children in Nigeria should be developed considering region, parent support, community support, teacher requirements, facilities, funding, instructional materials, supervision and staff policy. The innovation process requires great intellectual capacity. Innovation in education if effectively designed and planned, can help to solve the following educational problems; educational planning, educational administration, school supervision, educational financing, classroom management, instructional resources, population management, admission crisis, school insecurity, shortage of professional teachers, infrastructure facilities shortage and policy implementation. Innovation in education can transform the entire educational institution if well organized and implemented. UNICEF (2022) noted that customized games on solar-powered tables have helped to deliver math lessons to children in remote areas of Sudan. Digital learning platforms have assisted in teaching refugees and other marginalized children the language of instruction in Greece and Mauritania. Innovation in education matches the scale of the solution to the scale of the challenge. It draws on the creativity and experience of communities – like a programme in Ghana that empowers local mothers and grandmothers to facilitate early childhood education and ensure decisions are made by those most affected by their outcomes. Many innovators are already at work in classrooms and communities. UNICEF collaborates with partners to identify, incubate and scale promising innovations that help fulfil every child's right to learn (UNICEF, 2023).

Innovation in education assists in coming up with a programme that will enhance effective teaching and learning for all children in Nigeria. Innovative education aids effective data collection and analysis that support effective planning of child education. With current data, Governments assess progress across a range of outcomes and strengthen national Education Management Information Systems. Innovation in education aids comprehensive guidelines for education sector analysis that can be used in Nigeria to drive equity-focused plans and policies on education. Innovation in education has come up with measures and programmes that promote transparency and accountability in educational resources. Innovation in education can promote effective teaching methods, learning outcomes and effective policy implementation and education systems that guarantee students, parents and community engagement and involvement in the decision-making of the schools (UNICEF, 2022). The introduction of new technologies and services requires teachers and admin staff should have specific knowledge and skills. (Oluwuo 2021) concluded that without innovation, it will be difficult to achieve the lofty goals of education and overcome the challenges of an ever-changing environment. Innovation also enables schools to update practices rendered obsolete as a result of globalization and international research findings. The challenge of innovation has been attributed to "the absence of economic development in Nigeria is made possible because of weak institutions that produce strong leaders to war against access to education, technological advancement and opportunity for people to succeed" (Ayeni, & Abdullahi, 2024, p. 91).

On the other hand, technology is another resource that can be fully deployed to solve the various problems in the out-of-school children problem in Nigeria. Technological facilities can be used in the following areas;

Data management

To effectively plan programmes for out-of-school children, there is a need for current data from every local government and state of the federation. Technological devices can be used to collect these data, compute the data and analyse them. Educational management information systems (EMIS) provide valuable insights to school administrators through the systematic collection and analysis of data about student demographics, academic performance, teacher credentials, and overall school operations. In turn, these insights allow for informed decision-making to improve the educational process in terms of efficiency, effectiveness, and overall quality. The Educational Management Information System (EMIS) is an online hub that provides vital data to influential people in the education sector, allowing them to improve education at all levels (Niar, 2022).

Big data can help to manage the large amount of children's data nationwide. Danielkievych (2022) noted that the educational system regularly accumulates huge amounts of data, so the issue of systematic processing of that data is one of the most pressing today. Big Data in education allows you to rethink approaches, close long-standing gaps, and adapt the learning experience to improve the efficiency of the system all around. The task of describing the technology of operating with volumetric data arrays aimed at identifying the formed patterns in education and further modelling the development of the system also remains relevant.

The fourth 'educational' revolution requires a revision of the traditional educational imperative, which implies a rethinking of such concepts as *effective learning* and *subject learning*, as well as going beyond the educational model of transferring knowledge from teacher to student. The operation of Big Data in education is about in-depth analytics of the educational system. This includes the measurement, collection, analysis, and presentation of structured and unstructured data of huge volumes about students and the educational environment. Such insights help understand the most relevant features of the functioning and development of the learning system. A big data-powered system collects a very large amount of historical data. The question of how to process them in an accessible way is solved with the help of the wider use of communication technologies. The big data-power system is an infrastructure that is supposed to empower, since "it is the responsibility of government to provide those amenities that empower" (Ayeni, Sani, Idris, & Uzoigwe, 2019, p. 264).

Big data provides academic institutions with the opportunity to integrate critical platforms and applications that are often used to manage various aspects of their work. This allows them to improve their efficiency and, ultimately, significantly reduce costs. Technology itself is changing the way we analyze information and make decisions in areas such as academic performance, technology effectiveness, faculty, and organizational interaction. This makes it possible for students to build an individual educational trajectory in a new way, as well as assess the quality and choose an acceptable way of learning (Danielkievych, 2022).

Planning Out of School Programme

Children data gathered through innovation and technological devices in Nigeria can be used to effectively plan programmes for the out-of-school children in Nigeria. A programme is what is needed to put down the problem of out-of-school children in Nigeria. Advanced Learner Dictionary describes a programme as a plan of things to be done or that are included in the development of things to be done. Programme is usually a product of policy. Universal Basic Education is a policy programme aimed at providing access to basic education for all. It also encompasses other sub-programmes, such as special programmes for the nomadic population; education for the physically challenged; non-formal education; and formal education at primary and junior secondary school (NOUN, 2012). Planning is very important in educational programmes. Planning will provide clear direction for the actualization of the objectives of out-of-school children in Nigeria. (Ogunode, et al (2022) noted that to address the problem of out-of-school children in Nigeria, stakeholders in education must come to the table to plan ways out and measures to take to solve the problem. Danielkievych, (2022) submitted that as data collection and analytics tools improve, administrators are getting more information to make predictions and informed decisions about student admissions. This can help drive growth in a targeted manner and plan the use of resources at the scale of specific training programs and not just the organization as a whole.

Both innovation and technology are reliable resources that can be used to provide lasting solutions to the out-of-school children in Nigeria. Innovation can support effective data collection, planning, and implementation of programmes and policies on out-of-school children in developing countries and Nigeria. Innovation has helped to design innovative teaching facilities, learning facilities like customized games on solar-powered tables Digital learning platforms language of instruction platforms, project-based learning (PBL), blended learning and EdTech that has been used to provide education and reach children in rural areas and communities in developing countries like Sudan, Ghana Greece and Mauritania. These teaching and learning facilities like customized games on solar-powered tables Digital learning platforms language of instruction platforms can be deployed in Northern Nigeria to address the problem of out-of-school children. More investment in artificial intelligence and technology in Nigeria can help to fix the educational problem of out-of-school children in Nigeria.

Findings

The paper revealed that innovation and technology can be effectively applied to solve the educational problem of out-of-school children in Nigeria. The paper maintained that technology (artificial intelligence) can be used to gather data for planning, decision making and implementation of policies that will help to solve out-of-school children problems in Nigeria.

Conclusion and Recommendations

This paper discussed the importance of innovation and technology deployment in addressing the educational problem of out-of-school children in Nigeria. The paper concluded that innovation and technology can be effectively applied to solve the educational problem of out-of-school children in Nigeria. The paper noted that technology (artificial intelligence) can be used to gather data for planning, decision making and implementation of policies that will help to solve out-of-school children's problems in Nigeria.

Based on the findings, the paper recommends that the government should adopt innovation and technology in addressing the programme of out-of-school children in Nigeria. The government should invest heavily in artificial intelligence facilities to reach and provide quality education to the out-of-school children in Nigeria.

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