

## Leveraging Technology Education at Secondary School Level of Education for Sustainable Development in Nigeria: A Systematic Review

**ADENUGA, Babatunde Adeyemi<sup>1</sup>**

[adenugababatunde2@gmail.com](mailto:adenugababatunde2@gmail.com)

08033037289

**OLUSIJI, Olaseni Lemo<sup>2</sup>**

[rossandlemo@yahoo.co.uk](mailto:rossandlemo@yahoo.co.uk)

07061003464

**MUKAILA, Abiodun Yisa<sup>2</sup>**

[yisama@tasued.edu.ng](mailto:yisama@tasued.edu.ng)

08137224133

<sup>1</sup>Department of Technology Education, Lagos State University of Education, Oto Ijanikin, Lagos State, Nigeria

<sup>2</sup>Department of Industrial Technical Education, Tai Solarin University of Education, Ijagun, Ijebu Ode

### Abstract

*This systematic review examines the impact of technology education on sustainable development in Nigeria focusing on secondary school education. A search of peer-reviewed journals published between 2001 to 2023. The review reveals that technology education has the potential to promote sustainable development in Nigeria by developing students' problem-solving skills, creativity and critical thinking. This paper also reviewed the current state of technology education at secondary level of education in Nigeria and its implications for technological development. It also identifies hindrances to technology education in Nigeria, including inadequate infrastructure, outdated curricula, and insufficient funding in secondary schools. The review proposes strategies for policy makers, educators and other stakeholders to improving technology education and promotes sustainable development in Nigeria.*

**Keywords:** Technology education, Sustainable Development, Nigeria, Secondary School Education, Systematic review

### Introduction

Technology education in Nigeria is very apt considering the zeal with which Nigeria has accepted democratic governance. Democracy allows for robust debates choice, collective bargaining and respect for individual differences. If technology of today can incorporate features of democracy, Nigeria will achieve a lot of positive changes in providing various needs of her citizens. May 29, 1999 marked a new dawn in the country's civil rule and democracy. It came on the eve of a new millennium, which was a thing of happiness. This democracy is an age-worn concept, an ideal life regarded as modern and having something to do with the changing times. It is government of the people, by the people and for the people (Longman's Dictionary of Contemporary English, 1997). Democracy can be viewed as a universal culture developed many years ago to have elected people to govern. This country needs to practice real democracy and spread dividends of democracy to the citizenry. However, an attempt at developing the Nigerian society must of necessity be based on the stated national objectives. The objectives stated in the National Development Plan are

1. Building a united, strong and self-reliant nation
2. Have a great dynamic economy
3. Build a just and egalitarian society
4. A land of bright and full opportunities for citizen
5. A free and democratic society

DOI: <https://doi.org/10.64348/zije.20251>

Leveraging Technology Education at Secondary School Level of ... Adenuga, B. A., Et. al., (2025)

The above objectives provide a great guide towards the reconstructions and transformation of Nigeria from technological backwardness to a society that is technological self-reliant possessing enough technical know-how skills and materials required for the production of capital and consumer goods, as well as for defending the integrity and security of the nation.

A country's classification with regard to economic status usually takes the country's scientific and technological development into consideration. This therefore explains why a country whose economy depends on the industrialized world, due to the country's inability to adequately exploit science and technology to improve her conditions, is classified as a developing (industrializing) or less developed or under developed country. That Nigeria is still a technologically underdeveloped country is not debatable. The National policy on education science and technology (2013) recognizes this and commented thus: while many countries are in second phase of the industrial revolution in which computers, robots, microelectronics, biotechnology, nuclear technology e. t. c are yet to grasp the fundamentals of the first phase of the industrial revolution, which began in Europe in the eighteen century. Even the country is yet to create the necessary science culture in which the general public is made aware of the need to use scientific methods in their daily operations.

The policies that have been formulated by government in education as well as in science and technology, have aimed at correcting this situation. One of the policy statements for science and technology, for example, stresses that the educational system should lay much emphasis on science and technology at all levels. The objective of this according to the policy is to orientate the entire society towards scientific thinking in order to develop new technology and adopt the existing ones to improve societal well-being and security. The different methods stated in the National policy on science and technology, for meeting these objectives include making it possible for the average child to have early contact with the concepts and materials related to science and technology even before attaining primary school age, ensuring a sound science foundation during the first six years of the 6-3-3-4 structure.

Orienting science and technology curricular in polytechnics and college of technology to be less theoretical and more practical based ensuring that adult education includes, in addition to learning how to read and write, learning how things around us work, and encouraging and promoting the writing of mathematics and science books at all levels. Another policy statement in the National Policy on science and technology states that there should be a mass movement for science and technology development in the country. The objective of this, according to the policy, is to orientate the entire society towards science and technology within the framework of its customs and traditions. As stated in the policy, the strategies for meeting this objective include relating science and technology to formal and informal education processes and emphasizing their role in the socioeconomic development of the society in general and in individual personal development in particular providing adequately equipped science laboratories and workshops in the secondary and tertiary educational system.

Ensuring appropriate and adequate industrial attachment programmes for all science-based technical and professional course at the tertiary level. This National Policy on science and technology statements and objectives, apart from being in line with some of the provisions of the National Policy on Education, attest to government's efforts at ensuring the proper development of technology (science based rather than empirical based) in the country. The government has also taken a number of steps aimed at implementing the policies on science and technology as well as education properly.

In achieving the above, an attempt has been made to control science based programmed in polytechnics, colleges of technology, colleges of education (Technical) and universities through National Board for Business and Technical education. Attempts were also made at popularizing science and technology through support for clubs and associations such as the Junior Engineers, Technicians and Scientists (JETS), Nigeria Association of Teachers of Technology (NATT) among others. Despite these government's efforts, the process of developing the country technologically seems to offer more room for improvement than what obtain now. This paper will however discuss it further by stating the meaning of technology education Technology has been defined by various scholars but for the purpose of this write-up, Technology education is a critical component of modern education, enabling individuals to acquire skills and knowledge necessary for technological innovation and economic development. In democratic Nigeria, technology education plays a vital role in promoting technological advancements, entrepreneurship, and national development. However, the current state of technology education in Nigeria is plagued by numerous challenges, including inadequate infrastructure, outdated curricula, and insufficient funding. The technological

Leveraging Technology Education at Secondary School Level of ... Adenuga, B. A., Et. al., (2025)

development of the nation requires that the way the policies regarding vocational and technical education are being implemented be critically re-examined. Though the policies for vocational and technical education are wonderful in the policy of 2013 but there are some aforementioned plagued that are militating against these laudable policies implementation.

## Challenges of Effective Technology Education Policy Implementation at Secondary School Level of Education in Nigeria

**Students:** They exhibit a wide range of abilities on admission to junior secondary schools, in English language, all of which according to story (1988) are relevant to acquiring skills in introductory technology which is one of the core subjects in the junior secondary school curriculum. This situation could be due to either the environmental background of most Nigerian youths or the deficiency in primary education. It is also possible that a combination of the two factors is creating such situation. Some Nigerian youths grew up in environments devoid of challenges that could promote academic and intellectual development in them. Not only are they brought up not to be motivated to want to learn, they do not have opportunities to play with toys and manipulated objects. The primary schools that most of them attend neither provide opportunity for the study of science and technology. As Olofinnoba (1979) has rightly pointed out, the teachers of science in primary schools in Nigeria is usually not formally trained as science teachers. Most of them, are therefore, not well trained to stimulate the interest of the young pupils in science. In fact, most of the teachers in the primary schools are not only uncertificated, they attended teachers training colleges where they were exposed to lectures on various courses including those on nature study and arithmetic for the teaching of introductory technology to be effective in the teaching of science at the primary school level has to be improved also. If the teaching of introductory technology is effective to the extent that students grasp essential concepts and develop interest in the subjects such as woodwork, metalwork, technical drawing, applied electricity, basic electronics, building construction and automobile mechanic at the senior school level. Odia & Odia,(2023) stated that one way of improving the teaching of science at the primary school level might be to organize in-service training programmes regular for primary school teachers in science and technology teaching, manual dexterity and spatial awareness could also be developed in primary school pupils if only the schools would provide opportunities for the pupils to play with toys of various types manipulating objects and even construct some simple objects using clay, paper, wood and flat sheet of metal which have been formed into various shapes.

**Outdated Curricula:** Technology education curricula in Nigeria are often outdated, failing to reflect current technological trends and industry needs. This is another factor, which must be seriously considered for the improvement of technology education in Nigeria. The curricular for trades disciplines or subjects in the senior secondary school curriculum and technical/vocational college curriculum, as well as for basic technology are defective since they place little or no emphasis on the traditional technologies of the student's environment. These technologies include construction, smiting, boat making etc. The effort to transform the Nigerian society to a technologically developed society must, however, be based partly on the acquisition of skills and knowledge in the traditional technologies through constant investigation of appropriate methods of perfecting them by teachers and students (Magaji, 2022). It is on this basis that a review of the curricula in both the secondary schools and the technical colleges is advised.

**Insufficient Funding:** Technology education institutions in Nigeria most times receive inadequate funding, limiting their ability to provide quality education and training. The study of technology, without doubt, requires well-equipped laboratories and workshops, tools and equipment if relevant skills are to be acquired by students. It is however disheartening that in most Nigeria schools, especially secondary schools, most of the equipment, tools etc needed for effective teaching of technology are not there and even where they are available, most of them are defective and in-operational due to insufficient funding. The much-desired technology culture as well as a pool of skilled industrial workers cannot be developed under this type of situation obtaining now in the nation's secondary schools, technical colleges, polytechnics and universities offering technology education. This therefore explains why an urgent step should be taken during this nurtured democratic period to include policies that will create an enabling condition and funding for technological development during the democratic setting in Nigeria.

## Strategies for Improving Technology Education in Nigeria

So far, we have seen that science and technology are in pathetic state and much remains to be done. In this section, attention will be focused on strategies to further mobilize Nigerians so that science and technology can become part of our culture. This

DOI: <https://doi.org/10.64348/zije.20251>

Leveraging Technology Education at Secondary School Level of ... Adenuga, B. A., Et. al., (2025)

is particularly necessary if we want to improve the quality of the science and technology, then we must inculcate it into our youths and culture. In his own contribution, Late Chief E. F. Giwa, former chairman and Managing Director of Unilever Nigeria Plc, a blue-chip company, asserted that no nation can develop without a cadre of well trained technicians, technologies, engineers and the awareness of scientific and technical knowledge. He further stated that this should start from primary schools (Quoted in Agbeyoku 2001).

In seeking to achieve these objectives, review and updating technology education curricula to reflect current technological trends cannot be over emphasized. Science and Technology must be demystified by having the tools and equipment used in the primary and secondary schools sourced locally. This definitely make youths to stop seeing science and technology as a magic understood only by the brilliant children and the white man (Undie, 2021; Kimberly,2020). This will bring a condition conducive to innovation and creativity in the Nigeria child through a number of science and technology clubs, which includes JETS club that have been established and is already in operation in many secondary schools throughout the country. The clubs have brought increased awareness of science to the youths and have encouraged keen quiz competition both on radio and the television. The gradual spread of the JETS club to the primary schools is worthy of note and must be accelerated. It is however pertinent that these clubs are being hindered by finance. Both the Federal, state and private organization must give generously in support of these clubs if our science and technology will be improved during this democratic setting. For science and technology education to be improved and bring about the much-desired technological development, it must be mentioned here that the annual trade fair event is carried by the science and technology for industrial set up be extended and made to secondary and technical colleges. Hansen (2021) is of the opinion that this definitely will encourage the youths to visit stands with their man-made product or could even create awareness in their bid to want to invest new to be able to improve their quality of science and technology education, emphasis have also to be laid on teachers who teach the subjects. Education, a well-known fact is the key to industrial and economy development of any nation, and teachers really have the keys in their hands. There should be periodic in-service training of teachers as well as schools are encouraged to invite external resource people (Segun, 2023). The country can bring science and technology development to the frontier by ensuring adequate development, training and better remuneration of manpower. For technology education to develop to an enviable position that we all want, it is compulsory for government to carry out some tasks.

### **Suggestions in improving standard of technology education at secondary school level of education in Nigeria**

1. The government should provide good incentives to science and technology teachers at all levels of our educational system in form of good salaries, allowances, hazard and housing allowances and other benefits considered for them.
2. Government and private sector should invest in the building of standard laboratories & workshops and these workshops and laboratory should be fully equipped. Consumable and materials should always be made available. Workshops tools and equipment should be properly put in place. If this is done, the students will be able to relate theory and practical experience together thereby have the basic knowledge and the principle on the workings of science and technology.
3. Government must also build a good library in each of the institution. This will help students to make reference to important principle.
4. Government should recruit well-qualified science and technology teachers into our schools. As long as we continue to have shortages of qualified teachers at all level of our education so also technological development will be eluding us.
5. The existing curricula should be reformed and updated by government to reflect current technological trends and innovations around the globe.
6. Government should increase the funding of technology education. Technology education is capital intensive and government must do all within her power to fully support this form of education at all time because the fruit of such will lead to ranking our country among the world power.

DOI: <https://doi.org/10.64348/zije.20251>

Leveraging Technology Education at Secondary School Level of ... Adenuga, B. A., Et. al.,  
(2025)

## Conclusion

The systematic review highlights the importance of technology education in promoting sustainable development in Nigeria. The review also reveals that technology education has a positive impact on sustainable development but several challenges hinder its effective implementation in secondary schools. This paper therefore, has attempted to draw attention to the need to re-examine the way in which the policies on education as well as science and technology are being implemented with a view to improve it as a basis for the technological transformation of the Nigerian society. This paper further recommended the need to review and update the existing curricula, increasing fund, support and provide well equipped workshops in secondary schools in Nigeria.

## References

- Agbenyelu, E. U. (2001). Improving the quality of science education in Nigeria schools in the new millennium. *Kusugu Journal of Education*. Vol.1 No, 1.
- Federal Republic of Nigeria (2013). National Policy on Education. 4th edition. Lagos Nigeria. Research and Development council press
- Hansen R. (2021). The curriculum studies concept in technological education teacher development. *The technology teacher* 54(4). 43 – 48
- Kimberly, A. (2020). Types of unemployment. Accessed May 4, 2020 from [https:// www.thebalance.com](https://www.thebalance.com).
- Magaji, A. (2022). The impact of technology education for sustainable development in Nigeria. *International Journal of Education and Evaluation*, 5(1), 41-48.
- Longman. (1997). Longman dictionary (New ed). Longman
- Odia, J.O. & Odia, A . A. (2023). Developing entrepreneurial skills and transforming challenges into opportunities in Nigeria. *Journal of Educational and Social Research*,3(3), 289 - 298. MCSER Publishing, Rome – Italy.
- Olofinboba, M. O. (2014). Science and Technology Education in Primary and Secondary Schools. Amoda, M. and Tyson. C,D. Press.
- Segun, P. A. (2023). Issues, challenges and prospects of entrepreneurship education in job creation for sustainable development in Nigeria. *International Journal of Education and Evaluation*, 5(1), 41-48.
- Undie, J. A. (2021). The politics of education planning crises: Who pays and who bears the brunt. An inaugural lecture presented by Prof. J. A Undie. Calabar: University of Calabar Printing Press.