# SCIENCE AND TECHNOLOGY EDUCATION AS A VERITABLE TOOL FOR ERADICATION OF POVERTY IN FACE OF GROSS NATIONAL UNEMPLOYMENT

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**Abstract**

Unemployment situation in the country has been blamed on persistent lack of systematic and appropriate manpower planning and the educational systems incapability to impact in its products, the appropriate skills and competencies needed for employment reality in the society. Hence Science education and technical education is a critical factor in contributing to eradication of poverty. It is on this premises that the paper examines concept of science education and technical education in eradication of poverty. This paper further discussed objectives of science education and challenges facing science education as a tool for poverty eradication. It was therefore recommended that science and technical education curricula should be structured towards inculcating skills and competencies for the attainment of self-reliant in students for poverty reduction and solving of real-life problems.

**Keywords:** Science Education, poverty eradication, self-reliant, science curriculum, Competency, technology education.

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## Introduction

Innovative and acquisition of entrepreneurial skills acquisition serves as key factors in eradicating poverty, and it's been receiving attention globally. Training the learners to acquire useful skills helps them to live a fulfilled life after graduation. Education is an instrument for sustainable development and social change of any nation, Nigeria is not an exceptional.

Science and technology education teaching in general aims at equipping the learners with appropriate scientific and innovative knowledge and skills which will enable them to explore their surroundings and become more creative and self-reliant. The knowledge and skills which students acquire could be of value by helping them develop entrepreneurial skills for job creation, thereby leading to poverty eradication. Okoli and Onwuachu (2019), posited that exposing students to scientific and innovative skills through practical lessons could enable them acquire skills to develop the capacity for critical thinking, generate ideas; and be able to repair and/or service simple electrical connections and wirings in the home, service and maintain mobile phones, electricity generating sets, radios, and other household electronics.

One of the problems facing Nigeria and many other developing nations has been that of poverty due to unemployment. High rates of unemployment and lack of saleable skills among graduates of both public and private tertiary institutions are contributing immensely to the issues of insecurity in most parts of the country. Unemployment Rate in Nigeria decreased to 4.10 percent in the first quarter of 2023 from 5.30 percent in the fourth quarter of 2022. Unemployment Rate in Nigeria is expected to be 4.60 percent by the end of this quarter, according to Trading Economics global macro models and analysts' expectations (NBS, 2023). Entrepreneurial education in the university has become crucial to enable graduates create job instead of job seekers. This perhaps may be because of over dependence on government jobs or white-collar jobs. In the country today, graduates cannot create jobs; they strive to be employees of labour rather than being employers in their various fields. Nevertheless, these problems could lead to crimes such as youth restiveness, prostitution, armed robbery, drug abuse and kidnapping amongst others. These vices could be detrimental to investment promotion, economic growth and consequently have a negative feedback effect on employment, Ajayi (2019) concluded that the absence of sustainable economic growth and job creation, which are considered very instrumental in poverty eradication are the pressing challenges facing Nigeria today. The problem keeps crying for solutions and government feels that something must be done to get out of the waterloo and so one of the measures put in place by the federal government of Nigeria is to mandate schools from secondary to tertiary. Level of education to include the teaching of innovative and entrepreneurship skills in their curriculum. Innovative and entrepreneurship skills are one of the instruments for achieving sustainable development as well as employment creation and thereby eradicating poverty.

The National Policy on Education is definite that the defining character of an educated person is the competence to live and work successfully in the society. The proof of being educated is provided by possession of these competences. Individuals who lack life skills and job competences are prone to suffer identity crises and social disorientation. It is obvious that there is an overwhelming and need to deviate from present practices as it concerns the way we educate and train out young ones to face challenges of their future and their society. Therefore, the curriculum at each stage of formal education, from primary to tertiary

institution should be geared towards inculcating civilized and enlightened mode of living as well as competences.

Education systems of the twenty-first century are facing numerous challenges derived from globalization, recession, wars, insecurity, and modernization. The fast social, cultural, economic, and technological change has put pressure on the education sector to ensure it provides students with the competencies needed to confront and manage the complexity they are faced with effectively. Some of the salient challenges of this complex world are issues of unemployment, living below the poverty line and an unpredictable environment, and the obsolescence of knowledge and skills to make a good living. High rates of unemployment and lack of saleable skills among graduates of both public and private tertiary institutions are contributing immensely to the issues of insecurity in most of the country.

Science education is the bedrock upon which scientific and technological development depend. It is no longer news that, the developed countries such as China, Japan, United States of America, Germany and Britain etc have made the giant strides through their science and technology education and moreover, have utilized and are utilizing the products of well-developed science education programme. For developing countries to reduce poverty and develop their economies, they must take issues of science education more seriously. The lip service being paid to science education must stop.

Nigeria is a developing country which witnessed high level of poverty rate as a result of poor implementation of science and technology education policies by the government. The role of education in poverty eradication is close cooperation with other social sectors cannot be over emphasized (Delphonso &Viatonu, 2018 Omoniyi, 2013; Ozturky, 2011). This, to attain national development, eradicate poverty and be self-reliant, there is need for Nigeria to reposition her science education.

It has been noticed that scientific and technological development in Nigeria after independence is not something to write home about and this might be attributed to the quality and level of her science education. Thus, there is need to look inward into employment generating subjects and courses, bearing in mind the content of national philosophy of education as stated in the national policy on education. The training of the mind in the understanding of world around and the acquisition of appropriate skills, the development of both mental and physical abilities as equipment for the individual to live in and contribute to the development of his society (Federal Government of Nigeria, FGN, 2013).

The purpose of this paper is to examine the role of science education in eradication of poverty. The paper will further examine concept of science education and the objectives of science education. Finally, the paper will discuss the challenges facing science education as a tool for poverty eradication.

## Concept of Science Education

Science is a branch of study that is concerned with facts, principles and methods. It is the knowledge acquired by careful observation and deduction of the laws which govern changes and conditions by testing those deductions by experiments. Science education is the field concerned with sharing science content and process with individuals not traditionally

considered part of the scientific community (Agbowuro, Oriade, Shuaibu, 2015). Science education teaching in general aims at equipped the learners with appropriate scientific knowledge and skills which will enable them to explore their surroundings and become more creative and self-reliant.

Science is a process as well as knowledge. Children learn science by being involved not only with its content, but also with its methodology. The field of science education includes work in science content, science process (the scientific method) and teaching pedagogy. Science process skills are mental and physical abilities and competences which serve as tools needed for effective study of science and technology as well as problem solving for individuals and societal development (Nwosu & Nwaocha, 2014).The knowledge of science education prepares students to be actively engaged and responsible citizens, creative and innovative, able to work collaboratively and fully aware of and conversant with the complex challenges facing society (European Commission, 2015).

The knowledge of science and technology also helps in explaining and understanding the world around us. Science education is very important in promoting a culture of scientific thinking and inspiring citizens to use evidence-based reasoning for decision making; ensuring citizens have the confidence, knowledge and skills to participate actively in an increasingly complex scientific and technological world; developing the competencies for problem-solving and innovation, as well as analytical and critical thinking that are necessary to empower citizens to lead personally fulfilling, socially responsible and professionally-engaged lives and inspiring children and students of all ages and talents to aspire to careers in science and other occupations and professions that underpin our knowledge and innovation-intensive societies (Ajayi, Achor, Otor,2019). Thus, the knowledge and skills which science students acquire could be of value by helping them develop entrepreneurial skills for job creation and thereby leading to poverty eradication. In other words, the development of science process skills should lead to acquisition of the entrepreneurial skills that successful entrepreneurs use to start their ventures. Science process skill is the interface between transferor knowledge and entrepreneurial skill which is necessary for problem solving and functional living.

Generally, science is viewed as any discipline which can provide observable statement with a cumulative and endless series of empirical observations, which result in the formulation of concepts and theories with both concepts and theories being subjected to modification in the light of further empirical observations.

Science education involves the teaching and learning about science and scientific concepts, principles and practice of education among other educational concepts. It is chiefly concerned with acquisition of skills and knowledge through an organized ‘development of natural endowment and socially desirable potentials about:

i. Process or method (ways of investigating problem leading to formulation of hypothesis, designing and carrying out experiment, measuring and evaluating data
ii. Production of facts and substances e.g. principles, laws and theories, machines, drugs etc; and

iii. Development of positive, attitude to life i.e. restructuring certain beliefs, values, opinion etc. NPE(2013)

As science is taught in schools, some students continue and end up as scientists, pure or applied, some as science teachers and science educators.

## The objectives of Science Education in Nigeria

According to the National Policy on Education (NPE, 2013), the policies that shaped the Nigerian science and technology curriculum point to a well thought out science education objectives. These are;

i. Observe and explore the environment
ii. Acquire basic science process skills which includes; observing, manipulating, classifying, communicating, hypothesizing, interpreting data, and formulating models etc.
iii. Develop a functional knowledge of science and science concepts and principles
iv. Develop scientific attitudes, including curiosity, critical thinking and objectivity etc.
v. Apply the skills and knowledge gained through science in solving everyday problems in his environment.
vi. Develop self-confidence and self-reliance through problem-solving activities in science.
vii. Develop a functional awareness of and sensitivity to the orderliness and beauty in nature.

## Concept of Technical Education

Refers to training in theoretical and practical basic scientific skills and knowledge related to careers in STEM (science, technology, engineering, and mathematics) fields. Technical education facilitates the acquisition of practical and applied skills as well as basic scientific knowledge, it is therefore a planned program of courses and learning experiences that begin with exploration of career options, supports basic academic and life skills, and enables achievement of high academic.

Vocational and Technical Education (VTE) in Nigeria with particular emphasis on the attainment of national educational goals. Some VTE related goals as enshrined in the National Policy on Education include;

(i) introduction in to world of technology,
(ii) acquiring technical skills,
(iii) exposing students to career awareness and
(iv) enabling youths to have an intelligent understanding of the increasing complexity of technology.

Technical and vocational education and training is used as a comprehensive terms referring to those aspects of educational process involving, in addition to general education, the study of technologies and related sciences and the acquisition of practical skills, attitudes and understanding of knowledge relating to occupations in various sectors of the economic and social life (NPE, 2013)

Okarifor (2016) opined that technical and vocational education (TVE) has been an integral part of national development strategies in many societies because of its impact on productivity and economic development. In spite of its contributions, Nigeria as a nation has not given this aspect of education the attention it deserves. This is one of the reasons for the nation's underdevelopment.

Oguntuyi (2014) referred to vocational and technical education as an instrument for transformation, productivity and motivator for the betterment of individual who has passed through it. He further emphasized that vocational and technical education can be seen as that aspect of education use to gear the preparation of skilled manpower towards national development.

## Role of Science Education and Technical Education in Eradication of Poverty

According to the findings of Delphonso and Viatonu (2018) study, it was revealed that majority of the science students in the tertiary institutions preferred applied science courses like agricultural science, nursing, medicine, clinical biochemistry, mechanical and electrical engineer, computer science. The students in pure science courses claimed that they are not comfortable with their courses because they were not fortunate to secure preferred courses; therefore, they opted for available courses in pure science such as physics, chemistry, biology, botany, biochemistry, mathematics. It is now imperative for the curriculum of the tertiary institution to make sure that the curriculum should be relevant to the needs of the economy as well as expanding the opportunities available for our graduates. The reality is that the contents in the school curriculum are not relevant to Nigeria world of work needs. The pure science courses in our higher institutions lack self-reliant contents that will assist the students to be aware of their potentialities that can propel them to be self-reliant and employer of labour.

Science education as stated earlier plays a pivotal role in curbing the menace of poverty in the society. In the Nigeria system, the problem of unemployment which have led many people into poverty can be addressed through the implementation of appropriate policies and programme as contained in the science education curriculum. Science education as earlier defined talks about teaching and learning of scientific concepts and principles in relation to educational concepts. Science education serves as a strong foundation for those who wish to move onto business activities rather than relying on government jobs that are not even available. It contributes immensely to the eradication of poverty among Nigerian citizens in order to bring about national development in the following ways;

i. Science education helps individuals in the production of local beverages and wine which enable them to set up micro industries and other small scale enterprises to liberate them from poverty rather than seeking for white collar jobs like their counterpart from other disciplines (Gana, 2016).
ii. Science education helps in the acquisition of skills and knowledge in fish pond for fish breeding. This enables individuals to be an employer of labour and disallow them from engaging in unlawful acts and also reducing rate of poverty in the society (Oyerinde, 2017).
iii. Science education helps in the reduction of high incidence of school drop outs by providing alternatives for students of secondary schools in the production of dyes.

This enables them to engage in weave and dye clothes, small scale businesses (Gana, 2016).

iv. It helps in preparing individuals for career that are based on manually and practical activities rather than certification. This would assist individuals to make use of their hands and brain to better their lots and checkmate the incidence of poverty in their lives and society at large.

v. Science education (Chemistry Education) knowledge helps in the production of soap, food preservatives and pure water production. The knowledge acquired in this field by individuals enable them to establish their own businesses and thereby reducing poverty rate in the society. (Delphonso & Idowu, 2022)

vi. Knowledge of science education i.e. physics enables a man to repair electronic devicessuch as calculators and embark on electrical wiring of houses. He can also produce laboratory equipment such as standard resistors and knife edges for sale to schools (Delphonso & Idowu, 2022)

Skill is the habit of doing something well especially skill gained through training or experience. Skill according to Okorie in Alademerin (2018), is a habit of acting, thinking, and behaving in a specific activity in such a way that the process becomes natural to the individual through practice. A skill involves the mastery of practical expertise and knowledge in any occupation (Idowu, 2017). Skills are basic cognitive abilities and inbuilt qualities which a worker needs to possess to succeed in career jobs. Hence, skill in the context of this study is the ability of graduates of sciences to be able to put into practice the required knowledge and skills for self-employment in the industry or self-employment business.

Self-employment is the act of starting and running a successful business or social enterprise as an individual without any form of government or public involvement. An increase in the rate of self-employment plays an important role in forming and sustaining healthy competition in the economy of any nation. The level of self-employment in a country is not the only one of the factors determining employment creation but also the one to determine the entrepreneurship situation of creating more jobs. The economic and psychological benefit of self-employment is enormous and the most significant advantage of self-employment for the country is a drastic reduction in the unemployment rate, especially during the period of business cycle decline.

Comprehensively, self-employment is the act of being more self-sufficient within the labour market to realize one's potential through sustainable self-employment. (Nwaoga & Rogers, 2011). Self-employment is a two-sided equation and many individuals need various forms of support through the acquisition of saleable skills to overcome the physical and mental barriers of establishing and managing a personal business successfully. Self-employable skills are not just about vocational and academic skills, but it involves demand-driven skills for improved livelihood sustainability of vulnerable groups in society.

## Challenges Facing Science & Technology Education as a Tool to Eradicate Poverty

The neglect of science and technology education in Nigeria could be said to be responsible for the increasing rate of unemployment as a causing factor of poverty.

The poor implementation and funding leads to production of graduates that are ill prepared to face the entrepreneurial expectations of the profession. Oguntuyi (2014) highlighted major constraints to vocational education such as national growth and vocational technical education, job scarcity and severance of Nigerian youths, implication of technology on vocational education training, parental attitudes toward vocational education. The following are some of the challenges facing science and technology education as a tool to eradicate poverty as posited by Oyerinde (2017), Obunadike, J. C. and Ughamadu, U. (2014).and Sani (2011). Among the numerous challenges are;

i. Lack of skilled manpower
ii. Acute shortage of science and technology education teachers
iii. Poor funding of science and technology education
iv. Lack of adequate laboratory facilities
v. Poor remuneration of science and technology education teachers
vi. Lack of technical expert teachers to handle some of the equipment professionally.

## Conclusion

Nigeria as a nation needs to regenerate her teaching and learning of science at all levels of education to meet global trends. Most of the developed nations have transformed their countries and improve the lives of their citizens through science and technology education by way of eradicating poverty, self-reliance and national development. This will consequently have a great implication on investment in human capital, manpower development, scientific advancement and technological attainment of the country. This situation calls for serious concern, and suggests that Science and technology Education in Nigeria needs a serious re-assessment such that will re-focus the attention of researchers in the area of science and technology teaching. This will consequently have a great implication on investment in human capital, manpower development, scientific advancement and technological attainment of the country. Unfortunately, in Nigeria, traditional method of teaching and learning of science dominate four walls of the classrooms (Delphonso, 2018, Delphonso 2020).

In Nigeria therefore, there is need to improve on the teaching and learning of science and technology to meet global demands in the areas of self-reliant, eradicate extreme poverty and develop sustainably.

## Recommendations

For Nigeria to attain the goals of regenerating science education for poverty eradication, self-reliance and sustainable national development. The following recommendations are made;

i. Science and technology education curriculum should be restructured towards self-reliant in order to eradicate poverty in the society.
ii. Science teachers should endeavour to relate scientific concepts to real life situations.
iii. Students should be encouraged to have a change of attitude and perception towards the teaching and learning of scientific concepts and principles. They

should see it as a subject that can bring them out of poverty and make them to be self reliant.

iv. Government should increase budgetary allocation to the teaching and learning of science and technology.

v. Schools and government should employ more science and technology teachers and supply adequate instructional materials and equip science and technology laboratories for effective teaching and learning of science and technology education in Nigerian schools.

vi. Government should organise conferences, workshops, seminars, symposiums etc to train the needed human resources for Nigeria to breakthrough scientifically and technologically.

vii. Curriculum planners/government should ensure that jet club should be revived at all levels of education in order to encourage students in the study of science and technology oriented subjects and

viii. Relevant authorities should sponsor science and technical education teachers to attend international conferences and workshops in other to be familiar with modern techniques in handling educative tools and equipment.

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