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Functional Science Education: A Catalyst for National Development in Nigeria

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ABSTRACT

This paper examined the role of functional science education as a catalyst for national development in Nigeria. It viewed functional science education as a pillar for national development through its applicability in areas such as businesses, health sector, infrastructure, agriculture and institutions of learning. Features of functional science education such as relevance, accessibility, empowerment, self-reliance were equally discussed. The paper highlighted insecurity, corruption, under-funding, instability of science teachers as some of the challenges facing functional science education in Nigeria. As a way forward, the paper suggested stiff punishment for any corrupt individuals, adequate budgetary allocation by the government to the educational sector.

Keywords: Functional, science education, National development.

INTRODUCTION

The revolutions experience in all spheres of human endeavour globally is no doubt attributed to the sound and efficient science education. This type of education has impacted in all sectors of the economy, ranging from agriculture, health, infrastructure, judiciary, shelter, communication, politics, engineering, and transportation to mention but few. Virtually, all jobs nowadays requires advanced skills, in this skills, it enable people to be able to learn, reason, think creatively and having ability to solve problems, as such, an understanding of science and the processes of science contributes significantly to such skills [1].

Historically, human development globally in terms of sustainable development and self-sustaining progress of any nation are been characterized by the development and applications of science and technology which are monitored and responsive to the aspirations, needs and endowment of such a country. There is no doubt that the role and importance of functional science education to national development has been recognized by nations who are currently at the forefront in terms of human development [2].

There is no doubt that a sound educational system as well as functional science education is pivotal for national development and particularly sustainable development of any nation. In such vain; explained the definition of education as a process by which human being and societies reach its full potential in addressing environmental and developmental issues critically, also regarded as a foundation and bedrock for socioeconomic, political development as well as a means to better life and upliftment of the society as a whole, this can be seen as the most important tool for national transformation. It is viewed as a potent instrument for change of any nation, where it is seen as the main engine for the development of any individual member of the society and the nation at large, these attributes of education are pertinent to the fact that no nation develop above the quality of its citizens [3, 4,5, 6,7,8].

Breakthroughs in developed countries such as Japan, Russia, U.S.A, UK are due to their commitment in ensuring functional system of education in their countries. These countries were able to overcome several developmental challenges such as poverty, unemployment, insecurity, wars, and conflicts among other social vices due to their commitment to functional education system. Other countries such as Nigeria, China and Mali with large population explosion are still victims of slavery, colonial exploitation, neo-colonialism and imperialism due to lack of innovation, values, skills and right attitudes towards functional education system that will contribute to the overall development of their nation [5,7].

It is important to note that Nigeria having suffered from the effects of colonialism, which have affected its educational system adversely. These effects have significantly causes low rate of development, inadequate educational system, were graduates cannot be self-reliant and employers of labour but waits for many years for jobs after graduating which is disgusting [7].

The era where Nigerian graduates roam the streets, recruited as thugs by ill-feted politician, indulge in many ills in the society as a result of the kind of educational exposure received in schools, which was bequeathed to her citizen by the British colonialization, which is less ideological with the present realities of life, where graduates cannot be self-reliant and therefore cannot be employers of labour will need to be re-address by all and sundry [7].

Nigerians live in a changing world to face the challenges posed by the effects of colonialism which produced people with mere academic knowledge without the ability to strive in equipping young Nigerians with appropriate skills, values, attributes, abilities, competencies to live and contribute meaningfully to the development of the society they live. The endless search for new paradigms shift necessitated the need for functional science education emerges, which resulted in new information, approach, knowledge and systematic inquiring into the workings of nature with a clear view of understanding these new shift for the benefit of human [7, 9]

The thrust of this paper is to examine the role of functional science education as a catalyst for national development in Nigeria. The paper first looks at the concept of functional science education after which the features of functional science education was discussed. The paper then looks at conceptualizing of national development; the role of functional science education to national development was equally examined. The paper finally examines the challenges of functional science education in Nigeria and ways of curbing such challenges to effectively promote national development in Nigeria.

2. CONCEPTUALIZING FUNCTIONAL SCIENCE EDUCATION

Science education as seen as the application of educational theories in an attempt for endless search of knowledge, resulting in the development of learner's cognitive, affective and psychomotor domains, through systematic processes involving careful observation, deduction and testing by empirical means [9].

Science education can be seen as an approaches and ways which integrate and combines the content of science, technology and mathematics in the teaching and learning processes with the main aims and objectives of breeding students that are capable of facing challenges and utilizing the prospects in the 21st century workforce. These approaches are geared towards inspiring generations of learners in curbing challenges through decisive decision making, innovations, collaborations and creative problem solving techniques in the global society [10].

Globally, science education has been recognized as a prerequisite for scientific and technological development which provides opportunities for students to acquire relevant and useful knowledge, scientific skills, values and answers to problems in a bid to provide and interpret natural occurrence. It helps students to inculcate right values, self-discipline, scientific literacy and general commitment to natural phenomenon's [11].

Functional education is seen as a total process of developing individual with cognitive, affective and psychomotor potentials capable of contributing maximally to the development of the society in which they live. It seeks to prepare individuals especially youths to be self-reliance, responsible and enterprising thinkers, who become entrepreneur that will contribute to economic development and sustainable environment. This education ensure the availability of food for people, creates jobs for its citizens as well as the provisions of services to humanity as a whole, thereby transforming a nation from a consuming to a manufacturing status [3,5].

Functional education is a form of education that is relevant to the current and anticipated needs, problems and aspirations of the society, whereby preparing individual learners in facing social goals, economic realities and future challenges adequately, thereby making such individual learner to be useful to him/herself, the society and the nation at large [7].

Thus, functional science education is a clearer vehicle for everyday activities in our daily lives, where individual learner develops his/her skills, increase their capacities comfortably and safely. It is an educational system that is holistic, which focuses on the identification of situational problem, gathering of information to make meaningful decision in a world of challenges and realities of life, it helps users and end-users of educational exposure to acquire knowledge, values, skills and attitude in handling challenges as a results of globalization for a better co-existence and meaningful sustainable development [10,19].

3. FEATURES OF FUNCTIONAL SCIENCE EDUCATION

The essence of functional science education is to bring out the best in every individual of the society through holistic approaches which focuses on the identification of situational problem and meaningful decision in a world of challenges and realities of life, through educational exposure which helps end-user in acquiring knowledge, skills, attitude, needed in the facet of globalization. For education to achieve its purpose of being functional, the following features should be present according to [7], these includes: relevance, emphasizing the acquisition of practical skills and knowledge for a gainful self-empowerment, equipping recipients to harness their potentials involvement of educational stakeholders in its design.

Let us look at few of these features of functional science education one after another

- ✓ **Relevance**: for science education to achieve its functional purpose, the curriculum should be tailored, geared to meet the immediate and future needs of the individual learners and the society they find themselves. These help the learner to face the realities of life and the ever emerging modern world. Education seizes to be relevance if it is not appropriate or relevant to real life situations of the individual learner.
- ✓ **Accessibility**: the science education should available to all members of the society irrespective of age, gender, religion and ability. Nobody should be denied access to functional science education.
- ✓ **Empowerment**: Another feature of functional science education is that it should enable to equip its beneficiaries with basic skills,

knowledge, abilities, selves attitudes needed to perform actively and productively in the society, thereby reducing unemployment and poverty.

- ✓ **Emphasizes acquisition of practical skills and knowledge**: the important of functional science education evolve around the application of skills and knowledge to complex problems in a more practicable ways rather than just routine use of fetch and procedure the of practicability of this type of education implies skills and knowledge can be apply solve problems immediate problem when such problems arises.
- ✓ **Self-reliance**: functional science education should be one that prepares the recipient of such education to be able to equip themselves to be on the own, this is possible through proper application of skills and knowledge to create wealth and employment opportunities this will aids in reducing poverty and crimes among members of the society

4. CONCEPT OF NATIONAL DEVELOPMENT

Another concept to be explained here is national development were emphasise is laid on development, as such, a developed society is characterized by the provision of sources of living for its majority populace, with major premium attached to the elimination of poverty, provision of food, clothing and shelter. The above assertion gives a proper paradigm to the definition of development "as a multi-dimensional process which involves the elevation of the entire society in the faces of three major components or aspects, these aspects includes sustenance, self-esteem and freedom which are important in transforming individual members of the society to self-actualization in the challenges of the basic necessities of life". These transformative aspects or components of development can be categorized into five (5) dimension, these dimensions include peace, economy, environment, social studies and democracy [12].

The need for sustenance national development commences when a nation has the capabilities to satisfactorily provide food security and other fibre ingredient needed in her industries for economy emancipation. As such, national development should be able to transform individual member of the society in virtually all sectors of human endeavour [12].

Thus, national development can be seen as an aspect of the general developmental processes. These developments are geared towards self-reliance where individuals are required to have abilities in improving their own well-being without recourse to other members of the society. The general aspect of national development as a process of development is geared towards positive and progressive changes in human activities and other endeavour in the life of the people, these changes are attained through efficiency, performance and level of social institutions of the society in overcoming weaknesses, eliminating centuries old scourge of poverty, ignorance, diseases, thereby making life worth living on earth [9,13].

National development encompasses a nation phenomenon which describes the overall collective development of socio-economic, political as well as religious and technological advancement of such a nation or country through strategies mapped out by the government [14,15].

National development is essentially the stages through which a nation or country passes toward collective height in both its qualitative and quantitative self-actualization of its socio-economic, political, religious as well as technological advancement which can be harness by its human and material potentialities to improve the social welfare of its citizen. These human potentialities of the national development from the above assertion is paramount to us in this paper, were functional science education is a major tool in this process [16].

National development is said to be a process of systematic transformation of the collective social, economic, political, religious, scientific and technological life pattern of a country through proper, effective, coherent, co-ordinate management system, result-oriented social mobilization strategy in which citizens of a country fully and graciously participated and exhibit positive mind-sets in the overall reconstruction process of the entire human edifices [6,16].

Finally, the most encompassing objectives of national development are the collective and progressive realization of the innate abilities of every members of the society for the overall self-satisfaction and enhancement of the good of the society and the nation at large.

5. ROLE OF FUNCTIONAL SCIENCE EDUCATION IN NATIONAL DEVELOPMENT

Every government worldwide, Nigeria inclusive has realizes the role of functional science education and its bye-product which is technology in issues that are relevant and important to national development. It is for this reason that in the 1999 constitution of the federal republic of Nigeria, its enshrined the goals of science education in Nigeria according to the national policy on education (FRN 2004) that:

- The inculcation of national consciousness and national unity.
- The inculcation of the right type of values and attitudes for the survival of the individuals and the Nigeria society.
- The training of the mind in the understanding of the world around and
- The acquisition of appropriate skills and competencies both mental and physical as equipment for the individual to live and contribute to the development of the society [17].

Transformations and development in the area of science and technology have continuously altering the ways and manners through which people live,

connect, transact and communicate, with profound effects on economic development and transformation. These development and transformations are the products of science and technology, owning to the technological and scientific revolutions spring out in the areas of economy, health and other social sectors [12].

Development of critical areas of human endeavours such as economic advances, improvement in the health sectors, education and infrastructural transformation can be attained with revolutions in science and technology. These sectorial revolutions in the 21st century are emerging basically through the use of microprocessors, telecommunications, bio-technology and Nano-technology, were the by-products of these revolutions and transformations are yielding positives strides in business practices across the economy, thereby having power to better the lives of poor people in developing countries [12].

Breakthrough in the technological revolutions in the 21st century through functional science education has sprung across different sectors of human endeavour such as:-

- ✓ **Business**: transforming business practices across the economy through the interaction of insights and applications arising from the technologies converges of microprocessors, telecommunication, bio-technology, thereby improving regional business environment, sound macroeconomic management, and increase in domestic demand as well as increasing trade and investment ties with emerging economics. It equips companies with digital capabilities in ensuring business continuity during Covid-19 pandemic through telework arrangement, sell and purchases on digital platforms, management and organization of production processes remotely, strengthen cyber security and quality internet access, facilitate temporary repurposing of idle production capacity to ensure large-scale provision of essential goods such as health facilities like hand sanitizers, personal protection equipment (PPE) and medical supplies like diagnostic test and ventilators [21,22].
- ✓ **Health**: in the health services, these bio-technologies, Nano-technology have power to better the lives of poor people living in developing countries like Nigeria, these technologies helps in eradicating malaria, a scourge affecting African continent for centuries, cures for other diseases are also possible, thereby enabling people with debilitating health conditions to live healthy and productive lives. Also, investment in regional drugs-development infrastructure in order to share costs and to centralize experts is possible through science, technology and innovation, this will aids in manufacturing drugs of global standard. Equally, enabling global contact among health expert through international donor partnership and financing mechanism as well as helping in shaping research agendas among nations through the use of ICT, thereby creating opportunities for Africa countries to move beyond foreign aids and dependency [20,21].
- ✓ **Agriculture**: Scientific and technological advancement have greatly impacted in the agricultural sector, such as in the use of global positioning system (GPS) which helps farmers to monitor their acreage and accurately take samples of their soil year after years, thereby helping them in improving crop production. Advancement in science, technology and innovation have greatly impacted in the efficiency of farmers through the use of modern equipment such as cultivator, harrower, harvester, irrigation system mechanism, more so, in the irrigation system, farmers can instil in their smartphones application that allows them to water their crops, as well as the possibilities of using drone to induce pollination in seeds. Equally, the use of analytical instrument is made possible, such as using chromatography in learning about the nutritional integrity of food. All the aforementioned processes are possible through the use of biotechnology and science.
- ✓ **Infrastructure**: since infrastructure development is an important tool in attracting foreign investors to successfully operate as well as stimulating foreign direct investment (FDI), this in turn reduces costs for firms. Infrastructural development such as good roads, railways, highways, ports, communication networks, electricity, stable political environment which are all made possible through proper applications and usage of science, technology and innovation, these thereby increases productivity.
- ✓ **Institution of learning**: Science education, technology, mathematics and engineering are very important to the development of any country, that is why every nation must take it very serious in all its learning institutions, the importance of science education to national development can be seen in many aspect of our daily lives ranging from: A graduate of physics education training and becoming as apprentices by acquiring knowledge of electronics, thereby practicing as electronics technician, equally, graduate of chemistry education are taught on how to make dye and chalk, they can establish their own chalk business with little funding, through such avenue, becoming an employers of labour as well as contributing to the growth of gross domestic product (GDP) and national development as well.

6. CHALLENGES FACING FUNCTIONAL SCIENCE EDUCATION FORNATIONAL DEVELOPMENT IN NIGERIA

- ➢ **Insecurity**: The effects of insecurity in Nigeria is too obvious, owning to the fact that both lecturers and students alike do not know their fate every day until they retire to bed at night, even while at home sleeping, armed robbers and kidnapper issues are still in their mind, these have effects on their psychological wellbeing, killing of lecturers and students by cultists and other bad elements in pour learning institution is a thing for concerns, many parent have lost their places of work as a result of insecurity in the country, this in-turn have effect on their children, as this could leads to the children dropping out of school, also, students are unable to attend schools regularly due to the fear of

been kidnap and bomb explosion.

- **Corruption**: the effects of corruption towards functional science education for national development in Nigeria can be seen were money meant for purchasing of science and laboratories equipment are diverted or substandard equipment are purchased instead, thereby leaving most of our science laboratories empty or filled with obsolete science equipment, equally, money are diverted which were meant for staff training and development, however, where selection are done, it is based on who you know syndrome. Furthermore, lecturers in universities and colleges have turned their places of work to shops, where they sell handouts and books at outrageous prices to students. All these have impacted negatively on the quality of science education for national development in Nigeria.
- **Instability in Science teachers**: The unavailability of science teacher is no more the problem these days, the problem lies with their instability in the job which is due to poor earning by the teachers, many people use teaching job as a stepping stone to more attractive jobs, as a result of the poor earning by teacher, they are exposed in doing other jobs which in turn, divide their attention and concentration in their teaching jobs, and this no doubt affects their effectiveness in the teaching job.
- **Under funding**: yearly budget allocation to the educational sector by the Nigerian government reveals lack of commitment to quality education. The UNESCO recommendation of 26% of the total budgetary allocation to education sector have not been met by the Nigeria government over the years, this unfavourable budgetary allocation to the educational sector have affected science education and the whole educational sectors in Nigeria.
- **Examination Malpractice**: The alarming rate of examination malpractice in the Nigerian system of education is a thing of concern. Nowadays, teachers, parents and students instead of engaging in activities that will promote academic excellence, skills, attitudes, knowledge for the betterment of the students are busying wasting time in planning one form of examination malpractice or the other, thus, on graduation, they are certified but not qualified to handle basic skills, knowledge and other attributes needed in the modern world workforce, this is the general states of education and functional science education as a whole.
- **Poor Science Equipment and Educational Materials**: In most Nigerian schools, colleges and universities, science equipment an educational materials are grossly inadequate to go round during practical classes and examination due to teeming population of student, this leads to students unable to match the theoretical knowledge to practical, also some equipment have become obsolete due to technological advancement.

7. CONCLUSION

Studies and finding about the role of functional science education as a catalyst for national development in Nigeria is inexhaustible with a single study, finding from scholars, researchers, educationist and stakeholders in science education have shown the importance and role played by functional science education in areas such as business, health, infrastructure, agriculture and institutions of learning, with major challenges coming from insecurity, corruption, instability of science teachers as well as under-funding in the critical areas of science education. This paper posits that functional science education plays a vital role in national development in the 21st century Nigeria, which is been anchored by the scientific knowledge, understanding and skills.

8. RECOMMENDATION

From the foregoing, the following recommendations are made to proffer solution to the challenges facing functional science education in Nigeria for national development, these include:-

- The need for all Nigerians to fight corruption is important, as well as need for anti-corruption laws and measures to ensure enforcement of the laws.
- Science teacher's welfare, conditions of service and remunerations should be prioritized by the government to prevent teacher leaving the teaching jobs for a more attractive ones.
- There is the need to stop sales of books and handout by lecturers of universities, polytechnic and colleges of education, as well as enact stiff punishment for those who violate this law.
- Adequate budgetary allocation to educational sector should be prioritized by the government, as such; modern scientific equipment can be purchased.

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