

PHYSICS EDUCATION: A BEDROCK FOR ACHIEVING SECURITY AND SUSTAINABLE NATIONAL DEVELOPMENT

By

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Abstract

Nigeria is currently experiencing security challenges ranging from religious, ethnic/communal, student-based conflicts, terrorism, banditry, kidnapping, among others, which have become problems that constitute threats to coexistence of its citizens such as families, communities, organizations and to the survival of its democratic political system. It appears that the adhoc measures put in place by the government to solve the problem of insecurity in Nigeria have not been yielding the needed results. This could be due to the fact that young people and some of the political and religious leaders have been nurtured in some attitudes that cannot be easily changed. It is therefore, meaningless to talk of development in the absence of national security. It is against this background that the present paper looked at physics education as a bedrock for achieving security and sustainable development. Physics education, if well utilized through its ethics has potential to proffer solution to the security challenges in Nigeria. Insecurity in any nation can create some negative consequences to national development. In a state of insecurity, national development would be difficult to achieve. Therefore, the paper provided an overview of some concepts such as education, science education with cognizance in physics, national development and national security. The paper also highlighted the interdependent of science education, security and national development. In addition, the paper discussed some of the causes of insecurity in Nigeria and the place of physics education for national development. On the basis of this, it was recommended among others that there should be a reform of physics education curriculum at all levels of education with a view to providing its recipients broad based education in the development of the mind.

Keywords: Science, Physics Education, National Development, Security

Introduction

Nigeria is currently facing tremendous security challenges ranging from spate bombing in some parts of the country, political assassination, armed robbery, kidnapping for ransom, human trafficking, banditry, terrorism, extra judicial killing, among others. This calls for cooperation among stakeholders, science educators, particularly, physics and liberal education, which free the mind of their recipients from their misconceptions. This would therefore, establish a common link between national security and national development. This can explain the reason government and relevant agencies have invested a lot of human and material

resources in a bid to boost and sustain science education. Quality science education programme is developed to enable students acquire profound theoretical and practical knowledge, which would help them face the challenges of life, be self-reliant, contribute in national development, and meet the challenge of the global world. A nation where there is peace and safety, there would be progress.

Education is a peaceful tool for national progress, which encompasses sustainability, socially, politically and economically. The implication of this is that the development of any nation or society depends extensively on the quality of its education. That is why the Federal Republic of Nigeria (2014) stipulated the following major national educational goals:

1. The training of the mind in the understanding of the world around.
2. The acquisition of appropriate skill and the development of mental, physical and social abilities and competences as equipment for individual to live in and continue in development of the society.
3. The inculcation of the right type of values and attitudes for survival of the individual and the Nigerian society.

In view of this, education according to Babagbemi and Daniel (2016), Nnabona and Asodike (2014), helps man acquire knowledge and ideas that shape his attitude, action and achievement. It is a powerful weapon which can be utilized to change the world. This implies that it is the product of education that transform the society. From the foregoing, education connotes the process by which an individual develops abilities skills, and attitude of positive value for effective functioning within his own environment. Therefore, Sani and Ikpe (2019) opine that for any meaningful sustainable national development of any nation to take place, a quality educational system is paramount. Science education is seen as instrument par excellence for achieving Millennium Development Goals (FRN, 2014). On the basis of this, the Federal Government of Nigeria base admission ratio of Science students and Arts students on 60:40

The knowledge of science in today's fast changing world has become a basic necessity. It serves as an indispensable element for shaping man's life (Imo & Kefas, 2016). Science is the intellectual and practical activity, which encompasses the systematic study of the structure and behaviour of the physical and natural world through observation and experiment. In the study of Udoh (2016), science is seen as an indispensable discipline for technological development. It is in recognition of this that the Federal Ministry of Education (FME, 2009) formulated the general objectives in Senior Secondary Science subjects' curriculum as: to provide basic literacy in science for fundamental living in the society; to acquire essential scientific skills and attitudes for preparation for the technological application of science; to stimulate and enhance creativity. On the basis of scientific applications in industry and many other professions, its teaching and learning should be a matter of national concern, which would provide an opportunity for every student to acquire its concepts, principles and skills.

Science opens new frontiers to many disciplines such as medicine, pharmacy, engineering among others thereby contributing significantly in man's needs and aspirations (Imo & Daniel, 2016). Science is all around us. The air we breathe is science. The food we eat, the water we drink and the clothes we wear are all based in science. Science is responsible for nearly all the house hold products such as hair care products, cleaning products, body care products among others.

There are three branches of science, namely; the physical sciences (physics, chemistry, astronomy, earth sciences), which deals with the study of inorganic world; the biological sciences (biology and medicine), which deals with the organic world of life and its processes; the social sciences (anthropology and economics), which deals with the social and cultural aspects of human behaviour. However, for purpose of this paper, the physical sciences, with cognizance in physics and its place for national development was considered. Physics is one of the science subjects in the senior secondary school curriculum. The study of physics focuses on the properties that govern the behaviour of all matter. The discipline often involves things we cannot see or touch but can be proved. Basic example is gravity. Gravity cannot be seen or touched, but can be proved (Fasanya, 2016). Important of physics stimulates every nation to be interested in using physics as well as producing physicists. Physicists ask questions, formulate hypothesis and gather evidences using scientific method. Therefore, physics utilizes scientific method to formulate and test hypotheses that are based on observation of natural phenomena.

Literature abound in the field of physics education. Some of these literature are empirical studies, which focus on instructional strategies and students' achievement or performance in Physics (Fasanya, 2016; Usman, 2016; Ogunleye & Babajide, 2011). There are also many non-empirical studies that focused on how the discipline can be utilized to promote sustainable socio-economic development of a nation (Ayeni, 2021; Bello & Ayilara, 2019; Igbaji, Muswaru, & Sunusi, 2017). However, there seems to be relative shortage of literature addressing how physics education can be used to address the issue of insecurity and socio-economic development in a single paper. Hence the reason for this article.

Physics education is the theory and method of teaching physics in the curriculum. The theories and methods developed in the field of study enhance teachers' effectiveness and ability in the process of teaching in the classroom. According to Aina (2013) physics education is a body of knowledge that is characterized by unbiased observation and systematic experimentation. The knowledge of physics education is very important for effective living in the present modern age. It helps in discovery of knowledge while technology applies the discovered scientific knowledge to improve human task and operations. Physics education can also be as a discipline that improves the standard of living among citizens of a nation.

Physics education has made great impact in the world to such an extent that an ordinary man now tends to see it as an integral component of modernization (Omega, Baba & Bala, 2015). The subject has helped man in improving his environment and supply his basic needs and aspirations. Therefore, Bello and Ayilara (2019) emphasize that the security, economy and political stability of a nation is predicated by scientific and technological advancement. Physics education is concerned with sharing of science content and process with individuals who are not considered traditionally to be part of scientific community. The individuals could be students, farmers, market women or a whole community.

In another study carried out by Igbaji, Miswaru, and Sunusi (2017), the emphasis was that physics education, especially those based on the philosophical, sociological and psychological perspective in the endless search for knowledge, resulting in the development of intellectual, emotional and psychomotor domains through systematic processes involve careful observations, deduction and testing by empirical means. The implication of this is that physics education is more than the acquisition of scientific facts and skills. It equally includes the development of new ways of thinking, reacting and behaving. In Nigeria context, physics education according to Aina (2013) centres on the method of teaching physics, which can offer a rich context for developing 21st century skills such as critical thinking, problem solving and

information literacy. Physics education is important to the development of any nation in many areas especially in the area of scientific and technological advancement.

According to Badmus and Omosowo (2018) physics education represents an effective process meant for educational training, public awareness, values, behaviour and lifestyles required for a sustainable human and capital development. The benefits of Physics education cannot be overemphasized. The discipline is applied in the area of Information and Communication Technology (ICT). Physics education according to Ayeni (2021) helps man gain increase in understanding how the world works, while technology helps scientists to make more discoveries. The quality physics education will therefore, determine the quality of manpower and their products, which by extension, will determine the level of security and the development of a nation.

Sustainable national development connotes the development of the present without compromising the development of the future. It includes all aspects of the life of an individual and the nation. It is a process of reconstruction and development in various dimensions of a nation and development of individuals. It includes full growth and expansion of our industries, agriculture, and education, social, religious and cultural institutions. Moreover, national development implies development of a nation as a whole. It can be best defined as the all-round and balanced development of different aspects of the nation viz. political, economic, social, cultural, scientific and material. These are facts of national development. The above assertions contrary to national development as one dimensional process that encourages the pursuit of economic programs that appear competing with western industrialized countries in the level of economic attainment as opine by Ankeli (2019). In the opinion of Ebeh (2015), development is more than the provision of physical infrastructure, but also a multi-dimensional process involving the totality of man in political, economic, psychological and social realities.

In addition to this, Bello and Ayilara (2019), conceptualize national development as the desire and ability to use what is available to continuously improving the quality of life and liberate people from the circle of poverty. They stress further that development is closely associated with self-reliance, which requires the ability to learn how to improve one's well-being without recourse to others. Development is the basis by which nations all over the world are classified either as first, second or third world. This implies that countries that have achieved a certain level of success in line with development are referred to as developed countries, while the others on the other side of the division is regarded as developing countries. National development, in the submission of Bhoje (2014) is neither weighed through the number of buildings the nation has nor the road laid down or bridges constructed, but the human resources developed by such a nation through a well-articulated system of Physics education. The implication of that, according to the submission of Okorosaye-Orubite (2005) is that national development and security are symbolized by the presence of sustainable high literacy rate, qualitative and funding science education, availability and provision of adequate medical facilities food security, housing, respect for social justice and the laws of the land, political stability, commendable social behaviour, sensitive to the yearning and sufferings of the masses, improved standard of living as well as healthy and stable economy.

It is meaningless to talk of political stability, improved standard of living, health and stable economy in the absence of national security. National security according to Bello and Ayilara (2019) connotes all activities and arrangements put in place to ensure free movement, interactions among citizens without any real or imaginary danger and obstacles such as gender, racial, tribal or religious discrimination. It is an ability of a nation to overcome its challenges. It can also be conceptualized as a state of being protected from danger and anxiety or fear. It is

a condition of peace, stability, order and progress, which involve international economy and long term goals of national development. Ankele (2019) sees national security as the protection of national survival. In the opinion of Okoli (2017), national security is more than territorial defense and should focus on physical, social and psychological equality of life of a society and its members both in the domestic setting and within the large regional and global system. This implies that a nation that is capable of protecting herself from harm equally enjoys immense capacity for enviable development. In Nigeria, the level of insecurity calls for urgent attention, because the nation is ranked 148 out of 163 nations in the 2019 Global Peace Index. This therefore, put the national security in danger. Insecurity comes in different ways ranging from bombings in some parts of the country, election related crises, kidnapping, human trafficking, terrorism, extra judicial killing of innocent citizens, armed robbery, among others. All these call for all and sundry to be proactive on issues of national security in order to arrest this negative drift currently impacting the nation's peace. It appears that despite the adhoc measures put in place by the government at all levels to tackle insecurity in Nigeria, the efforts have not been yielding positive results as contained in the studies of Emah (2022) and Orikpe (2013).

Causes of Insecurity in Nigeria

Insecurity in Nigeria is a significant reason why the growth and development of the country is affected. Though the country is highly blessed, the government is yet to proffer a lasting solution to the problem of insecurity. In this paper, some causes of insecurity in Nigeria are discussed.

1. **Corruption:** Transparency International (2019) placed Nigeria on 146th position out of 168 countries that research was conducted on. The term corruption ranges from bribery, fraud, nepotism stealing of public fund, embezzlement, among others. Corruption is synonymous to injustice, and where the duo meet, the resultant effect is crisis, which can lead to insecurity of life and property.
2. **Political Instability:** The instability in the political system in Nigeria can also lead to insecurity of life and property of people.
3. **Religion Intolerance:** Religious crisis is a disagreement between two groups of different religions that struggle against coherent existence. Any doctrine that is against the principles of nationhood is likely to be a source of insecurity to the nation. In Nigeria, most of the violent experienced in some parts of the country have its trace of religious undertone. Recent example is issue of alleged blasphemy of Islam in Kano. Religious issues of this nature can pose insecurity a nation.
4. **Influx of fire arms:** Smugglers use porous coastal borders of the country to sell arms, which are used illegally by kidnapers and terrorists to destroy life and property of people.
5. **Problem of Ethnicity:** In the real sense, the country's different diverse ethnic groups do not cause insecurity in Nigeria. However, political leaders and religious leaders sometimes use ethnic sentiments to pursue their selfish ambition therefore create mistrust and resentment between ethnic groups and religions.
6. **Unemployment:** The overwhelming unemployment rate in the country is capable of causing panic especially when it comes to Nigerian youths. Unemployment rate in the country has risen to 23.1% according to NBS.
7. **Open/Porous Borders:** Nigeria has borders that are poorly guarded. Insurgents from other countries can come into the country without any check, most especially in the North Eastern part of Nigeria. This can result to insecurity of human life and property.
8. **Weak Judiciary System:** Judiciary is supposed to be the last hope of common man. However, the judiciary in Nigeria is somehow weak. The implication is that people feel insecure when criminals and terrorists go free.

9. Terrorist Threat: There are different terrorists in Nigeria, including Boko Haram, which poses insecurity threat to the life of people.

10. Bad Governance: The increase incidents of violent attacks are symptoms of weak, marginal or exploitative government systems in Nigeria. The inability of a government to provide public services and meet the basic needs of the masses can create a group of frustrated people who can easily be classified as violent by any event.

Other causes of insecurity are; oppression, slavery, narcotics, poverty, unfair distribution of allocation, nepotism, human trafficking and many more.

The Place of Physics Education in National Security and Development

One of the critical issues in Nigeria is the constant and recurrence of violence in various parts of the country and the need for urgent remedial measures to avoid retarding national development. Nigeria is currently experiencing great interwoven socio-economic, political and security challenges. The challenges seem to have overwhelmed the government at all levels of governance and tends to make the nation ranked 148 out of 163 nations in the 2019 Global Peace Index as stated by Bello and Ayilara, (2019). Emah (2022) emphasized that if the principle of love, harmony and tolerant, dialogue, enabling environment, patriotism and self-involvement should be properly learnt enough, it would be easier to resolve most cases of conflict amicably. The knowledge of Physics education is important for effective living in this present modern age. Considering its numerous applications in industry and other professions, it is therefore, imperative that every individual is given an opportunity to acquire its concepts, principles and skills. However, in the study of Amusa (2015), critics of scientific and technological development argue that the continuous use of scientifically developed weapons and ammunition such as rocket launchers, ballistic missiles, improvised explosive devices are the creations of physics, and therefore, maintain a high level suspicion on the position of physics education in promoting peace and sustainable national development. In the study of Otto (2016), Physics education provides man with increasingly clear pictures of how to overcome national and security challenges.

The knowledge of Physics education is very important for effective living and security in this present technological age. Physics education has many applications in industry and other professions, which can solve the problem of unemployment in the country. It therefore, becomes imperative that every individual is given an opportunity to acquire some of its concepts and skills. Graduates of Physics education can be self-employed because he has some knowledge of electronics that can make him be able to have a little period of training as an apprentice and then stand as an electronic technician. For example, semiconductor is very important in the modern technology and useful in ceramics, which if learnt, can enable a person to earn a living. A graduate of physics can also work in hospital (Radiology department), he can be a physics teacher in a secondary school or a university physics lecturer. Physics education enables an individual to think rationally.

In addition, Physics education can promote peace and sustainable national development in the following areas:

1. Energy Crisis: It is quite obvious that Nigeria's major economy is crude oil, which is a non-renewable energy source. However, the issue of environmental friendliness is currently putting crude oil into a global check. There is need to seek alternative energy sources such as hydrogen fuel, which can be used to power electronic gadgets, run engines and vehicles. Nuclear power is still the best for power generation but, Nigeria as a nation lacks the manpower. This can only

be achieved through physics education. People should be encouraged to study physics. Physicists are needed in the energy sector for more research.

2. Problem Solving: Almost everything on the earth is governed by physics laws and principles. Therefore, national issues that demands urgent attentions necessitate the production of quality physicists to model the problem and proffer the solution to the problem.

3. Human and Economic Liberation: Welfare of the citizen is the ultimate goal of any nation. As Nigeria begins to embark on technology to produce goods and services, there is the need to develop the technology and the people to the world standard. This can be achieved through Physics education.

4. Society: The society in which we live is based on some ethics that justify the existence of its citizens. In the same way, science (Physics) is based on ethics. Therefore, knowledge of physics education will enhance individual to possess the moral behaviour expected of him and thereby promoting peace in his environment.

Conclusion

Security is the most vital element in human life. There are security challenges posed by many factors such as weak judiciary system, porous border, injustice, bad governance, corruption among others. Insecurity in Nigeria is a significant reason the growth and development of the country are affected. The responsibility of the government of any nation is to ensure the security of life and property of her citizens. Science education, particularly, physics is very important in every aspect of human life. It is based on ethics, and if well-developed, has the potential to promote peace and develop any nation especially in the area of scientific and technological advancement. Therefore, every individual should be given the opportunity to acquire some of its concepts, laws, and principles that would enhance individual to possess the ethics expected of him in the society. This would therefore, promote the spirit of tolerance, enabling environment and patriotism.

Suggestions

Based on the above discourse, the following suggestions are proffered.

1. Physics education curriculum should be reformed at all levels of education by the government through the curriculum planners with a view for providing its recipients broad based establishment in the development of mind.

2. Educational stakeholders and policy makers should establish strong cooperation with the political and religious leaders through dialog to guarantee effective utilization of physics education for national development and security.

3. There should be a proper modernization of security agencies through adequate training organized by the government for the security personnel on how to use highly modernized technological weapons.

4. There should be leadership development and solidified border security through adequate training organized by the government.

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