

## Refocussing Mathematics and Science Education towards Addressing Security Challenges for National Development in Nigeria

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### Abstract

*This paper addresses the need to refocus mathematics and science education towards eradicating security challenges for national development. The value of mathematics is felt in the areas of science discoveries and inventions. Science and Mathematics education is considered as a tool to helping people create a society characterized by dignity for all, and in which injustice, arrogance, violence and bigotry have no place in the society. The need to refocus mathematics and science education becomes imperative because knowledge expands people's possibilities, promote creativity and imagination and the products of science and mathematics engage problems as wide ranging as cryptography, budgetary, financial, capital index, income index, education index and consumer price record. Likewise, it harnesses how mathematics and science education can address the challenges of national security to restore peace in Nigeria. It was recommended among others that graduate of mathematics and science education should be made to acquire practical skills that will enable them to be self-employed in the future and that government should be more proactive in responding to the acts and emergent security threat in the country.*

**Keywords:** Mathematics, Science, Security, Politics, National Development.

### Introduction

All around the world, mathematics is essential. It serves as a link to other courses given in any official educational system, such as science and technology. According to Ogundele et al. (2019), mathematics is the science of numbers, quantity, and space in evolving as a product of the human mind, largely focused on concepts, procedures, and reasoning. This is consistent with their argument. This suggests that one of the fundamental disciplines that can support the country's economic growth in the near future is mathematics. It is also thought of as workforce education that contributes to the human and capital development of any country. But the study of mathematics education also examines how people think about mathematics, how

they apply it in their daily lives, and how students can make connections between the mathematics they learn in the classroom and the mathematics they encounter in their surroundings. Educating people in mathematics is crucial to enabling them to produce for the country's progress. One important tool for supplying the people needed for the nation's technological progress is mathematics education. One might deduce the justification for mathematics instruction from the country's educational policy (FRN, 2014).

Permanent literacy and the capacity to communicate effectively with numbers are instilled, and these skills lay the foundation for critical and scientific thinking. Taking into account its significance for scientific research and a country's technological advancement, mathematics should be taught as a basic topic in Nigerian schools. Science is one field where the need of mathematics knowledge is recognized because science relies heavily on mathematical principles to reach logical conclusions. According to Ogundele et al. (2019), acquiring fundamental science process skills is seen as "learning how to learn," which essentially means that kids learn how to learn by applying critical thinking and creative information utilization to their knowledge. These researchers, however, focused on the fundamental science process abilities as the cornerstones of scientific inquiry and critical thinking that may be acquired through targeted science education activities. An efficient science education fosters the growth of more responsible individuals who, among other things, support the creation of infrastructure, portable water, medical care, a robust economy, and a better environment.

Hence, Ogundele, et al (2019) citing Gotep (2010) stated the need for providing science education to help offer solutions to most of the developmental problems linked to infrastructure, spare parts, heavy equipment, manufacturing of small domestic machinery, as well as security. This is why a call for refocusing Mathematics and Science education towards eradication security challenges for National development becomes necessary.

### **Role of Mathematics Education for National Development**

Only when a country achieves significant advancements in science and technology can it be considered economically developed. Without a question, the development and use of contemporary science and technology sets developing nations apart from developed ones. This suggests that a country's level of research and technology determines its standard of living. In reality, according to Aguele and Usman (2007), mathematics is the key to the science, and science serves as the foundation that allows technology to flourish. It is sufficient to declare that the degree of science and technology in any country is determined by the quality of mathematics, which is based on the type of mathematics education. Consequently, mathematics is essential to the development of a nation. According to Aguele and Usman (2007),

mathematics is the primary tool used to formulate hypotheses in science and other academic disciplines. In other scientific domains, it serves as an explanation for observations and experiments.

Therefore, all things considered, the basis of disciplines such as Physics, Mechanics, Engineering, Economics, Chemistry, Biological Sciences, and so on is composed of mathematical procedures. It is important to remember that mathematics advances scientific knowledge and that current technology is dependent on mathematical education. These developments simultaneously boost economic viability and productivity and indirectly address the nation's insecurity issues.

### **Roles of Science and Technology in a National Building**

According to UNESCO (2010), science is a non-dogmatic corpus of unchanging reality that provides information, comprehension, and operational procedures that provide compelling perspectives on the world. Knowledge of science, or what has been called science education, is crucial to having a better life in this world. In fact, science education, according to Ogundele et al. (2019), is concerned with creating a scientifically literate society, which in turn equips students with the fundamental information, abilities, and attitudes needed for future employment in science and associated subjects. It assumes that the goals of science, as stated by United Nations University (2014), would include maintaining social stability and national security; boosting economic growth and efficiency; facilitating a seamless transition to an information society; enhancing quality of life (particularly in the areas of public health, medicine, and electronics development); safeguarding the environment for improved living conditions and higher land productivity; and developing a new culture appropriate for the new society (a struggle has always existed between traditional cultural values and progressive contemporary values). To advance science and technology, steer national development, and meet socioeconomic requirements, a national consensus should be established.

### **Science and Politics**

Politics cannot be dissociated from science and its development. Politics is seen as when a body of people is clearly organized as unit for the purposes of government (Olawuyi, 2013). Scholars such as Modebadze (2010) and Harrison et al. (2015) have reiterated that politics is a science of government. Politics is related to science in that, for a government to be successful it is required to observe, measure and interpret societal scientific and technological development. Since politics is the science of government, the aim is geared towards improving the lots of citizenry. Scientific methods are applicable to politics through the accumulation of fact. Olawuyi (2013) opined that in the whole political world therefore, learners are to observe, classify, connect, and compare for the formulation of general principles.

While scientific advancements have made it easier for humans to live on Earth, there is also a serious political risk that science will be used to destroy the planet. The employment of biological weapons, nuclear bombs, and missiles—all products of scientific research—by politicians to wipe out their perceived opponent of progress in a conflict and destroy vast environmental resources could have unintentional repercussions. The aim to control politics globally gave rise to these harmful uses of scientific knowledge. The inference is that nations with nuclear weapons may be able to influence world affairs from a position of power.

### **Concept of Security and its Implications on Nigeria**

Security refers to the condition or feeling of safety from harm or danger, protection and presentation of core values and the absence of threats to acquire value. Kolawole (2014) foresee the prevalence of political crisis, ethnicity, military illegal arms dealing and arms trafficking, human kidnapping, corruption and fulani herdsmen as indicators that pose serious threat to our national security. However, the current general rate of insecurity in Nigeria is multi-dimensional in nature. The Niger Delta crisis, the acts of bombing and killings by the activist Islamic sect, Boko Haram, the ethno-religion crisis in Plateau, Kaduna, Benin, Fulani herdsmen and the political violence that followed after 2011 and 2015 general election results mostly in the northern part of the country and the determination of winners by the court rather than the votes cast in 2023 elections have further threaten the state of security of this nation. Indeed, this threat has compounded the current national security challenges that prick concern on Nigerians as experienced in poverty, unemployment, yahooyahoo, banditry and corruption.

### **Poverty**

Poverty is the most basic problems threatening the stability of Nigeria and the world in general. Poverty simply means a situation of lack of resources to acquire the basic needs of life among which include food, shelter, and clothing. Adesupo (2010) asserted that many of the criminal offences in the society can be attributed to poverty. In other words, poverty is a breeding ground to all forms of anti-social behaviour and criminal tendencies in the world.

### **Unemployment**

One of the major security challenges in Nigeria is the high prevalence of unemployment. Sijibomi and Issac (2014) viewed unemployment as a situation where someone of working age is not able to get job either as part time casual or full time. Daluba (2015) described unemployment as a state when a person who is knowledgeable in skill in a particular field of interest continuously goes in search for job and unable to find. The views from these researchers with the proliferation many Public and Private Colleges of

Education, Polytechnics and Universities that produce graduates every year who flood the labour market to increase the number of job seekers. Unemployment creates a lot of problem in the country and it needs to be “tackled” without delay. The notable affect among them are violence, crime, drug abuse, political thuggery, child abuse, murder, kidnapping, boko haram, hostility, robbery and a host of others.

### **Corruption**

Hindrance to peace and security in Nigeria is corruption. Corruption can be seen in getting involved in an action that leads to unauthorized gain in the form of money, goods, and services. This lends credence to Maidubi (2015) view that corruption could be either financial or positional. It is positional when an influenced person abuses the position for his or someone else’s in an undue advantage. Financial corruption refers to misallocation of funds that may involve unofficially diversity of resources assigned to certain activities to other uses. Researchers have emphasized that there is perfect correlation between corruption and insecurity in Nigeria. Critics are daily drawing attention to the relationship arguing that crime such as armed robbery, kidnapping and terrorism are reactions to the refusal of those in power to check their excesses. At the root of the corruption, quagmire in Nigeria is the failure and virtual collapse of government, the contamination of accountability procedures and the looting of the money meant for the socio-economic development of the country which implicated on poverty and security challenges.

### **Harnessing Mathematics and Science Education to address the Challenges of National Security in Nigeria**

Any nation's progress is based on its educational system. The result of education's failure to meet demands and to foster economy, independence, and self-sufficiency has been a rise in youth unemployment and the prevalence of social problems. Ogundele et al. (2019) made the following claim about the importance of mathematics education: it advances scientific knowledge and makes modern technology more accessible. It also increases economic productivity and viability, which in turn lessens the nation's challenges with insecurity.

In light of the importance of science education, Ogundele et al. (2019) claimed that acquiring a foundational understanding of science process skills can aid in providing solutions for the majority of our developmental issues, including infrastructure, security, and the production of heavy machinery, small home appliances, and spare parts, among other things. If the government can institutionalize a culture of science and ingrain education literacy among the main societal segments—particularly the youth—science education can function as a tool for promoting peace and stability. Additionally, improving one's abilities would help individuals live in less poverty, and graduates may find work and expand the scope of assistance.

Better yet, the main causes of today's national security issues are social and economic injustice, food insecurity, and ignorance because these elements have an effect on people's quality of life as well as peace and stability. Given this, scientific education may effectively facilitate the use of science and technology to enable mechanized agricultural methods that promote food security and sufficiency. Since large-scale food

production is now possible thanks to current agricultural techniques and land utilization laws, using organic fertilizer—which is essentially a creation of science and technology—is standard practice.

Nonetheless, in cooperation with the nuclear treaty movement, the American Association for the Advancement of Science (AAAS, 2006) expanded the scope of its science and technology policy fellowship programs to include fellowships in global security. According to AAAS, the fellowship will give individuals with backgrounds in public health and biomedicine a unique opportunity for development, implementation, and assessment. Additionally, the fellow will become knowledgeable with international arms control agreements, federal response effort architecture, natural strategy as it relates to biological weapons, and government funding sources for all coordinated security activities (AAAS, 2006). Therefore, emphasizing science and math in the classroom would offer long-lasting solutions to the multifaceted issues facing our globe, especially Nigeria.

In view of the above, according to Wasagu et al (2022), the impact of mathematical skills in a nation's security include wavelet transformation (Signal Intelligence), Financial security, Economic security, and Cryptography (Data security). Wavelet Transformation, also known as Signal Intelligence, is a relatively new approach that relies on the transmission of a sequence of numbers and is crucial to all forms of signal transmission. A fascinating new technique called wavelet analysis uses physics and math concepts to solve challenging security and civil issues. A few of the many uses for wavelets include wave propagation, data compression, signal processing, and more. Wavelets are strong statistical tools. Zakariya and Barva (2013) claim that wavelets analyze complicated data at various sizes and locations and precisely rebuild it.

In addition, a financial instrument is any tradable asset, including cash, proof of ownership in an entity, or a contractual right to receive or deliver cash or any other financial instrument (Abubakar, Charles-Ogan, & Albert, 2014). For one's own financial security, mathematical abilities like budgeting and counting are necessary. Additionally, for the easy evaluation of ATM cards and the detection of fraud, skills like number identification and accurate money value are required. Bonds, deposits, and other assets and liabilities are all evaluated numerically in banks. Simple or compound interest rates are used when granting loans, overdrafts, and Commission on Transactions.

Furthermore, to gauge a country's economic health, economic indices are used to calculate economic security. These metrics are measured using mathematical abilities. The Gross Domestic Product is one of the main metrics used to assess a nation's economic health (GDP). While a positive GDP suggests health, a negative GDP is indicative of a recession, which denotes unhealthiness. The Human Capital Index (HCT), Education Index (EI), Mean Years of Schooling Index (MYSI), Expected Years of School Index (EYSI), Income Index (II), and Consumer Price Index (CPI), which is used to assess reflection, are further economic

indicators that call for mathematical proficiency. In the end, algebraic operations, percentages, ordinal counting, and ratios are crucial mathematical concepts that are needed to understand any country's economy.

Lastly, cryptography, also known as data security, is the science of using mathematics to encrypt and decrypt data. It is based on the concepts of prime numbers and number theory. According to Jiang (2013), data security is a major security concern when it comes to the transmission of computer passwords, electronic commerce, private conversations, and Automatic Teller Machine (ATM) cards. Cryptography is the practice of hiding information and converting some secret information to a non-readable text. It allows one to store sensitive information or transmit it across insecure networks (like the internet) so that it cannot be read by anyone but the appropriate person(s). Applications of cryptography include military information and intelligence, electronic commerce, bank and payments, and electronic building access (Zakariyya & Barwa, 2013).

### **Conclusion**

The Nigerian education system at the present moment requires re-examining the implementation of mathematics and Science education curriculum if we must tread along global advancement. The concern for tailoring mathematics and Science education towards empowering the citizen to be self-reliance therefore calls for an urgent paradigm shift and sustainable attention to concomitantly address over dependence of the citizens on the resources available in the country as well as reduce the rate of insecurity and other crime rates like banditry, illegal mining, robbery and kidnapping.

### **Recommendations**

The following recommendations were anticipated in the light of the hub of the paper

- i. Students or pupils should be encouraged in the area of acquisition of mathematics and basic science aptitudes, because how scientists generate new knowledge rests on unique skills. So, there should be special provision and encouraging incentives for the study of science at each level of education in Nigeria.
- ii. Nigeria Government should institutionalize a culture of Mathematics, Science and Science education literacy among all major segment of the society particularly the youths.
- iii. The graduate of Mathematics and Science education should be made to acquire practical skills that will enable them to be self-employed in the future.
- iv. Nigeria government should be more proactive in responding to the acts and emergent security threat in the country.

- v. Nigeria government ought to generously fund research in Mathematics and Science that can expand the design and packages of a machine which may be utilized to battle insecurity issues within the country.

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