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Science, Technology, Engineering & Mathematics – Tools of Socioeconomic transformation

Case Study: Nigeria

INTRODUCTION

Everything is connected. From the biological functions of micro-organisms to the cultural behavior of macro organisms, everything is connected. Science and Technology has been the tool used by man to invent his necessities right from the beginning of time. Science draws upon concepts of mathematics. Technology is built on discoveries of Science, and Engineering is the framework that brings technology to life and keeps it functional. Everything IS connected.

A vast majority of students that study courses today do so simply to secure a good job after school and make a living. There seems to be nothing wrong with this ideology at first until we end up with disillusioned students unfulfilled in their studies and confused after graduation. The skills that are needed for them to excel in their chosen fields are absent. Knowing so little about the application of that which they have learnt breeds a counter-productive system. This is why students do not find it easy to get jobs after school. The skills needed to secure jobs may already be known by them in theory, but real-life application of these skills is what really translates into true knowledge. How many graduates fail at interviews for answering amiss when in fact, they understand the theoretical concept behind the questions being asked but not its application in real life?

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Science, technology, engineering and mathematics education: Does Nigeria // see the need?

A policy maker who is neither STEM-literate nor appreciative of the relevance of STEM literacy will not champion STEM-accelerating policies. It is a simple truth.

A Global Outlook

Today, developed countries prioritize the STEM competency of their citizens as a dire need. It is not simply because science and technology have been the drivers of their economic growth, neither is it simply because the number of billionaires in the world today, which has doubled over the past decade, consists of people who have made their fortunes through Engineering, Information, Communication and Technology. Most of these countries believe as well as developing countries do, that the country with the largest number of engineers, scientists, technologists, technicians and mathematicians will determine who rules the world. Our nation, Nigeria realizes this too as can be chronicled by the reforms being made since 1962. Sadly, our actions based on this realization have been largely ineffective. Policy-making is a function of self.

Bridging the gap

Reforms have been proposed to help bridge the continually widening gap in STEM Education in Nigeria but they seem largely ineffective so far. Professor Promise Okpala suggested Technology transfer. In his article on the subject of reforms in STEM Education in Nigeria, he notes that technology transfer would fail if the receptors of the technology have not gotten adequate development to start with, which is true. Technology indigenization and Government policy formations and implementation were other propositions of the article. It leads one to the question of the government's role in this.

The missing link in the current Nigerian curriculum is experiential, hands-on knowledge. It is a bridge that connects the theoretical prowess of students (of which Nigerian graduates are vast) with real life application.

A foundation for the future Massachusetts' Plan for Excellence in STEM Education

Version 2.0: Expanding the Pipeline for All

A Plan from the Governor's STEM Advisory Council

In 2009, Governor Patrick Deval, governor of the state of Massachusetts signed an Executive Order cited No. 513, creating the **Governor's STEM Advisory Council**. The Governor, alongside former Lieutenant Governor Timothy Murray, charged the Council with creating a comprehensive plan to strengthen STEM education by teaming with academic and business leaders to develop a series of strategies that will increase student interest in STEM, training for teachers and new opportunities for learning in STEM areas. By 2013, the council expanded the reach of the plan to everyone in the state, its motivation being to create a STEM-literate community. Today, Massachusetts is at the forefront in the United States in STEM and is well ahead of many nations of the world, breaking new grounds in science and technology every day.

In 2016, Special Adviser to President Muhammadu Buhari on Social Protection Investment, Maryam Uwais, reported that 100,000 students are to benefit from STEM with Bursary for financial support for tertiary students studying courses in Education, Science, Technology, Engineering and Mathematics.

At first glance, it is evident that the government's stated plan is merely scratching the surface and not critically addressing the challenges of STEM in the nation.

Without much help coming from the government, concerned individuals have often asked what else can be done. Not-for-profit organizations have been set up, to make a difference in the lives of students from all over the world. When nations are serious about their STEM future, projects such as “Change the Equation” are enacted. To help other nations in the world or a particular segment of a population, foundations such as WAAW Foundation work to advance STEM Education for African women, developing curricula, monitoring growth of education and hosting camps. The missing link being bridged is Experiential training; a hands-on approach to learning.

STEM-Ed Foundation was founded upon this vision - to bridge the gap between theory and practical in the grooming of future scientists, technologists, engineers and mathematicians. As one learns more about STEM though, one sees that it connects even with the musician's crochets and quavers; one sees that it cannot be divorced from art as a discipline. Everything connects.

The role of NGOs in stimulating interest in STEM topics and careers



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Personal commitments

Working with STEM-Ed Foundation and sharing the message of the need for STEM revival in this nation has been a partially fulfilling exercise. On one hand, a larger number of people are committing to the cause and the conference and media outreach of the foundation have been encouraging. On the other hand, there is a major concern of Impact. If the messages are merely passed, the foundation runs the risk of falling into the mainstream dilemma of *all words and zero action* - a fundamental problem which gave birth to the foundation to begin with.

I have found that there are, among us, young professionals whose personal visions are to be world-class scientists, technologists, engineers and mathematicians worthy of the name, who wish to pursue a career in a field that connects the dots and evolves with knowledge, who envision a professionalism that decries the need to call expatriates when there is a technical problem in the country. These iconoclasts envision a country that passes into bill, policies that pull stakeholders together in a bid to drive the nation forward on the shoulders of STEM.

A PEEK INTO A YOUNG GRADUATE'S VISION

I have often been asked what I envision when I think about the country. To be honest, the list keeps growing. For now, let's just add a couple of things to the visions of the young iconoclasts in the previous paragraph, courtesy of Massachusetts STEM plan.

For Nigeria, yes I envision a home where PARENTS engage their children with questions about what is going on in their world and they respond with ideas that are supported by the knowledge and experience they have gained through mathematics, science and technology classes that have been enhanced through embedded experiential learning.

I envision RECENT COLLEGE GRADUATES demonstrating the knowledge, skills and abilities necessary for employment as members of diverse, collaborative teams addressing global as well as local challenges.

I envision ADULTS (schooled and unschooled), as lifelong learners, routinely going to schools and returning time and time again in order to advance their knowledge, skills and abilities to support their pursuits of emerging opportunities in new fields.

I envision NIGERIA'S workforce being the envy of the continent and of the world. Imagine us not merely boasting of a robust GDP which has not translated into wealth creation for the population, but actually supporting the growth of current industries. Everything is connected!



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