

## QUALITY STEAM EDUCATION FOR EMPLOYABILITY IN NIGERIA: RUNNING AHEAD

BY

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### Abstract

*The core mandate of the Nigerian education industry includes employment generation, poverty eradication, socioeconomic transformation, and wealth creation among others. One in every three (33.3 %) employable Nigerians are unemployed. Globally, education is regarded as a potent tool for sustainable national development, and the key to eradicating poverty, unemployment and insecurity. In spite of the fact that there are hundreds of tertiary educational institutions and several thousands of primary and secondary schools in the nation, unemployment increases at an alarming rate annually, while human development remains appalling. This calls to question the quality of education available in the nation. It equally raises an urgent need to revamp the education sector and focus specially on STEAM education in order to eradicate unemployment and poverty and put the nation on the path to sustainable socio-economic development. Therefore, this paper focuses on operationalization of Sustainable Development Goal (SDG) number 4 (Quality Education) and leveraging it to promote employability of products of STEAM education from Nigerian educational institutions. The paper advocates for innovative quality control mechanism in the education system, curricula changes and stronger synergy between the work places and education sector.*

**Keywords:** Employability, Quality education, STEAM education, Sustainable Development Goals, and Unemployment.

### Introduction

The role of education industry in human capital development for poverty education was also reported in the write up. In this paper, explanations on measures put in place to address an alarming population growth were addressed. Attempt was also made to discuss how quality education especially STEAM education can be used to increase the number of people with relevant skills for financial success (operationalizing target 4.4 of the SDG4). This will significantly improve employability of graduates from the nation's educational institutions and consequently eradicate or at least reduce unemployment and poverty and put the nation on the path to sustainable socio-economic development. The paper was concluded by highlighting how SDG 4 transforms into more and better employment opportunities for Nigerians.

Nigeria, the most populous African country and the 7<sup>th</sup> in the world is home to 210,351,969 citizens according to an estimate by the (Worldometer, 2021). Controversies on the impacts of population on national wealth and development that started way back when capitalism was at the nascent stage still awash the literature to date. Malthusian school of thought considered large population as more of liability than asset. According to Social Science Libretexts (2021), these adherents of Thomas Malthus, the 19<sup>th</sup> century British philosopher and economist, postulated that ‘food production will not be able to keep up with growth in the human population, resulting in disease, famine, war, and calamity’. Hence, Thomas Malthus advocated for “moral restraint” which translate to compulsory practice of abstinence by unmarried persons, forced sterilization and criminal punishments for parents who could not support their children. Hence, it was not astounding that population control was widely practiced during the 20<sup>th</sup> century across the globe. China, India, and Peru among others aggressively used forced sterilization among other forms of birth control to reduce population growth. Indeed China only ends its 35years old One-Child official policy on 17<sup>th</sup> April, 2015 (History.com, 2021; Alonso, 2014).

In contrast to the Malthusian school of thought, Adam Smith, the 18th-century economist, and father of modern capitalism political economy system considered population to be an asset. Interestingly, the first three most populous nations, China, India and USA are equally the top three most developed economies. Astoundingly, none of the top five countries with shrinking population such as Bulgaria, Lithuania, Latvia, Ukraine and Serbia (World Population Review.com, 2021a) is in the club of the top.

According to The Cable (2015), Nigeria has been projected to be home to over 400,000,000 inhabitants in year 2050 and become the third most populous nation in the world. This huge population can be transformed into productive asset if the nation invests massively in human capital development.

The development of the human capital for employment generation, poverty eradication, and sustainable socioeconomic and technological advancements in the society, is the core mandate of the education industry. The number of universities in Nigeria expanded from less than 40 in 1996 to 197 in the month of April, 2021 according to the Minister for Education as reported by Omolaoye (2021), similar rapid expansion took place in other educational institutions. Indeed, there are thousands of secondary and primary schools in Nigeria as reported by the (World Education News + Reviews, 2017). Adult literacy rate in Nigeria was 62.02% in 2018 (Macrotrends.Net, n.d.). However, Nigeria is home to over ten million out-of-school children, the highest number in the world as indicated by (BBC News, 2017). This rapid expansion in number of educational institution is part of efforts to achieve the goals of education as specified in the National Policy on Education by the (Federal Government of Nigeria, 2013).

Olurounbi (2021) reported that one in every three (33.3 %) employable Nigerians are unemployed; most of whom are graduates from Nigerian education institutions. However, only 41.4% of the national labour workforces are skilled labour while only 48.6% of ages 15 and above are employed (United Nations Development Programme, UNDP, 2020). One of the several consequences of unemployment is poverty that is now endemic in the nation. According to World Population Review (2021a) the nation’s poverty rate stood at 40.10% which is far behind South Sudan with 82.30%. However, in spite of this figure, in year 2018, Nigeria was widely reported to have displayed India as the global capital of extreme poverty with about 87 million poor citizens, the highest number of people in extreme poverty globally (Adebayo, 2018). The National Bureau of Statistics (2020) also reported that 40% of the population lives below the nation’s poverty line.

Poverty and criminality appears to form unholy alliance. The World Population Review (2021b) ranked Nigeria 16<sup>th</sup> in position out of 135 nations with a crime index of 63.86. The

nation scored 8.314 and ranked 3<sup>rd</sup> on global terrorism index 2020 (Vision of Humanity.org, 2020 November; Institute for Economics and Peace, 2020). On daily basis, print and electronic media outlets in Nigeria report violent crime such as banditry, kidnaping terrorist attacks, robbery and so forth. There is no society without crime just like there are no nations without poor citizens.

In view of the widespread endemic poverty, insecurity, and unemployment, it is not astounding that Nigeria is a member of the club of low human development nations. The United Nations Development Programme (UNDP) (2020) reported that life expectancy at birth of Nigerians is 54.7 years while the Human Development Index (HDI) value was 0.539 which ranked at 161<sup>st</sup> position out of 189 countries. Life expectancy for health, Gross National Income per capita for standard of living, expected years of schooling, and mean of years of schooling for education are the major indicators in calculating HDI. It is important to note that two out of the four indicators used in computing HDI are in the area of education. It is therefore, obvious that education is a major factor in ending poverty, unemployment, insecurity and improves human development, hence a justification for the inclusion of SDG4 in the global effort to ensure sustainable development in all nations.

### **Concept of Employability**

Employability refers to ‘the skills and *abilities that allow you to be employed*’ (Cambridge English Dictionary (n.d.)). It is the most crucial factor in labor market as demand for skilled labour takes precedence over unskilled labour. Education is concerned with human capital development which translates to producing highly skilled labour force by equipping citizens with employability skills for either self-employment or employment in both organized private, and public sectors of the economy. Doyle (2020) identified six skills of employability to include communication, collaboration, critical thinking, ethical comp liability, ICT literacy and emotional intelligence. These skills can readily be developed through STEAM Education. The focus of STEAM education is on utilizing of Science, Technology, Engineering, the Arts and Mathematics as the pathway for guiding students learning through inquiry, dialogue, and critical thinking.

Employment refers to contract-based relationship between two parties that involve payment for work done by one the two parties referred to as the employee by the other referred to as the employer. The later may be a profit or non-profit making organisation, co-operative or any other entity. Usually the employee works for payment from the employer (Wikipedia.org, 2021).

There are different types of employment arrangements as listed below:

- Full-time - In this standard employment, employees work typically between 30 and 40 hours per week/ 130 hours per month and often enjoy some benefits.
- Non-standard forms of employment – this describes other forms of employment arrangements that differ from standard employment. International Labour Organisation (n.d.) listed examples to include; “temporary employment; part-time and on-call work; temporary agency work and other multiparty employment relationships; as well as disguised employment and dependent self-employment ” (OECD,2020 ,P.1)

There are several definitions of unemployment, however, it is commonly used to describe situations where employable individuals within the age 15 and 65 actively seek for work but are unable to secure any appropriate job. Individuals that are working in inappropriate job are also, considered to be unemployed. Similarly, individuals that are waiting to return to work after they have been discharged are considered to be unemployed. It is important to stress that employable individuals that have stopped seeking for job within the last four weeks for

whatever reasons such as retirement, pursuing additional qualification in educational institutions, ill-health and so forth are not considered to be unemployed (Corporate Finance Institute.com, 2019). In Nigeria, InvestAdvocate.com (2021), gave the official definition of unemployment as

“the proportion of those in the labour force (not in the entire economic active population, nor the entire Nigerian population) who were actively looking for work but could not find work for at least 20hours during the reference period to the total currently active (labour force) population”.

### **STEAM Education and Skill Acquisition**

STEAM is the acronym for Science, Technology, Engineering, Arts, and Mathematics; it is a holistic framework for teaching and learning of the aforementioned interrelated disciplines. It evolved from STEM, the acronym for Science, Technology, Engineering and Mathematics which focused primarily on scientific concepts. Whereas, the cornerstone of STEAM is to equip students at all level of education with knowledge and skills required for success in the 21<sup>st</sup> century workplace. Creativity, multiple inquiry and investigation processes connect Science, Technology, Engineering, Arts, and Mathematics together in an interwoven manner. STEAM is an attempt to stimulate a lifelong students’ affinity for these disciplines with the ultimate goal of preparing them for their future and society by equipping them with innovate in-demand skills. Riley (n.d) described STEAM as an educational approach to learning that utilizes Science, Technology, Engineering, Arts and Mathematics as access points for guiding students’ inquiry, dialogue, and critical thinking. The end results are producing students who participate in hands-on learning, demonstrate resilience in addressing problems. embrace collaboration, and work through the creative process. These are the innovators, educators, leaders, and learners of the 21<sup>st</sup> century (STEAM, An educational Approach, n.d)

STEAM emphasizes the need to examine the aforementioned discipline not as separate but as interdisciplinary fields. STEAM emphasizes the role of science, technology engineering, arts and mathematics in modern society, with the view to encouraging a better and wider mean of work diversification and employment generation for the populace. STEAM helps in relationship building, collaborative work, as well as in designing appropriate learning experience for quality education. Quality STEAM education is expected to be a means of job creation to job seekers and unemployed youth. This is because it is characterized with essential traits that encourage self- reliance. The holistic approach adopted in STEAM enables students to engage in analytical, methodical, artistic and creative thinking simultaneously as demanded in 21<sup>st</sup> century workplace. Herein lays the connection between STEAM education and employability (Lathan, n. d.; Thomas, 2020). In other words, STEM education equips students with employability skills discussed earlier in this paper.

The world educational system is aligned towards the actualization of Sustainable Development Goals (SDG). Countries of the world, developed or developing, are all striving towards the attainment of the goals. Nigeria, being a member of the United Nation cannot be left out of the strives for it to be at par with the global world. These goals otherwise known as global goals are 17 in number, with the fourth emphasizing on quality education. Boeren (2019) presented the roles of parent, school and country policies in ensuring quality education implementation. Some of which are that by 2030 every child should have access to early childhood and pre-primary education; equal, compulsory and completely free education at primary and secondary levels irrespective of their gender. The policies also expected all women to have equal right to reasonable and quality technical, vocational and tertiary education. It is also important that youth and adults acquire appropriate skills, knowledge and

attitude for employability and sustainable development among others. Preto- Jimenez et al. (2021) also emphasized the need for the realignment of educational roles and functions for easy attainment of sustainable development goal. Quality education is often of paramount importance to other SDGs.

Osman, *et al.* (2017) described the framework of quality education as a life course approach. The framework according to them is anticipated to help in producing wide range of fruitful learners, self-assured personalities and responsible citizens who are ready to sustain the core values and principles of commonwealth. The researchers stressed the fact that the quality and quantity of knowledge disseminated have impact on the educational system of a country, some of which are the labour market, economic growth and production of professionals in the key areas of sustainable development.

### **Towards Employment Generation: Running Ahead**

In breaking down the SDG4, part of the policy briefs is that by 2030, the number of youths and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship should have increased substantially. One of the major problems that have bedeviled Nigeria for decades is massive unemployment. The ripple effect of this problem is being felt in the state of security in Nigeria with its attendant worsening of the nation's economy. Lack of employment opportunities has led many youths into different types of crime, ranging from kidnapping to Internet fraud. It was one of the main reasons for the ENDSARS protest of the year 2020. Qualitative education goes a long way in ameliorating the economic and socio-political problems facing a nation. The world has come to realise that technical and vocational education is the key to economic development. This is the secret of the so called Asian tiger nations like China. China has developed her economy through an education system that is focused on science and technology, technical as well as vocational education. Providing this type of education within the framework of STEAM could change the story of any nation as exemplified by the huge success recorded by China.

Nigeria has attempted to transform its economy through the 6-3-3-4 education system. An important aim of the 6-3-3-4 education system was to provide vocational and technical education to secondary school students, such that upon graduation, they would have acquired vocational skills that could make them to become self-employed if they choose not to further their education. As lofty as the policy was, beyond the increase in the number of years spent in secondary schools, the policy was never seriously implemented. Government was unable to provide teachers for the technical and vocational subjects, and the equipment procured for those subject rot away in schools or were carted away by thieves.

A critical examination of the Nigeria education system would reveal that the country has been unable to provide quality STEM education for its populace and this is a major contributor to the dismal economic situation of the country as we have it today. The reasons are not far-fetched; government was unable to provide the required infrastructure, equipment and personnel required for the programme. Now that the world is navigating towards STEAM, a lot more is required. Providing STEM education within the context of STEAM will require additional infrastructure, resources and personnel. In the case of Nigeria, our problem goes beyond migrating from STEM to STEAM; our problem is first of all how to take care of the lapses in STEM for a smooth transition to STEAM. This is why it is important for us to 'run ahead'. In running ahead, the following actions must be taken:

1. Provide an appropriate framework for STEAM education in Nigeria
2. Effect appropriate curricular changes required for STEAM implementation
3. Provide appropriate infrastructural facilities required for STEAM implementation in schools.

4. Conduct training for teachers and officials of the Ministry of Education on STEAM
5. Employ teachers specifically for the purpose of STEAM implementation
6. Facilitate the production of books that reflect the spirit of STEAM
7. Collaborate with nations that are already ahead of us in STEAM education
8. Mass mobilisation

At the moment, no concrete steps have been taken by government on STEAM education. Government grapples with many challenges confronting the current school system; from dilapidated physical infrastructure to inadequate number of teachers. Education is not even given its proper place in budgeting. Implementing STEAM education will require additional funding, hence for Nigeria not to be left behind in the scheme of things there will be need to accord education a higher priority in budgeting. Government needs to engage the expertise of the citizenry, especially those in the education industry and significant other professionals to develop a framework for the implementation of STEAM in our education system. The framework will be the working guide for the implementation of the programme. It will provide details on the necessary restructuring that needs to be effected within the school system; the financing, the roles of different stakeholders (government, parents, students, NGOs) etc. It will derive from the standards set by the United Nations, and subjected to appropriate scrutiny to ensure it conforms to the aspirations of the Nigerian State.

The curriculum is the driving force of any education system. The adoption of STEAM into our education system will require curriculum change at the Basic and Senior Secondary education levels. It will involve a change or revision of the curriculum of the respective subjects currently being taught in those levels in a way and manner that teaches the respective subjects from the perspectives of others. For instance, some aspects of Fine Arts could be taught from the perspectives of Chemistry; in painting for instance. Coming up with the appropriate curriculum for STEAM is undoubtedly not going to be a cheap task; a lot of work will be required. The implication is that the development of the curriculum of the respective school subjects will involve the inputs of other curriculum experts other than the experts in the respective subjects. It means that an expert in Chemistry will be required to sit down with experts in Fine Arts to develop the secondary school curriculum for Fine Arts. The implication of this is that in the first instance, subject teachers and curriculum experts in science for example will have to identify the areas where the Arts could be of relevance in facilitating the teaching and learning of science such that when Artists are carried along in developing the science curriculum, they will be able to bring their knowledge to bear in fusing Artistic knowledge appropriately into various portions of the science curriculum.

The clamour for migrating from a STEM to a STEAM approach to learning is premised on the believe that approaching learning only from the perspectives of STEM is too narrow to give room for a worthwhile problem solving (Catterall, 2013). STEAM is believed to have the potential of bolstering educational performance, increasing innovative capacity, creating a skilled workforce and ultimately improving the economy (Betram, 2014). As pointed out by Yakman (2008), The Arts disciplines that should be brought into STEM to form STEAM include performance and music, visual art, language and the liberal arts like philosophy and sociology. Even though these disciplines are not completely isolated from STEM (at least, music and visual arts are still taught in some secondary schools), there will be need to expand the facilities for teaching these subjects to accommodate them within the framework of STEAM. Hence, expanding the school facilities to include an Arts theatre, visual arts and language laboratories should be envisioned. Provision should also be made for recurrent expenditure to cater for the recurrent needs that are normally associated with these subjects.

Teachers are the primary implementers of any education programme and if there is any change or transition from one system to another, the teachers have to be trained appropriately for them to fit into the new programme. Government will need to train teachers on STEAM

and the implications it has for their classroom practice and how it would impact on the overall tone of the school system. Workshops should be organized for teachers and they should be sponsored for these workshops. Experts on STEAM education should be invited from countries that have already migrated to STEAM, to train ministry officials and school principals on the concept of STEAM and how it is being implemented in countries that have already adopted it. These workshops could then be stepped down to school teachers and other stakeholders directly involved in STEAM implementation. There will equally be need for the teachers to be trained on how to adjust to the changes that STEAM could have brought into the curriculum of their respective subjects.

Effective implementation of STEAM will require more hands in the classroom. Government must be willing and prepared to employ more teachers not only to cater for the current deficiencies but to specifically cater for the needs of STEAM. A major problem of Nigerian schools is inadequate number of teachers even for subject like English language and Mathematics. Many Art subjects have not been taken seriously in terms of human and material resources. If the STEAM approach to learning will succeed, government will have to pay attention to human capacity required for it to thrive.

Textbooks are fundamental instructional materials; they play very significant role in the learning process. Quite often, textbooks are used to drive education programmes. As has been done for many programmes in the past, government, educational professional associations and private authors should collaborate to produce textbooks that will be compliant with the spirit of STEAM. Teachers' manuals, students' texts and workbooks should be authored as deemed appropriate. Government should subsidise the production of the textbooks as done before for programmes like the Universal Primary Education (UPE) when books were produced in large quantities and distributed to schools. In revising their books, authors should incorporate the STEAM ideology.

There is need to collaborate with countries that have gone STEAM full-fledged. Government should facilitate exchange programmes that will enable our experts to understudy the STEAM education programmes of our foreign friends, while some of them also come here to work within our education system for some time. Assistance in the areas of materials should be sought from buoyant nations and international aid agencies.

There is need to mobilise all Nigerians for the success of the programme. Appropriate government agencies under the Ministry of Information and Culture should collaborate with the Ministry of Education to organize enlightenment programmes as a way of sensitizing the generality of the people on the need for it and the inherent benefits for our country.

## **Conclusion**

In this paper, we have tried to establish the connection between SDG 4 (quality education) and employment generation through STEAM education, and expounded some steps that Nigeria has to take in running ahead to achieve the goals of SDG 4 through STEAM. The position of this paper is that for the goals of SDG 4 to transform into more and better employment opportunities for Nigerians, there is need for all stakeholders in the Nigerian economy to work together to ensure that necessary inputs and machineries are put in place in the education sector. The paper advocates for innovative quality control mechanism in the education system, curricula changes and stronger synergy between the work places and the education sector.

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