



Sustainable Development Challenges in Nigeria: The Role of Science Education

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Abstract

The school stands to be the foundation of every development in the 21st century of any nation. Nigeria got independence 59 years ago, and the issue of sustainable development is still elusive due to many challenges as a result of poor education, lack of good governance and corruption. The present thesis argues that the best way to achieve sustainable development is to pay attention to three critical areas. These are teacher and teacher education programme, developing the entrepreneurial skills of science students and lastly enhancing students' scientific literacy. The script asserted that present infrastructure in schools, governance and corrupt-laden society would not be ironclad for the three areas. The paper viewed that sustainable development depends on the school to produce creative youths who are employable through quality science teachers, sound entrepreneurial skills and high scientific literacy. The conclusion is that the nation should prioritize entrepreneurial skills and other employability skills in the science curriculum.

Keywords: Authentic learning; Entrepreneurial skills; Governance; Corruption; Scientific literacy.

1. Introduction

Nigeria got its independence 59 years ago: out of these years is only 20 years of democratically elected government rules. Given these years of independence, it is worrisome that the country is still struggling and remains among the developing nations amid abundant resources (natural and human). Shreds of evidence that the nation is struggling to develop are but not limited to poverty (Adejumo and Adejumo, 2014), insecurity (Obayori *et al.*, 2018), poor education (Aina *et al.*, 2017), corruption (Odo, 2015), poor infrastructure (Orji *et al.*, 2017), unemployment rate (Aina *et al.*, 2014), environmental degradation (Adebiyi *et al.*, 2017). It is a serious concern that despite all efforts made by the past and present governments, it is obvious the national development remain stunted.

Sustainable development has not been given a specific meaning, but the common viewpoint is that it is a development of the present without hampering future needs. Adejumo and Adejumo (2014), quoting the International Institute for Sustainable Development (IISD) say "it is meeting the present needs but not impeding the needs of future generation". Alamu (2017), perspective of sustainable development is parallel to IISD that it is meeting present needs and not hindering the ability of the future generation to meet theirs. Literature abounds on how to achieve sustainable development in Nigeria, which may not be disputed. However, this review is looking at education vis-à-vis science education.

Science education is the 'heart and engine' of development of any nation (National Research Council, 1996). Science education is relevant and critical in any sector of National development. It is, however worrisome, science education in Nigeria has been facing severe challenges since the nation got independence (Aina *et al.*, 2014). These challenges are but not limited to, lack of fund for research and teaching, poor pedagogy, inadequate qualified teachers, lack of modern-day teaching resources. These challenges have made sustainable development in the country unattainable to date.

2. Challenges to Sustainable Development in Nigeria

Throughout these years of independence, sustainable development has been elusive despite being the era of democratic rules. The problems have been slowing down the national economy and made the country to remain in the clusters of the developing nation. The three challenges the article is considering are poor education, bad governance and corruption.

The significance of education in sustainable development was highlighted by the UNESCO Education for Sustainable Development (UNDES) which considered education essential to the achievement of sustainable development worldwide (Mohanty and Dash, 2018). Education for Sustainable Development is necessary for moving sustainability forward, help to learn, continue after school and involvement in community life (Mckeown, 2005). The UNESCO looked at sustainable development in four areas, which are social, economic, political and environmental (UNESCO, 2018).

Nigeria education has been criticised for having failed in the four areas highlighted above and therefore, which is inimical to sustainable development. It should be the role of education to meet the needs of the citizens socially, economically, politically and protect the environment. Research studies indicate that Nigeria education has not been able to meet the needs of Nigerians in the areas mentioned above. The author survey of some schools in Nigeria in 2019 shows that the country has problems in the education sector. Some of the findings are significant to national development. The three challenges mentioned earlier, education, governance and corruption depend on each other proportionally. Bad governance produces corruption, and inadequate education is the result of corruption (Aina *et al.*, 2017).

3. Governance

Good governance is the key to sustainable development in any nation. Governance is how governments utilized power in the management and distribution of a country's social and economic resources (Ogundiya, 2010). The nation got independence in 1960 and has been ruled by the military up till 1999 when the country had the first democratically elected government. Several leaders who rule Nigeria have been queried of Nepotism, lack of vision, corruption, injustice and others. Governance is regarded as the use of State resources and power to achieve and enhance the citizen's well-being in a transparent way (Agbodike *et al.*, 2015). The case of Nigeria is that most leaders who have ruled since 1999 till date are not transparent. Many of these leaders are not committed to true nationhood because they allowed personal, tribal, religion and regional interest becloud the national vision (Odo, 2015).

Nigeria at 59 with abundant human and natural resources is still crawling despite all these vast endowments. The country is expected to promote democratic values such as public accountability, transparency, fiscal discipline and due process being under a democratic system of government. It is painful that the leaders who supposed to enforce these values have lost their credibility. Appointments in most government agencies and ministries are not by merit but based on whom you know, religion and ethnic background. The best candidates do not fill job vacancies. The most critical issue in Nigeria since 2015 till date is that the entire populace is polarized along the line of religion and ethnic frontiers. This is impacting the social and economic value of the country severely.

Insecurity is ravaging the nation; human and natural resources are being wasted daily. The government is overwhelmed with the security problem of the country. Ritual killing, Cybercrime, kidnapping, religious intolerance and various kind of insurgencies are multiplying daily. All these destroy the economy of the country. It is constitutionally right and mandatory for the government to provide security for the people living in the country. Environmental degradation is on the rise because of the vandalisation of petroleum pipelines, deforestation and bombing of religion centres. Otoghile *et al.* (2014), looked at the issue of governance as a factor contributing to the development of any nation in the globe. The poverty rate has reached an alarming level because of unemployment and underemployment in the nation.

The people resorted to different kind of methods of getting money to survive as the poverty rate increases. The forests are depleted of valuable trees by people engaging in charcoal production as a mean to survive. These people knew the adverse effect of deforestation but did not care because they need to survive when there is no government job. This is having a terrible effect on the Ozone layer, which in turn leads to global warming. Other people engage in illegal bunkering, which is dangerous to the environment because of oil spillage. Many communities in the eastern part of the country have been severely affected by this illegal activity while most of their lands and rivers are no longer fit for agriculture. The governance in Nigeria is weak and corrupt, leading to a high level of corruption in the country.

4. Corruption

Corruption has become ways of life in Nigeria. Corruption has pervaded all areas of an average Nigerians lives. The three arms of government are corrupt, lecturers and students are not left out; parents and family members are also captured in the corruption issue. The market men and women are included, the military, artisan, school administrators, religious leaders and even the traditional rulers are not excluded in corruption saga. Corruption has eaten deep into the National Assembly, and they are unable to use their power to ease the social and economic powers the Nigerian are facing (Adeosun, 2012). Judges who are supposed to be the defender of poor people and the hope of ordinary citizen are invested with corruption (Odisu, 2016). Belfut *et al.* (2014), have once attributed the underdevelopment in Nigeria to a high rate of corruption in the country. There have been cases of diversion of funds meant for the national, state and local projects to personal accounts. In some cases, corrupt government officials have made the recovery of such money herculean from the looters.

Hundreds and thousands of small and big companies have fold-up because of corruption. Corruption is not only on money issues: what about appointments? There are many Nigerians who are outstanding in their field of study but are not given jobs because of corruption. Many Nigerians professionals are doing well in other countries of the world because corruption pushed them out of the nation. The school system in Nigeria is failing because of corruption. Most Governing Councils in the Nigerian tertiary institutions are made of corrupt politicians who are not contributing anything meaningful to education but to fulfil quota system (Aina and Akintunde, 2013). These are people who make inappropriate appointments, awards questionable educational contracts. Some wealthy Nigeria ensures their children get admission into the University of their choice using money. They followed up these children to Universities and influenced their grades and eventually wangled their way to get employment of choice. It has been observed that many of these actions are affecting the economy and slow down the nation development. The corruption has severely damaged Nigeria education from past decades.

5. Education

Education is a tool for national development (Oyewole and Osalusi, 2016; Thom-otuya and Inko-tariah, 2016). The present standards of education whereby young people are not well educated are concerns for the future of the nation. It is equally worrisome that teachers in Nigeria are not performing to expectation (Oyewole and Osalusi, 2016). The human resources required to develop the nation are the product of education (Thom-otuya and Inko-tariah, 2016) where such are compromised as the case of Nigeria, it is apparent that the future is at stake. It is not hyperbolic to say the Nigeria education has lots of challenges impacting sustainable development adversely. Students are not willing to learn; teachers are not goaded to perform their roles; resources are not available for teaching, and the society is discouraging schooling. The worst is that the government is not sincere in funding education.

The Nigerian youths of today are not willing to learn again because society has misplaced their values for education: they valued wealth more than education. Unlike many countries like Finland, where the teacher commands respect from society: teachers in Nigeria are not valued and respected.

However, some teachers in Nigeria are not professionally and academically qualified for the job of teaching (Aina and Olanipekun, 2015). According to Zuzovsky (2009), teacher qualification is more than degree certificates: it is made up of seven indicators. Most of the Nigeria teachers are deficient of many of these indicators. It is a truism to say some teachers are not productive because of these seven constructs that make a whole-teacher. The seven indicators of a qualified teacher are formal education, the subject matter knowledge, pedagogical studies, duration of the preparation period, certification and licensing status, years of experience and professional development activities.

In the 21st century, it is odd for a teacher not to be vast in the use of technology for teaching. The truth is that most Nigerian teachers at all level of education are still struggling to incorporate technology into their teaching. The government may be trying to encourage the use of technology for teaching in schools, but most teachers are not ready to shift from the old ways of teaching. Most developed countries are savvy about technology. Thus, they are well developed.

The teacher education programme is appalling in Nigeria. The programme devoted much attention to the acquisition of content knowledge and little time to practicum. It thus implies little attention is given to the training of teacher in pedagogical knowledge. A country like Finland does not trifle with this area, and that explains the reason pedagogical knowledge of a candidate is assessed before giving a teaching appointment in that country. It is exasperating when a teacher training institution like a college of education spent less than six weeks for the teaching practice exercise, which should last for three months.

Funding for education in Nigeria is inadequate. The UNESCO stipulates years back that 26% of the total annual budget should be for education. This has not been implemented in Nigeria, which explains reason there is always a dearth of learning materials in schools, inadequate infrastructure and research-oriented learning in the tertiary institutions. The school buildings in most schools are dilapidated with old furniture resulting in students learning under the tree and on the bare floor in some part of the country because of lack of funds.

6. Achieving Sustainable Development in Nigeria Through Science Education

Given the discussions above, there could be various ways to achieve sustainable development despite these challenges. However, this thesis is looking at the perspective of science education to achieve sustainable development in Nigeria. Many developed countries had discovered the high potentials in science education and accorded it the desired position in their educational system (Gödek, 2004). The remaining part of this paper is devoted to the various ways science education could be harness to achieving sustainable development in Nigeria.

The script considered Teacher, Scientific literacy and Entrepreneurial skills critical to science education in achieving sustainable development in Nigeria. The paper discussed the three constructs and the significance of each to achieving sustainable development in Nigeria.

The teacher is critical to the quality of education in any nation (Babatunde and Braimoh, 2018). Any nation that trifles with teacher and teacher education will not have the desired developmental growth. It, therefore, implies that there cannot be any sustainable development without quality teachers in schools. Thus, the importance of quality teachers to teach science subjects in Nigerian schools should not be compromised. To teach science in the 21st century requires teachers that are well trained, vast in integrating technology to the teaching and capable of using research-based teaching strategies. The talk-and- chalk method of teaching is obsolete and cannot meet the needs for sustainable development. The government should ensure that all science teachers are giving an enabling environment to develop their skills in the pedagogy of science teaching.

The teacher should be able to integrate technology in science teaching to enhance sustainable development. A research study suggests that teachers are deficient in the use of technology in teaching (Hosseini and Kamal, 2013). According to Barisic *et al.* (2017), digital competencies should be considered in teacher education and the field of teacher professional development. Integrating information and communications technologies (ICT) in teaching and learning is a crucial fundamental issue in educational institutions of the world (Nordin *et al.*, 2013).

The science teachers in Nigeria are not motivated to give their best in the teaching profession because of poor welfare. The Finland teachers are well catered for by the government, making young graduates fascinated to teach in the country. The Nigeria government should have a change of orientation as regards teacher education and teacher's welfare. Funds should be available for all science teachers at all level for professional development. The working environment of any teacher must be such that motivates him/her to put in the best.

There are innovations in science teaching and learning every day around the globe that is essential for both the neophyte and experienced teachers. Teachers who are not able to travel outside Nigeria to attend a conference or

workshop should have ways of joining their counterparts in developed countries to collaborate. In this age of global connectivity science, teachers should be able to sit down at his office and collaborate with colleagues anywhere in the world through a webinar. Professionalism should be legislated in teaching to avoid the present scenario where teaching is for anyone either professionally qualified or not. Teaching science to produce graduates who are creative and scientifically literate is germane to sustainable development

7. Entrepreneurial Skills

Empirical studies show that entrepreneurship education is a tool for reducing the unemployment rate among youths in Nigeria (Araba, 2012). Venkataraman (2000) cited in Karimi *et al.* (2012), entrepreneurship is essential to the increase of economic efficiencies, market innovation, creation of new jobs and raising of employment level. According to Onuma (2016), the rate of youth unemployment in Nigeria is due to the lack of entrepreneurial skills of students. According to Martin and Iucu (2014), entrepreneurship education purpose is to develop entrepreneurial skills and attitudes of the students. Entrepreneurship education in Nigeria is to build in students skills for job creation. Teachers are critical to entrepreneurship education because they are the facilitators and multiplier of ideas who helps students to acquire the skills (García *et al.*, 2017). Entrepreneurship is a powerful instrument for creating jobs and enhances economic power in the labour market (Byun *et al.*, 2018). To help learners to develop skills, knowledge and attitudes required for achieving goals they set for themselves is the role of entrepreneurship education (Minna, 2018). Acquiring entrepreneurial skills require an effective teaching method, (García *et al.*, 2017).

Therefore, science teacher education and training must be prioritised among many social needs. It is vital to include entrepreneurship education in the science curriculum. Every science subject should have an entrepreneur as a topic of study to equip the students with the knowledge and the repertoire for job creation. Students will be creative if the knowledge of the entrepreneur is applied to most of the topics in science subjects. For instance, topics like saponification in chemistry, fishery in biology, electronics in physics and others. These are topics that if students are well trained, could make students become employers of labour and be self-sufficient in life. Today, many of these topics are thought with lecture method for the students to pass exams and earn certificates. Many are holding good certificates without requisite skills for job creation: the certificates are useless. That explains reason many of the graduates go into crime to survive when the certificate could not get the needed jobs. The 21st century is not for certificates but skills: let the nation go back to the science of skills, not certificates. There are growing global challenges today that require individual decision to tackle. Thus, there is a need for both the teachers and students to be scientifically literate.

8. Scientific Literacy

Scientific literacy is a concept that has no consensus meaning: however, the general view is that it helps the use of scientific knowledge to solve practical problems in society (Ogunkola, 2013). Scientific literacy allows students the use of scientific principles and processes to make personal decisions and take part in scientific discussions on issues affecting society (National Research Council, 1996). A high scientific literacy strengthens lots of the repertoires that people employ in day to day activities. These activities include but not limited to, solving problems creatively, thinking critically, working cooperatively in teams, using technology effectively, and valuing life-long learning (National Research Council, 1996).

A scientifically literate individual would not be easily indoctrinated or brainwashed as it happens among the insurgents in Nigeria. Many youths recruited to Boko Haram are brainwashed that western education is wrong. Similarly, the kidnapers, armed robbers, Cybercrime, popularly called Yahoo boys and ritual killer recruits new members by indoctrination. The future of the nation is at stake with these criminals increasing their member every day. The students learning of science by memorisation can never enhance scientific literacy. Science instruction should be by research-based strategies such as peer instruction (Aina, 2017a), peer instruction argumentative strategy (Aina, 2017b), dialogical argumentative model (Langenhoven, 2014), Brain-based learning (Aina and Ayodele, 2018), reciprocal-argumentative model and other. The science teacher should shift learning focus to developing students' critical thinking ability through which scientific literacy could be enhanced. According to Siarova *et al.* (2019), critical thinking is one significant component of scientific literacy, which is a vital repertoire to allow individuals to function as a responsible citizen in the present changing world.

9. Conclusion

Given the preceding, the critical position of quality teachers, the inclusion of entrepreneur in science curriculum and scientific literacy had been underscored in achieving sustainable development. Therefore, the Nigeria government should ensure adequate attention is given to the training and development of world-class science teachers in the nation. Only a few of the present Nigeria science teachers would be capable of enhancing entrepreneurial skills and scientific literacy in the science curriculum. It should be noted that entrepreneurial skills and scientific literacy could be antidotes to the three challenges earlier discussed in this paper. According to Udompong and Wongwanich (2014), UNESCO is of the view that the scientific literate people will reduce various challenges in society and also leads to sustainable development. A scientific literate individual would know that collecting money from politicians to compromise election results is inimical to the cooperate existence of the nation. Such an individual will know that a credible election will produce honest leaders for good governance and good education. A science graduate who is rich in entrepreneurial skills will not be involved in any illegal business to

degrade the environment. It is at this juncture that recommendations for achieving sustainable development in Nigeria become critical.

Recommendations

The paper suggests the following recommendations to achieve sustainable development in Nigeria through science education:

- The government should focus its attention on the training and development of science teachers.
- The government should make science teachers' welfare and other teachers a number one in all policies of education
- The teaching of science in primary and secondary schools should be exclusively for science education teachers.
- An entrepreneur should be made a topic in all science subjects to equip students the skills required for job creation.
- Teaching should not be for 'all-comers' but for only those who have a passion for it and trained to teach.
- Critical thinking and scientific literacy should be the focus of all science teachers instead of the grade.
- All government officials who study science-related courses should be mandated by law to attend higher education in Nigeria.

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