

Science And Technology Education: A Veritable Tool For Peace, Conflict Resolution And National Development

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Abstract: Many African countries are troubled with one form of conflict or the other resulting in national insecurity of all sorts. Nigeria, a typical African country, is a case in point. With the threats of Boko Haram, militancy and cession, all fueled by ignorance, mutual suspicion, lack of survival skills and hopelessness of the youths on one hand and on the other, repeated saga of bad governance, all have added up to make the people extremely poor and vulnerable. Consequently, there is no peace and security in the country. Many peace actions have already been taken by the government, private organizations and individuals. However, these actions are in the regular conflict resolution programs. This paper followed UNESCO's recommendation to adopt innovative actions exemplified in the engagement of science and technology education, and so focused attention on the youth of school age. The paper thus highlighted school related violence and conflicts that eventually escalate into national dimensions. The paper then discussed ways in which science and technology education could be harnessed to eradicate ignorance and establish youth empowerment strategies through curricula enrichments: These include outright debunking of falsehood and superstitions by scientific facts, holistic approach to the study of science as well as mandatory entrepreneurial school brands and compulsory school based environmental challenge resolution projects. It is hoped that such will disseminate scientific literacy beyond school borders leading to enlightened, positively engaged and consequently empowered youths and their communities. National security in all arrears, peace and development will be the eventual result.

Keywords: Conflict resolution, peace, science and technology education

I. Introduction

Many African countries, Nigeria inclusive, are at the verge of disintegration and collapse if nothing radically urgent is done to arrest the present state of insecurity and total lack of peace plaguing the continent. The youths are restive, leaders, whose minds seem to be 'carved in stone' and unchanging are isolated from the people, mutual suspicion and dereliction of labor and productivity have left their toll. Extreme poverty, insecurity and debased life are the consequences. Social institutions have weakened and are near collapse. Osuagwu (2007), stated that Governments in Africa seem to have lost sight of the only reasons for establishing the state: "To secure the wellbeing of the nationals. To acquire scientific (*and technological*) knowledge. (*And*) To promote national development Instead of pursuing these noble ideals, people in government and their allies - be they politicians, common criminals, dubious business men, traditional chieftains, civil servants or even religious leaders, see themselves as strong men and thus device all sorts of crude and antisocial strategies to maintain their strong holds. The youths are confused, visionless, hopeless, have even become vicious and self-destructive. The future is very bleak.

Taking an example from Nigeria, a West African country which gained independence from Britain in 1960 and in 1963 became a republic. The latest population census, conducted in 2006 puts the population of Nigeria at 120 million people, occupying approximately 923,768 square kilometers of land (Dike, 2015). This makes her the most populous black nation in the world. Approximately, out of every seven black men in the world, one is a Nigerian.

This makes Nigeria significantly influential in the continent. Whatever concerns Nigeria, therefore concerns not only African but the entire black race. Nigeria is blessed with good climatic conditions, mineral resources and good vegetation. However, successive governments have been battling to weld the various ethnic groups in the country together. Nigeria is largely an agrarian population, yet has to import most of her food, but thanks to the oil boom of the seventies, attention paid to food production has dwindled over the years and she is now a heavy debt nation. Babalola (2002) explained that the effect of this is that expenditure on social services, education not exempted, had sometime had to be curtailed.

Nigeria has good policy on education. According to the National Policy on Education with the five main focal points as, to create a society just and egalitarian, united strong and self-reliant, economically dynamic and strong, full of opportunities for all citizens. Judging Nigeria from her natural endowments, human and material, these goals are quite achievable.

Many Governments, past and present have struggled, through various programmes and visions to achieve these goals. The vision to make Nigeria one of the World's best 20 economics by the year 2020 and the various poverty alleviation programmes are just a few. The present focus of government on the flight against corruption, though not quite a development programme but a consciousness that will lead to sustainability of gains and set goals is highly welcome.

In spite of all these programmes, visions and national consciousness, yet Nigeria is faced with a growing challenge of peace and insecurity: Boko Haram extremism, Niger Delta Militancy. 'Winner takes it all' political extremism, cultism, bigotry, secessionist campaigns, have clearly polarized the country. Society is filled with fear stricken populace.

The authors of this article believe that it is time to have a closer look at the issues surrounding lack of peace, insecurity, extreme violence, the place of youth of school age and the role of science and technology education as tools in securing peace, progress and development for Nigeria and Africa in general. This belief is in line with UNESCO's conviction that science, culture, technology and communication education can be relied upon to contribute to eradication of terrorism (UNESCO, 2003).

Concept of Peace and Security

The Oxford Advanced Learners Dictionary defined peace as living without war or violence while security comprise of activities that prevent attack or guard peace. It is widely believed that ignorance, lack of survival skills of individuals and poor remunerations for good efforts and dignified labour threaten peace and security. Bad governance, emanating from mediocrity and criminality leave in its wake all issues that threaten peace and security, corruption and lack of vision are its hall marks. According to Okere (2014), security simply means being free from harm. It is the responsibility of the government to secure her territory – people and property. However, in most African countries, unfortunately, government is run by people who do not concern themselves with the affairs of the people. It has been observed for instance that, the problem with Nigeria is that political leaders appear to be more self-centered – they are corrupt and thus not making serious efforts to improve the people's socioeconomic conditions (Dike, Ekeh & Okpala, 2014). Incidentally, the notions of justice and equity are paramount in any endeavour to establish and sustain security.

While combating terrorism and other forms of insecurity and corruption through political muscle, dialogue and other initiatives are welcome. However, for the present, UNESCO thinks that innovative routes need to be explored. Chief among the innovative actions is the harnessing of humanity's repertoires of knowledge and skills inherent in science and technology education and the youth together with other educational programmes already developed to deal with intolerance, conflict resolution and peace creations (UNESCO, 2014). Science and technology education can provide the missing link of knowledge and skills to combat ignorance, suspicious lack of imitative and empowerments required for wealth creation, sustenance and virile leadership.

School Related Violence and Insecurity

While exploring ways of properly engaging science and technology education as veritable tools for peace, security and development among the youth of school age at all levels, this paper looks at school related violence among adolescents in schools. Part of school related violence noticed in higher institutions of learning already have their roots in secondary schools and sometimes, even in primary schools (Amadi, 2013). If science and technology education is to be used to instigate peace, procure security and empowerment, it has to be relevant at the level of students own experiences.

Cultism

Apart from natural aggression and bullying discernable in youths of school age, organized crimes, masterminded by cult groups which more often escalate into violent rival attacks, now define our school communities. These crimes and cult violence result in gun running, rape, robbery, kidnapping, coded communications, fetish and occult practices and other clandestine meetings among students. Cultism and cult practices create a general atmosphere of insecurity in our schools, student cult groups are often sponsored by deadly, well established parent bodies. These parent cult societies prey on the innocence, inquisitive and exploratory minds and agility of the youths whom they initiate.

Political Thuggery

Many young people of school age are often recruited as thugs by 'do or die politicians'. Many of these young people enlist into thuggery from school with the aim of making quick cash. With violence as their stock in trade, they master it by all means and acquire the necessary equipment for it. These students often return to school after the political battle must have been lost or won but never to be the same again. They finally become

terrors on campus, to school's internal and external communities. Violence escalates and peace diminishes rapidly.

Clannish Violence and the School

Some villages or towns engage in violent wars resulting from disputed boundaries, revenue allocations accruing from government or company's compensations or simply disagreement with government and her agencies. More often than not, young able bodied men, many of whom are of school age, are easily recruited into clan or village vanguards, trained and equipped. These intelligent, enterprising young men and women are often relied on to prepared the Improvised Explosive Devices (IED's) used in such wars. Due to the long drawn nature of these clashes, many students drop out of schools, school environment become charged with regular violent eruptions.

Armed Robbery

The most common and easily experienced outcome of all sorts of undue and early exposure of young people of school age to arms is armed robbery. Many students who possess arms use them on regular basis in armed robbery, there by creating tensed atmosphere of violence both on campus and the environs. Campus violence has really given law enforcement agents sleepless nights without an end in sight. There is need for peace to reign in the school environment for meaningful progress to be made. Apart from the efforts of organized security operatives charged with combating crime everywhere, the authors believe that sometime something radically different needs to be done to create alternative mind sets. Young minds trained and equipped to reject falsehood, investigate and rationally judge situations are urgently needed. Young men and women skilled enough to become solution, not confusion providers. This is where we think science that technology education properly packaged and strategically delivered is 'sine qua non'.

Economic Insecurity and Environmental Challenges

Poverty is the underlying factor in most cases of violence in Africa. Human life has been reduced to nothing by extreme poverty. Government seem not to care about the welfare of the people, this is especially so in notable African countries. The explanation for this could be the fact that Government revenue does not depend on the productivity of her people but, like Nigeria, Government derives more revenue from oil and her functionaries, therefore live in a world different from the rest of the people. The youth with bleak future, being principally unemployable, resort to crude violence, kidnapping, vandalism, armed robbery and blind politics as a way to make ends meet. Parents, and indeed, the children and their society pay dearly for it. The environment instigates and supports no productive efforts. There is total decay or completely non-existent infrastructure. Government schools are night mares – buildings without roofs and classrooms devoid of any form of furniture and teaching and learning materials. Students are exposed to a life of indecency and survival of the fittest. Stealing, brutality and bestiality are the best graduating skills of students. School environments inspire nothing in students but a sense of insecurity, violence, hopelessness and destruction.

II. Science And Technology Education For National Security And Development

Science and technology education is the driving force for every society, especially, as we face global social and economic insecurity. Science itself has helped man to understand his natural environment. It is the vehicle to inculcate scientific literacy and ultimate technological breakthrough. Science education involves teaching science to the youth in relation to their environment and for the improvement of their conditions of living. Science education is the only hope a country like Nigeria has of realizing its five educational goals for national development. Olorukooba (2007) opined that if the technological education for the 21st century for scientific literacy of our society has to be accomplished, then there is the need to promote effective teaching of STM subjects in the schools right from primary through secondary to tertiary levels. Many authors and science, technology, Engineering and Mathematics educations alike agree that part of the reason why a country like Nigeria may not attain her millennium Development Goals (MDG,s) are curriculum based. Adikwu (2008) explained that the problem with science education is a lack of good curriculum and therefore it must be developed. Another challenge has been identified as in the case of Nigeria, is the inability of science and technology education to take the lead in the achievement of the nation's millennium development goals due to poor entrepreneurial skill acquisition content. According to Egolum, "The place of skill acquisition as a factor of development of any nation can never be compromised. No matter the quantity and quality of the natural resources of any nation, there is still need for self-reliance of her citizenry (Egolum, 2013). This again points to the relevance of school science and technology education to everyday life of the youth. According to Egolum (2013) Science and technology education are not new in the school system of both of African countries and of the rest of the world but the practice and outcomes have always marked the difference in developing and developed countries.

III. Enlightenment And Empowerment Inputs From Science And Technology Education.

For Science and technology education to meaningfully contribute to sustainable peace and security among the populace, there has to be clearly stated, applicable steps to be followed. Science and technology are offered in schools through various subjects at various levels. The initiatives, innovations or actions must run through all the subjects at all levels. Authors of this paper believe that the following actions will meet the demands and expectations from science and technology education as vehicles of enlightenment leading to peace and security enhancements in our society:

1. Debunking Falsehood through Curriculum Enrichment.

UNESCO in addressing the issue of peace and security via the vehicles of science and technology education referred to the need for innovation if we are to respond effectively to new situations and this must be through curricula enrichments. Akinyemi (2007) already made reference to curricula enrichment as a daunting task and includes radical approaches to the development of all possible inputs into qualitative education programme. Scientists have been encouraged to respect ethical issues in pursuit of knowledge. The rigours that scientists have followed to come up with scientific knowledge and the value and applicability of such knowledge seem to have remained elitist. The authors of this paper advocate that scientific knowledge be popularized among the populace, by publishing them, through texts books and other media, teaching them in schools alongside existing falsehood they now replace. Every subject area in science has some discovered facts about aspects of the universe it deals with. These facts and their relationship in nature (Scientific knowledge) have hitherto remained on their own in test books, or as activities for students' explorations without any effort to use them to expose and combat existing preconceptions, superstitions, magical practices or witchcraft. An example will make this proposition clear: In the cultural belief of some tribes in Nigeria, a certain evil spirit may invade a marriage and be re-occurring in child births just to taunt the married couple, then it returns to the spirit world, leaving the young child dead each time. This spirit is called "Ogbanje" among the Igbos of Eastern Nigeria or "Abikun" among the "Yoruba's of Western Nigeria. This experience of repeated birth and death of the young evoke some culturally prescribed practices in seeking to evade or prevent this "wicked spirit" from punishing the unfortunate family. Some of the retributive responses include "butchering" the lifeless body of the infant before burial to forestall its repeated visits.

However, biological science teaches that marriage between individuals of 'AS' chromosome genotypes are very likely to have equal chances of giving births to normal ('AA' or 'AS') children and sickle cell ('SS') suffers. Many of these sickle cell suffers die young and such deaths may be repeated several times in a row. This scientific fact should be taught to students and written about in texts along with such falsehoods or superstitions they defeat or illuminate. In another example from chemistry: Among the Ibo's of Nigeria, if a woman discovers, by taking a lick off the spoon or her palm of the soup she is making, that it is over-salted. She may proceed to 'heal' the soup by taking some salt and pouring it into the fire place, directly under the cooking pot. In chemical knowledge, this is a matter of solubility and supersaturation of solutions. If the soup is already salty while on the fire, it will be worse on cooling down and sprinkling crystals of salt into the fireplace is a useless exercise. The fact of solubility and saturation of solutions by solutes should be used to debunk known falsehoods among the people

From physics, the facts of dispersal of light of different wave lengths (seen as light rays of various colours) in the rainbow. This fact of science easily demonstrable should be taught and published as a matter of curriculum prescription, alongside the falsehood that the rainbow is a giant snake with its head and tail in two large bodies of water. The present authors believe that if science curricula are enriched to include debunking falsehood, scientific knowledge will spread wider and falsehood will diminish.

Scientific knowledge has remained in conflict with traditional and unscientific belief systems and practices in the minds of school children. In order not to be ostracized from the societies of their people, they have learned to keep science within the boundaries of the classroom while their everyday lives are governed by falsehood that create conflicts and destroy peace. Such curricula enrichments and the corresponding textbooks will be carefully tailored to specific issues within a cultural area to make it meaningful.

2. Scientific and Technological Literacy through Non-Formal Ways.

A higher proportion of African population generally and that of the significant figures for the youths, are found in the non-formal settings – religious and worship places, markets, gatherings for rituals and rites, village meetings and so on. There should be conscious efforts made by the scientific community towards the dissemination of scientific and technological know-how. This will be much like Agricultural Extension Service Workers who go to farmers and bring them updates in knowledge and practice in their areas of endeavor. Developed nations gradually built a sub-structures firmly on science and technology and use it to define their national life as well as interpersonal discuss. The inability of a vast majority of individuals in a community to base their individual and collective decisions on dependable and defensible premises, will limit the extent they

will interact with the world outside their own. It has already been argued by Onwukwe (2007) that acquiring and continually spreading scientific literacy to all segments of our society with its consequential technological applications, will liberate our society from the shackles of under development.

The authors referred to above clearly identified such non-formal settings as women's "August Meetings" now very popular among the Ibos, church conventions or even specifically giving out invitations for gatherings at villages squares, town halls, and so on, for dissemination of scientific and technological knowledge and practices. By communicating scientific knowledge and the technological skills non-formally through adapted language media, Onwukwe and Ngozi – Olehi (2007) argue that so will the local language vocabulary expand. By so doing scientific and technological culture will gradually replace witch craft, magic and superstitions.

3. Advancing the Case of Science as an Interdisciplinary Subject.

In Nigeria science is taught briefly in primary schools as Basic Science which then breaks off into discernable boundaries in the upper schools. In upper secondary school, it is fully departmentalized into Physics, Chemistry and Biology as the main science subjects. The integrated or interdisciplinary approach is quickly dropped while natural issues presenting challenges in real life remain interwoven and intricate. While the disciplines and subject boundaries advance the course of science, the present authors are here advocating that "Integrated science" be allowed to be part of the senior secondary school curriculum. A student, whether pursuing a career in science and its related discipline or not should be made to offer it, just like mathematics. Examining bodies like the National Examination Council, NECO, should then be able to examine students on it. Such interdisciplinary science should be a compulsory admission requirement by Joint Matriculation Board, JAMB. All universities will be required to establish it as a general studies department for students who may not major in it. To communize science and technology as basis of standard practice, the educational programs of institutions of learning must be modified. The curriculum should be prescribed in such a way that it is investigative in nature, seeking answers to challenges and problems in a holistic approach. All communicators of science both in the formal or non-formal settings should be made to study such a 'discipline' at higher levels. The more native populations who see wholeness in nature as well as see it in subject offerings in schools and scientific literacy campaigns, a natural chord of harmony conflict will reduce.

IV. Building Functional Entrepreneurial Education Culture

The call to inculcate entrepreneurship into the curricula of most school subjects in Nigeria has long been made. Curriculum reforms have gone ahead to prescribe 'Trade subjects' as avenues to inculcate entrepreneurial skills to students yet many public schools are not offering these subjects. Schools have difficulties in offering entrepreneurial education to students due to lack of amenities and infrastructure such as workshops and basic tools. Despite these challenges, entrepreneurial skills acquisition through schools is a major step in breaking the cycle of poverty and unemployment that keep the youths, both while in school and out of school restless. The present authors are proposing a system of education in which each secondary school is identified with a particular Trade subject – Animal Husbandry, Dying and Bleaching, Catering and Craft Practices and so on. As much as possible, such schools can liaise with private entrepreneurs to build such entrepreneurship in the schools. With time, schools are encouraged to acquire brand names for their products. Schools will be expected to select such trade subject (s) that may not be hampered or limited by any amenity or infrastructure they lack. If this proposal is adopted and implemented all students graduating out of schools are already entrepreneurs of sorts. Poverty and ignorance, unemployment and allied conflicts would be resolved. The society will be the better for it. Economic security of the people will thus be building up.

V. Environmental Challenges And Technological Education

According to Wikipedia (2012), the free encyclopedia, environmental security is a threat to national security. Flagrant abuse, over exploitation and neglect of the Nigeria's physical environment has been on the increase. Major cities like Lagos, Warri, Port Harcourt, Abuja, and so on, have suffered much of environmental degradation over the years. Mega cities of other African countries are not left out. The case, though not as alarming as in mega cities, is not different in our rural communities. Refuse build up, the menace of Polythene materials that has rendered many farm lands unproductive and market squares unsightly, the blocked drainage ways, gullies, abandoned wreckages, to mention but a few.

This paper proposes that science and technology education, through projects, researches and field trips bring these issues to the attention of students within a locality where a particular environmental degradation is prominent. The curricula of science and technology education should be improved such that each graduating student at all levels of school does work on sustainability of the environment. The authors of this paper believe that this will help the youths to be more mindful of initiating actions that improve on the environment than that

of destroying it. If this is sustained, soon a national consciousness of sustainability of the environment and natural resources will build up.

VI. Conclusion

This paper agrees with many authors, social critiques, concerned peace imitators that Africa is largely unsafe, lacks peace and may collapse if no actions are taken. Nigeria as a typical but also influential African country presents a scenario for concern. While many peace building actions and conflict resolution strategies are going on as well as governments' battles against insurgency and organized crime are expected to improve, radical dimensions and innovations should also be explored: science and technology education has a role to pay through curricula enrichment and diversification. Through such avenues ignorance and falsehood are exposed, a culture of science and technology will permeate the populace through non-formal means, holistic view of science if propagated and entrepreneurial skills as well environmental challenges will be made part of the school life of the youths. Knowledge empowers and skills enrich the individual, a community and eventually the nation. A culture of building and preserving the environment rather than destroying it will be part of human culture.

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