

INTEGRATED SCIENCE EDUCATION: A VERITABLE TOOL FOR POWER AND EMPLOYMENT SKILLS ACQUISITION FOR CHANGING COMMUNITIES

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Abstract

It has dawned on us as a nation that we operate in a state of motion without any apparent movement. Recent statistics reveal that in spite of the fact that Nigeria being Africa's largest economy with GDP valued at an impressive over \$510 billion and ranked 26th largest globally, poverty levels in Nigeria are high, with nearly 100 million living on less than \$1 daily. Evidence from the Nigerian Bureau of Statistics (N.B.S) reveals too, that about 1.8 million graduates enter the labour market annually in the country, and have instead of bringing in the needed economic revival, increased the woes of the country. The country's woes till date, in respect of non-performance in economic growth have been irrevocably predicated on the western-type education bequeathed her by the colonial administration since 1842. The inherited structure, however, was deficient and defective in content and scope. This calls for a radical change to our education system. This paper thus discusses the need to adopt and adapt integrated science to our education system as a veritable tool to equip individual recipient to attain the power and employment opportunity for changing communities in Nigeria. It examined the introduction and quality of integrated science into our education system. The paper concluded that since the production of new generation of graduates who are equipped with scientific technology and entrepreneurial capabilities is an important responsibility, the government must show some level of good political will with a view to transforming our educational system. The paper recommends, to successfully pursue the expected goals, government must be responsive to its responsibilities, and other stakeholders in the sector

too must have a re-think in their approach towards educational matters in the country.

In 1963, President John Kennedy said, "Peace is a daily, a weekly, a monthly process, of gradually changing opinions, slowly eroding old barriers, quietly building new structures (Santrock, 2001:170). Taking a cue from the aforementioned, one might be tempted to juxtapose Nigeria's experience on the same pedestal, and infer that Nigeria as a nation, for the past one century and many decades ago, has had no absolute peace in spite of her being Africa's largest economy and ranked 26th largest globally, since poverty levels in the country are high. A hungry man, however, is an angry man. This same scenario is very evident in our polity till date. Evidence from the Nigerian, Bureau of Statistics (NBS) reveals that about 1.8 million graduates enter the labour market annually, and have instead of bringing in the needed economic revival, increased the woes of the country. Why is it so? According to a former Minister of Finance, Ngozi Okoji-Iweala, Nigerian graduates are unemployable and thus the high rate of unemployment among graduates roaming the streets in search of non-existent jobs. It was more worrisome in that they are dependent on their parents for the basic needs of life (The Guardian, March 17, 2016). The situation was very pathetic, and it behoves us therefore, to escape from the continued doldrums of non-performance in our economic growth index as a

nation which was predicated on the western-type education bequeathed her by the colonial administration since 1842. The plausible alternative is to adopt a radical approach to change the inherited educational system which is deficient and defective both in content and scope and not living up to its billing.

Nigeria, abinitio had established a broad-based system of training and/ or educating her citizens to enable them to realize their full potential, to contribute to the socio-economic growth and development of the nation and lead a personally fulfilling life before the advent of the colonial administration in 1842. The recipients of such training at the time, were believed to have had the kind of all-round education needed for the production of competent workforce relevant to the world of work that would function maximally in the society (Okoro, 2015). In corroboration, Fafunwa (2004) identified a few of the cardinal goals of pre-colonial education in Nigeria to include among others;

1. To develop the child's latent physical skills, intellectual skills and character;
2. To inculcate respect for elders and those in position of authority;
3. To acquire specific vocational training and to develop a healthy attitude towards honest labour; and
4. To understand, appreciate and promote the cultural heritage of the community at large. Unfortunately, the moment the interaction between us and the erstwhile colonial administration was perfected, the impact was great, it rather became a mismatch and a lacuna was created. Succinctly speaking, the kind of education offered by the missionary schools was highly lopsided, defective in its curriculum, which stressed more of theoretical knowledge at the expense of technical, vocational, science and technology education, and only catered for the training of teachers and pastors. In spite of that, the few Nigerian elite who were educated in the

system acquired a new but foreign culture, which in turn, modified their mode of life and consequently a new social class was created in Nigeria. Thus began the process of training the first group of Nigerian Manpower (Osuala, 1993). Most importantly, vocational and technical education, which was much more relevant to economic growth, was neglected. The envisioned manpower which emerged at the end of the nineteenth century when the European nation's economic and political activities had increased in Nigeria, was ill-equipped and inept to cope with the challenge of modern economic development, he further argued. The contact was actually an aberration, and had only succeeded at reframing the architectural educational chart of Nigeria in the negative perspective till date. It is more worrisome, when we recall that a few of the Nigerian elite charged with the responsibility to manage education matters in Nigeria were inept and bereft of the pre-requisite knowledge and had not divested themselves of the unavailing practice of using Europe as a model for developing Nigeria (Okoro, 2015).

Furthermore, the colonial administration in Nigeria never considered it worthy that we must be part of the global culture (i.e. become scientifically literate) not until 1859 (Seventeen years, after the advent of western education in Nigeria) when the first secondary school (CMS Grammar School, Lagos) was established. It was at the time, the first mention and teaching of formal science in any part of Nigerian Schools was heard of. Even at its inception and introduction, its teaching and learning remained a mere mirage. Again, in 1878 (Thirty-six years after the advent) the introduction of science into Nigeria Post-Primary institutions which provided courses up to O'level was achieved.

Nevertheless, it lacked the prerequisite scientific skills acquisition necessary for the recipient of such knowledge to become self-reliant enough and functional to make any rational judgment about his environment. In the prevailing circumstance, Nigeria is endowed with human and material resources needed to jumpstart its industrialization, yet the country is neither growing nor developing. Mere possession of natural and human resources is no longer the precondition for national growth and development. By implication human capital development is the only apt answer to that, which if well harnessed will contribute towards the economic development of the nation, and the individual persons in particular. Suffice it to say that the strength of any nation's economy is inextricably linked to the strength of its education system (Okoro, 2013). Be that as it may, Nigeria's ability to compete globally in the 21st century must begin each day in the classrooms. This could be feasible through the acquisition of scientific literacy by the citizens exposed to sound and quality education system. It is necessary to recall that the worth of a nation, in the long run, is the worth of the individuals composing it. Nigeria's education system must be both inclusive and integrative. An inclusive education is a prelude to globalization (Okoro, 2015). It is often said to be the prerequisite for quality manpower development in a changing community, and must be given serious priority attention. The object of education is to prepare the young ones to educate themselves as they grow. Ngwoke (2006:102) argued that "to be empowered aright the youth must be educated aright" because education is key to life and life existence. Nigeria as a changing community (nation) needs the education system that prepares her citizens for power and employment generation capacity that will help to engender the expected economic growth. It is on this premise that the Eastern Regional Government indigenous policy on education of 1963, captured and articulated by Cooney (1990) in Okoro (2015) is

being considered apt hereunder to rejuvenate the moribund state-of-the-art in the country thus;

Education policy to be serviceable and viable must be geared to the special needs and aims of a nation. We must now evolve a policy, a system which will produce men and women who will not be out of place in a technological age; a system which will ensure uniform standards; a system which will feed our industries with personnel without starving our schools, colleges, the church, and offices of such personnel; a system that will inculcate in our youths due respect for the land. In short system which will produce useful, self-confident and competent citizens.

The 1963 indigenous Eastern Regional Government Memorandum on Education became a beacon that has paved the way for subsequent re-engineering of sound, functional and enabling educational plans in Nigeria for Nigerians. The document patterned in consonance with the ideals, values and culture of Nigeria was adopted and adapted for the country as a working paper on education matters. The adoption of the blueprint was significant, a novel idea in the Nigeria context for solving her own educational challenges. Its vision was to prepare new generation of graduates who are equipped with scientific, technical and entrepreneurial capabilities to move the nation forward technically which is underpinned by economic growth and general wellbeing of the citizens.

In another development, to have a blueprint on education that has a national outlook and child-centred, the first ever "National Conference on Curriculum Development" initiated and organized entirely by Nigerians was held in Lagos from 8th - 12th September, 1969. According to Taiwo (1980)

in Okoro and Chigbo (2001), the 1969 conference entitled: “A philosophy for Nigeria Education”, reviewed among others, the obsolete goals of the imported educational system with a view to re-designing a new set of goals which are in tandem with the present needs and aspiration of the Nigeria society. In 1973 the modified edition of the 1969 document became the National Policy on Education (NPE) as we have it today. “It was first published in 1977 and revised in 1981, [1998, 2004 and the latest 2013] in a form which articulates the country’s plan to use education as an instrument for transforming Nigeria into a self-reliant and technologically developed nation” (Ohuche, Nzewi and Nwachukwu, 1988) in (Okoro and Chigbo, 2001) (Okoro, 2014). One of the developed systems is the 6:3:3:4 education system. The 6:3:3:4 system structure replaced the five year structure, and fully came into operation in the country in September 1982.

By and large, the system was adjudged apt for the country to enable her assume its desired vantage position in the modern development in science education. The hallmark of it all, was to ensure that the adoption of integrated science to our education system as a veritable tool will equip individual recipients with the pre-requisite skills for power and employment generating capacities for changing communities. Community is an organized political or social body; a body of people in the same locality; the general public, society; any group having work, interests etc in common, dependent on each other for life and survival (Geddes and Grosset, 2010). The paper examined the introduction and qualities of integrated science into our education system. It highlights the production of new generation of graduates equipped with scientific, technical and entrepreneurial capabilities as important responsibilities for wealth creation, that government must show some level of political will to ensure success. The paper also recommends that government and other

stakeholders in the sector must be responsive to their responsibilities to ensure success in educational matters in the country.

Integrated Science

The word science is derived from the Latin word *Scire*, meaning “to know”. According to Okeke (2007:3), Science “is the systematic investigation of nature with a view to understanding and harnessing them to serve human needs”. Science is par excellence, a potent master key to human development and progress. It is one of the most human aspirations and expectations, a necessary ingredient for both mankind and a country’s socio-economic development. Balogun, in (UNESCO, 1995) averred that a good science education should enable us to develop science process skills, and understand the conceptual structures of science as well as how science and technology affect human beings and society.

Integrated science, in other words is a course of study whose concept was conceived as far back as 1957, which usually serves a general education function and /or purpose. It is a course of study, an off-shoot of the 1969, “National Conference on Curriculum Development”, designed and introduced into Nigeria schools to begin to teach the pupils what science is and how a scientist works. Its inclusion in the core-curriculum at the Jss I-III levels is an innovation, nascent and being one of the most recent and current integrative approach to the teaching and learning of the distinct science courses in Nigerian secondary school system. The idea was to inculcate in the students a seamless transition of scientific knowledge in their study of the basic sciences at their later part in our secondary education system, and for the acquisition of sound scientific skills for tackling some of the societal challenges. This of course calls for a major restructuring and up-grading of the educational system, which is an absolute necessity.

Integrated Science Education: A Veritable Tool for Power and Employment Skills Acquisition for Changing Communities

Thus, the curricula for science education should therefore, be restructured to focus more on the production of new generation of graduates who are equipped with scientific, technological and entrepreneurial capabilities” (Ali, 1998). No wonder the Federal Government in realization of the envisioned benefits thereof, of the new approach, and to redress the unsavory situation of the education system in the country, had to adopt a ‘core-content’ of integrated science curriculum wholesale. To give it the deserved political will, the Federal Government had in the National policy on Education (F.M.E. 2004:35) declared its intention that henceforth, in the JSS system of secondary education, “Science and Technology shall continue to be taught in an integrated manner in the school to promote in the students, the appreciation of the practical application of basic ideas” of science education. Science and technology have been described as the primary drivers of progress of nations, and have constituted veritable instruments that make material and human development march forward. The impact of the inherited education system was nothing to write home about, for instance not until 1946 that the conscious planning of a system of technical education in Nigeria started, when it was given a major place in the Ten-Year Plans for Development and Welfare. Before this date (104 years of contact), the colonial government’s attitude was that provision of technical education for Nigerians beyond very limited artisan training for Governmental departments was neither necessary nor feasible (Osuala, 1993).

Understandably, the introduction of integrated science core-content curriculum to our education system becomes imperative. As to buttress the aforesaid, Okeke (2007) argued that what divides the world today into “developed” and “developing” countries is the level of science and technology development therein. And that rapid and sustainable development of any country can only be achieved through scientific research,

rational applications of science and technology knowledge and skills. Integrated science education: a veritable tool for power and employment skills acquisition for changing communities will be very apt for Nigeria, a developing/changing country, if only its tenets are holistically implemented. Certainly as a sound mind trainer, it has some in-built practical values which assist individual recipients who are exposed to its study to acquire the scientific knowledge, sine qua non for development in all aspects of life and in ones profession.

In view of the concept of the philosophy and objectives of integrated science with emphasis on the fundamental unity of science, the quality of its introduction at the Jss level would among other things lay adequate foundations for scientific and reflective thinking in students of the contemporary society of our modern technology. “On account of its comprehensive nature, it will help to foster creativity in children and nurture same progressively in later years. It will help to improve the quality of life in Nigeria (Okafor, 1988). In a nutshell it is poised to produce self-motivating manpower equipped with functional skills that will invariably engender in the recipient with the necessary employability and job creation skills.

Education, Power and Employment for Changing Communities

The inestimable value of education as the mother of all professions, and the bedrock of the socio-economic development of any nation is not in doubt. It remains the most powerful weapon applied in changing the society for the better. The Federal Republic of Nigeria, in the 4th edition of the National Policy on Education (2004), stipulates vividly that education is an instrument for national development, and must be relevant to the needs of the individual and those of the society, in

consonance with the realities of our environment and the modern world. For Ali (2006:413), “education is a structured and organized human development system or tool for inculcating knowledge, skills, attitudes and behaviours in someone with the intention of making himself actualized and socio-economically independent”. Self-actualization is the hallmark of a quality and functional education. Thus, Akpan (2008), posits that international competitiveness is increasingly being defined in terms of ability to access, learn, adapt, utilize and innovate from available technology. To achieve this feat, the education system in question should be designed to be all inclusive shall be both pre-vocational and academic. It is in this vein that Sharma (2010) opined that this is achieved by securing a broader and more balanced curriculum for all citizens so that they can develop the qualities and skills required for adult life and work in a technological age, encouraging schools to be more responsive to the needs of multi-ethnic society dynamism. Nigeria in her wisdom, and desirous to achieve relevance and gain a competitive edge in the 21st Century market economy, adopted and adapted the core-content curriculum of integrated science that is both pre-vocational and academic. This of course prepares the child (individual) to be self-reliant and lifts him out of poverty syndrome in later life. The resultant effect is the production of crop of new generation of graduates equipped with scientific, technical and entrepreneurial capabilities as important responsibilities for wealth creation. It therefore fosters individual capabilities, national growth and advancement. Education is a provider of services, and the quality of the service is determined both by the person delivering and the person receiving the service. The satisfaction of students, their parents, their future employers, and so forth are dependent on the type of education that has been provided.

Although every power belongs to God! But in the context of our discourse, education an instrument “par excellence” inculcates in an

individual the power and /or ability of being resourceful and skilled in a particular trade. It repositions the individual to acquire the requisite skills to enable him to live out his potential and lead a personally fulfilling life. Since the learning needs of all youths and adults should be met through access to appropriate learning and life skills programmes, and integrated science is poised to achieve thereof, the linkage, therefore between it (education), power and employment for changing communities must be strengthened and broadened for optimum output. The political will needed from the government is to create an enabling environment that will guarantee a holistic implementation of the core-content curriculum of the designed educational system. From the foregoing discourse, it denotes that education is a dynamic force which influences the mental, physical, emotional, social and ethical development of the individual. It connotes too that education is the process by which positive experience is gained, not just about making a living but also about making a life. It emphasizes both intellectual and practical education that makes an individual becomes a productive member of the society. Hence the three variables education, power and employment which are more or less in a seamless harmony, must be synergized for maximum productive output for changing communities.

Factors Militating against Skills Acquisition for Power and Employment for Changing Communities using Integrated Science as a Veritable Tool

1. One of the major factors that militate against the smooth execution of the educational programme is policy summersaults. It is always difficult to define what policies we are implementing at any point in time in this country. The perfection of any policy is achieved only if

it is being translated into practice to give the desired utility. But in most cases, you will discover that when a policy is being formulated, before it gets to the level of implementation, a new policy is already emerging;

2. There are some structural problems. Many of the ministers that utilize science and technology like agriculture, communications technology, etc do not seem to know how they relate with science and technology;
3. The government has not been able to commit enough resources to implement policies to the letter and see to its effectiveness and limitations (The Guardian, February 27, 2014 pp. 38,49)
Obanya (2004) in Okoro (2014:247) to corroborate this, argued that the overall climate of political instability led to lack of continuity in educational policies and projects, including frequent changes in education sector personnel, as each new regime chose its new set of ministers, advisors, technocrats, and administrators, and as each new regime sought to re-invent the wheel by pretending to start from zero. With these prevailing uncertainties, we might continue to operate in a state of motion without any meaningful movement with respect to changing communities.

Conclusion

The introduction and adoption of the core-content integrated science curriculum to our education system was to redress the unsavory aspects found in the inherited education system. The Federal Government to inculcate in the students a seamless transition of scientific knowledge in their study of the basic sciences at their later part in schools for the acquisition of sound scientific skills for tackling some of the societal challenges; declared in the National Policy on Education (FME, 2004:35), that “Science and Technology shall continue to be

taught in an integrated manner in the schools to promote, in the students, the appreciation of the practical application of basic ideas” of science education. Policy Summersaults, Structural problems, climate of political instability among others were identified as major constraints to the holistic implementation of integrated science education as a veritable tool for power and employment skills acquisition for changing communities.

Recommendations

For the successful implementation of the core-content integrated science curriculum, to be able to lay adequate foundations for scientific, critical and reflective thinking in students of the contemporary society of our modern technology, the government and other stakeholders in the sector have to be responsive to their responsibilities. The underfunding of education in Nigeria negates its expectation. There must be a re-think and modification of attitude, collectively and individually towards the issue that concerns education in the country, to achieve the desired goals. More importantly, it is high time we divested ourselves of the unavailing practice of using Europe as a model for developing Nigeria and disabuse our minds of the white man’s ethos, for we cannot become what we need to be, by remaining what we are. Darwin once said, “It is not the most intelligent or strongest species that survives but the one that is responsive to change”. This is the time!

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