REPOSITIONING THE RELEVANCE AND FUNCTIONALITY OF SCIENCE IN CONTEMPORARY NIGERIA

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Abstract

This paper discusses repositioning the relevance and functionality in contemporary Nigeria. The paper assumes that there are misconceptions of science and lack of scientific literacy. It believes that science is as old as man and that our indigenous science and ingenuity which could have formed good starting points for relevant and functional science have been neglected. The paper holds that the science we learn and practice in Nigeria today is theoretical and abstract and thus non-functional and irrelevant. It examines factors militating against relevance and functionality of science and proffers the way forward for reposition relevance and functionality of science

Introduction

Science could be said to be as old as man itself. Man in his history of existence has always strived to analyze, understand, explain and interpret natural phenomena to solve numerous problems and conditions posed by nature. He has also continuously and relentlessly engaged in one form of activities or the other, (which could best be referred to as scientific activities and as well accumulating knowledge). In other to solve these problems for better conditions for living for himself and other useful living things around him. Such activities have gone through various stages of modifications and refinement as man advanced from one age to the other. The science of one age has often become the non sense of the next, hence one can talk of ancient and modern science. At whatever age, whether it is the age of anonymous science-stone age or the era of supersonic aircraft, micro-computer and space shuttle, one fundamental concern has been the relevance and functionality of such science. It is the science that has always provided acceptable solutions to man's problems and needs and making him better than he has been previously found. This is the type of science that will attract his attention and sustain his interest

The questions therefore remain: What kind of science do we emphasize in Nigeria? Is it relevant and functional? What is our focus? Have we lost our focus? What role is science supposed to play? Is it playing that role? The paper therefore attempts to examine all these myriads of questions vis-a-vis repositioning the relevance and functionality of science in Nigeria, which supposedly has been jolted out of position. It posits also bow relevance and functionality of science/science education can be enhanced.

What is Science?

What is this thing called 'science'? A concise and precise definition of science has become increasingly difficult. Science means different things to different people depending on how the word is used, explained or portrayed. To some outside the field of science and science related-discipline, science is something abstract and far-removed from day to day existence of human beings (STAN, 1988). This seems a very naive idea as the process of human existence is in itself scientific. "To some others, it is a virile instrument of technological and economic development" (STAN, 1988). It is a lopsided view as science is not only a moans to an end or machinery but also an end in itself. Those with faint idea see science as a body of accumulated facts (STAN 1988). This has excluded the process of accumulating such knowledge.

Science means more than all these. Nevertheless Emovon (3983), Ogunniyi (1984), STAN (1988) have defined or viewed it perhaps from different perspectives but their views or definition seem to be relevant to the purpose of this discourse. In all supposed divergent approaches to the explanation of the concept of science, there seems to be however, a consensus that science has three attributes: processes, products and attitudes.

According to Emovon (1983), "science constitutes the axle on which the development and progress of both' the individual and the nation depend". He was of the opinion that science could be destructively or constructively used. It is indispensable. It is either we swim with it or sink without it.

"Science is an attempt by human beings to organize the experiences about nature into meaningful systems of explanation" (and useful operations Oguniyi; 1984). More or less, it constitutes how we react or adjust to our environment, its factors putting them to man's advantage and use. STAN (1988) viewed science in six perspectives as body of knowledge about our universe, a method or means of obtaining knowledge; aspect of human activity executed by scientists, a part of man's culture and as a social institution. This view took cognizance of every aspect of man's existence and operations. Science is therefore everything about man and what man does.

There is no doubt that science enjoys a pride of place in Nigeria including our school curriculum. This is probably due to the recognition of the contributions of science. It is this recognition that have constrained the federal government of Nigeria to make a far reaching proclamation about science at all levels of the nations formal educational system (NPE, 1998)

Concept of Relevance and Functionality

Relevance and functionality are two fundamental issues in any enterprise. In order to benefit maximally and optimally due consideration must be given to these issues. Relevance, a noun from the word relevant, according to advance learners dictionary of contemporary English is being "connected with what is happening'[1] while functionality, a word from functional which means "having, designed to have" or serve practical purposes. The science that does not connect or concern itself with contemporary community issues such- as poverty, disease, unemployment, hunger, culturally appropriate technology, over population, etc. cannot be relevant as well as functional. A science that "evokes diverse view points, present competing interpretations of data and offer choices among possible actions" a science that encourages high levels of scientific and technological literacy and capacity and is thus essential in the development of self-sufficiency (Abdallah; 2005), that is the idea of relevance and functionality of science. One would like to ask if this is the type of science, we are emphasizing or something else. Are we blinded with the concern of passing examinations and fulfilling admission requirements as well as providing the civil service with a ready source of manpower to the actual reasons why we engage in science? If the science we learn in schools is not meaningful and practicable to the learners then it will not be optimally relevant and functional.

National Philosophy/Coal of Science

One of the five main goals of Nigeria is the building of a united and strong and self reliant nation and it believes there is need for functional education for the promotion of a progressive, united Nigeria (FGN, .1998). To this end, school programmes should be relevant, practical and comprehensive. The nation education goals derivable form the national philosophy also include among others:

- The (raining of the mind in the understanding of the world around and
- The acquisitions of appropriate skills and the development of mental, physical and social competences as equipment for the individuals to live in and contribute to the development of his society.

The provisions of these policy statements are both inadequate in terms of "specifics and focus for proper guide and orientation of planning and implementation of science and technology" (Baike; 2000). In essence, relevance and functionality cannot be guaranteed in "a manner that will be society friendly in tackling human developmental problems". In pursuant of relevant and functional science especially in developing countries like Nigeria, efforts are being made by the various stake holders towards achieving not only scientific literacy but acquisition as well as of the underlying scientific and technological culture. Unfortunately, there are problems that pose formidable constraints to the relevance and functionality of science.

Factors Militating Against Relevance and Functionality of Science

The problem standing on our way towards relevant and functional science in Nigeria are many and differ in their nature, some of such problem include among others.

Curriculum Issues

The realization/recognition of the enormous contributions of science to the nation's economic and technological advancement has earned science a pride of place in our school curriculum.

However, the relevance and functionally of this science have been hampered by the concept of intended and implemented curricula (Eniayeju, 1997). He contended that there are disparities between the two. In his opinion, the contents of the intended curriculum are relevant and functional using the Tyler or Johnson parameter of curriculum development. The implementation is poorly done and grossly inadequate. The implementers depend on textbooks that do not properly define the scope of the subject matter with poor sequence for instruction laid out. Inappropriately targeted curriculum frustrate learners, increase failure and inability to reinforce the development of problem solving skills and critical thinking which are akin to relevance and functionality of science.

Antecedent of History

Science was introduced to our schools very likely by our colonial masters and missionaries for obvious reasons. Their interest was essentially trade and religion which were not the same need for the development of science and the nation. Also there was this erroneous belief that Africans were inferior human beings and as such not capable of understanding (modern) science. As a result science teaching lacked coordination and focus from inception. Alonge (1-983) cited in Baike (2000) observed that "having separated science from technology, limited questions were asked concerning science" which were not related to problems associated with real life situations. Thus, foundation for relevant and functional was not laid. Unfortunately, it seems that the same trend has continued with those at the helm of affairs today.

Non Recognition of Indigenous Science/Ingenuity Among Local Scientists

Before the introduction of the "modern science" by the colonial masters in our school. Science/science activities have been in place. The scientific laws, principles and theories have been in use but not in the form these are presented in modern science e.g. the traditional smelting of iron, the manufacture of local dyes, production of salt and local manufacture of wine to mention a few. Although the local science would be very 'crude' there, was no concerted effort to begin from what the people already know and acquainted with, before something more sophisticated. This is a singular factor that facilitates the development of conceptual understanding and meta-cognitive capabilities.

The non recognition/appreciation of indigenous science/ ingenuity and integrating them in order to explain the principles, facts; laws and theories have robbed the Nigeria people the relevance and functionality of modem science. A case in point is the story of Mohammed Bah Abba of Jigawa state who in 2004 discovered a system of cooling household foodstuff. The full story is in Box 1

Box 1 - community science and technology

Mohammed Bah Abba. Food Cooling System

In rural northern Nigeria, there are no refrigerators. Most people do not even have electricity. So perishable food must be eaten immediately. Or it will go wasted Mohammed Bah Abba a local teacher, has developed an ingenuous solution the pot-in-pot preservation cooling system. A small earthenware pot is placed inside a larger one and the space between the two is filled with moist sand. The inner pot is filled with fruit. Vegetables or soft drinks, a wet cloth covers the whole thing. As water in the sand evaporates through the surface of the outer pot. It corners heat drawing it away from the inner core eggplants stay fresh for 27 dates. Instead of the usual three tomatoes and papers last for up to three weeks. A recipient of the Rolex award for enterprise. Abba, 37, who hails from a family of pot makers, is using his $75.000 award (o make the invention available throughout Nigeria. He has already sold 12.000. Mohammed Bah Abba won a Rolex award not simply because he designed the pot-in-pot. He overcame obstacles to produce and distribute it, and ensured that the people who need it could buy it for an affordable price.

http:/www.time.com/time/2001/investions/basic/input.html

There are many such discoveries undocumented in this country, which should be seen as relevant and functional science i.e. using materials around us and applying modern scientific laws,

principles and theories. (Note: Rolex Award for Enterprise is foreign based. No recognition or commendation from within Nigeria).

Scientific Literacy/Culture

Shamos (1995) outlined scientific literacy to mean

a) Having an awareness of how the science/technology enterprise works.
b) Having the public feel comfortable with knowing what science is about; even though it may not know much about science.
c) Having the public understand what can be expected from science.
d) Knowing how public opinion can best be heard in respect to the enterprise.

Urevbu (1990) assets that if the citizens of a country are literate scientifically, it makes them less at the mercy of their environment. In this age of rapid technological development, scientific literacy is a must for those who deal with agriculture, family planning, health, nutrition and sanitation etc. (STAN; 1988). Are Nigerians scientifically literate? A survey carried out showed that Nigerians including researches are more on what science and how science but not why science. (Urevbu; 1990) and findings from researches revealed that great percentage of Nigerians are scientifically illiterates. This will in no doubt portend danger for relevance and functionality of science.

The Examination System

Our education system is very much examination oriented. That is, there is much emphasis on passing examination, which is most of the time theoretical. Teachers are continually underpressure to cover the generally content-heavy syllabus and prepare students "adequately" to pass the examinations, often within limited time frame. Most often, the examinations are concentrated towards eliciting mastery of content, which are done by mere recall of facts. This breeds neglect on the development of problem solving skills and functionality of whatever knowledge acquired. No relevant science is learnt except textbooks science, which is often forgotten after passing the examinations.

Language of Communications

In Nigeria. English language is the lingua franca and also medium of instruction. Scientific ideas and concepts are expressed, explained and communicated in English language. Textbooks and formal instructions in the class or in the laboratory are in English language. Jegede (1982) in Baike (2000) showed that students experience difficulties in comprehending textbook materials. Lack of understanding of English language will result into half or near lack of understanding, developing misconceptions which lead to the science knowledge acquired being not relevant and functional.

Enhancing the Relevance and Functionality of Science

From the foregoing, it could be seen that the science we learn and practice both in our schools and society has not been properly positioned as to bring about relevance and functionality. There is need to make a shift to an equilibrium position. This calls for action for implementations. The following need to be done and urgently too.

- The curriculum: recruitment, training and retraining of teachers.

The implicit and mistaken assumption that the teachers whom the science curriculum is handed over will automatically implement should be discarded. The gap between the intended curriculum and the implemented curriculum should be removed or at least narrowed. This calls for concerted efforts in recruiting the right caliber of teachers. A situation where teaching at various levels has been reduced to 'all comers affair[1] should be highly discouraged and stopped. The Teachers Registration Council, institutions and other relevant authorities should endeavor to implement all the necessary regulations and laws concerning teaching as a profession without further delay. Every quack should be shown the way out. Teaching field should cease to be a dumping ground. Only professionally qualified, tested and certified should be recruited into our school system. Those already in should be made to fit in or risk being' flushed out.

People who cannot be gainfully employed elsewhere should not be allowed to come into teaching profession. The pre-service teacher should thoroughly be exposed to conceptual change pedagogy, philosophy of science, science and society, improvisation of simple, yet essential equipment of teaching and learning science. Retraining of teachers via conferences and seminars should be emphasized and sponsored by those concerned. All the above among others will equip the

teacher to leach science for relevance and functionality.

Curriculum and Textbook

The content of our curriculum should be decreased as they contain much concepts and facts whose examples are foreign. The doctrine of ethno-science should be included. Not every textbook should be allowed to be in circulation. Standard should be set for textbook authors and the books should be approved for use both in schools and wider society by those meant for that e.g. STAN.

Policy Makers

The historical mistake of not laying concrete and functional foundations for science in our schools and society should be corrected furthermore, such mistakes should not for any reason be allowed to occur again. Such foundation should not be only laid but maintained at all times. Proper monitoring machinery should be in place to ensure that policies about science are properly and religious implemented to the latter. Our policy makers should be scientist or at least scientifically literate,

Recognition of Indigenous Science/Ingenuity

The clamor for the transfer for scientific and technological know-how of the western world is empty in itself. The indigenous science and ingenuity should be encouraged, developed, integrated and improved upon. The teaching and learning of science in schools should not be based on foreign examples, theories, laws and principles of science should be illustrated and demonstrated with things in our environment e.g. Mohammed Bah Abba food cooling system.

Scientific Literacy

The need and importance of this has already been highlighted. The world conference on education for all (Jomtien 1990) conference on project 2000 recognized that the strengthening of scientific and technological literacy and capacity is essential in development of self sufficiency. Abdallah (2005) is of the opinion that scientific enterprise is something that is around us" the following strategies are suggested to enhance science and technology in other to make it relevant/for the adults.

- Public adult education institutions should offer more refresher courses related to science literacy.
- Adult education courses organized in the private sector should include courses in scientific literacy.
- The media TV in particular should focus on the task of familiarizing a large audience with science literary programmes especially bothering on community issues

Most of the measures already discussed will enhance scientifically at other levels especially at the formal education level.

Mode of Examinations

To enhance relevance and functionality, examination bodies and all that are concerned with assessment should structure their question in a fashion that will cover the various levels of cognitive levels from relatively low to higher levels. Since teachers tend to teach and students tend to learn the way students are assessed, relevance and functionality will be unconsciously and naturally reflected and enhance.

Language Bottleneck

Ihuarulam (2005) noted that many researchers have long identified one of the most significant factors for poor learning of science, which could lead to irrelevance and non-functionality. This is the language based handicaps in science. These are of two types. Firstly is lack of proficiency in English language. This has serious effects on the ability of students to read, understand, think and comprehend instructions in science as science is taught and learnt in English in Nigeria. Secondly is that the

students are deficient in the language of science i.e. the scientific 'jargons' (terminologies). Language of science presents difficulties from two perspectives- unfamiliar technical words and misconceptions.

He suggests the following as remedies to curb the language bottleneck and make science relevant and functional.

i. To establish National Science Language Project (NLSP) that will:
   - Standardize and translate scientific terminologies into Nigerian languages.
   - Translate existing popular science books into Nigerian languages.
   - Write and produce new .textbooks and other instructional materials in Nigerian languages studied in various institutions of higher learning in Nigeria.

ii. Introduce a course in Science Education/ Methodology to emphasize the use of indigenous languages in the teaching of science.

iii Organizing short-term courses for serving teachers on how to teach in indigenous languages. Iv Books and other materials produced by NLSP should be produced in enough quantity.

V The indigenous language[s] commonly spoken in a given area should be adopted for science instruction and should be used in conjunction with English language to solve the problem of heterogeneous nature of some Nigerian cities and that of multilingual and multicultural nature of Nigeria.

Conclusion

In this discourse, it has argued .that a number of factors/ problems combine to impede the relevance and functionality of our science in our contemporary society. Some of such factors have been highlighted, some possible measures have been offered, if implemented have potentials for eliminating the problems and thus paving way for repositioning our science and making it relevant and functional. The issues that need be addressed is how can all these ideas be packaged and sold to the public, the government, administrators, NGOs, teachers and students in order to bring about relevant and functional science in Nigeria.

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