

PROBLEMS AND PROSPECTS OF IMPLEMENTING SCIENCE AND TECHNOLOGY FOR QUALITATIVE EDUCATION IN NIGERIAN SCHOOLS

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Abstract

The importance of Science and Technology in the overall development of a nation cannot be overstressed without Science and Technology over voyage to the year 2020 will be bumpy and uneventful. This paper, therefore, focused on the problems and prospects of implementing science and technology for qualitative education in Nigerian Schools. The significance of Science and Technology in economic, political, social and cultural development has been discussed. The problems which hinder the full implementation of Science and Technology have been listed and the strategies for realizing our proposals to attain qualitative education by the year 2020 have been articulated.

Introduction

Our enthusiastic voyage to the year 2020 and beyond is likely to remain bumpy and slow if the role of science and technology continues to be accorded a mere lip-service. We need to move beyond rhetorics to emphasize the role of science and technology in national development and back - up our emphasis with concrete measures verging on a task -force approach.

The world-wide recognition of the importance of science and technology in development has propelled the African governments to set up an African Regional Centre for Technology in Dakar in order to provide an institutional framework to curb the technological dependence on advanced nations.

The mobilization of Nigerians for science and technology constitutes both a short-term and long -term effort to industrialize the nation; combat disease, ignorance, superstition, hunger totemism and witchcraft; mobilize human and natural resources and harness them maximally.

Significant efforts have been made by African governments towards prioritizing their development goals, science and technology as a field has enjoyed a bulky share of the annual budgets. In Nigeria; the government has introduced a deliberate policy to encourage the development of science. For example, admissions into the Nigerian Universities have been strictly guarded to follow the 60:40 science; arts and other ratio for quite a few years now. The value of scholarship awards for science students has been made significantly higher than that for non - science courses in the higher institutions of learning. Special grants have been made available to the schools by the government to improve the teaching of science. In some cases, the teachers of science subjects have been paid a science teacher's allowance to boost their morale. A section on a proposed package on better life for science teachers will add more to the idea.

In spite of all these relatively recent commendable efforts, one can still see a yawning discrepancy between what is, and what should be. The society in an innocent way asks some fundamental questions. For example, why can't the numerous faculties of engineering in the Nigerian universities manufacture vehicles, spare parts and other related machines to ease the present transportation problem? Why do we still have to import vehicles or their parts? Why can't the civil engineers we produce from universities design and build low-cost houses to ameliorate the housing problems? To add more such questions is unnecessary since the point is made already.

Lamenting over the paucity of technological development in African States, Kwami (1982 : 108) states:

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This technological dependence is suicidal for development countries; for it negates technology development, discourages the up-grading of traditional or indigenous technologies, lames creative and innovative abilities, kills the spirit of self-reliance, and prevents self-sustaining development.

The situation is so serious that one is tempted to suggest a task-force action to produce scientists and technologists in the right number as soon as possible. The nation still needs manpower in the non-science fields such as Arts, social science, Law, Education (arts and social science based) and library studies. The cardinal question here is that of *emphasis* and *priority* at this particular phase of development. No discipline is to be sighted or marginalized.

Science and Technology Defined

Definitions are irksome especially when there is no consensus on one. But they are a necessary nuisance since they provide a general guide as mental organizers. The author is therefore, not daunted in risking definitions, no matter how imprecise they may sound.

Science: “Science” is the branch of knowledge that is empirically acquired through observations, experiments or tests and logical analysis. Perhaps a definition of *science* is unnecessary since most people know “science” through the collection of school subjects (Mathematics, Biology, Physics, Chemistry, Technology).

The definition of science can thus be garnered from those activities that characterize the execution of each of these subjects in school.

Information collected systematically through a series of observations, experiments and test is deemed reliable. Any planning or decision taken on the basis of such information is deemed verifiable valid, reliable or dependable. Science therefore, helps mankind to discover, exploit, test, verify and use the outcome to improve his living conditions, environment, society and advance knowledge itself. Science destroys fiction or holds it suspect.

A nation that is built on fiction is anchored firmly in hallucination. It is devoid of quantum leaps in meaningful developments.

Technology: The term "Technology" is derived from the Greek word "techne" and the Latin word "technicus". This two terms mean “art” or “craft”. In fact, the Greek term “techne” was generally used to designate “a bag of tools” and was later responsible for the general definition by many people that technology is the study or mastery of the use of tools in the manufacturing and industrial sectors. Some people conceive technology to be “industrial arts for commercial or military purposes”.

For our working purpose, let us define “technology” as a systematic and scientific application of practical skills and the theoretical knowledge to solve problems, particularly those problems that can hinder scientific development. There may, of course be a form of technology that is not necessarily rooted in or related to science. But this form of technology is primitive and traditional, largely handed down from generation to generation, for example, story-telling, dancing, weaving of baskets or the use of some herbs to treat diseases. Technology is thus related to a people's material culture.

Technology Involves The Following Activities

- The preparation and utilization of materials .
- The selection of appropriate goals, techniques and media to transmit the techniques .
- The maintenance of materials that have been constructed and installed.

The above activities indicate that technology must be taught. The selection of appropriate goals, methods and materials implies the transmission of technology to the youths. One of the most serious technological problems of developing nations is the lack of a maintenance culture. It is not sufficient condition to develop and install technological materials without a satisfactory husbandry. These materials soon become obsolete and the process starts all over from zero again. The maintenance culture must be inculcated in the youths and adults.

Characteristics of Good Technology

- The following are the characteristics of appropriate, effective or good technology .
- It must be relevant to the needs and aspirations of the nation as well as citizens.
- It must be relevant to the peculiar culture and the peculiar problems of a people.
- Exotic technology can neither be operated nor appreciated by a people for whom it is intended.
- Technology must be practicable. A theoretically - based technology is meaningless since it cannot be practical zed
- It must be efficient in the sense that it should be able to solve technological problems.
- It must be scientific. Good technology is not fiction, it is derived from empirical realities, scientific observations, experimentation and verification. As a scientific component, it must be systematic.

The usual criticism of the 'wrong' transfer of technology stems from a drastic departure from some of the above characteristics by some people who attempt to transfer foreign technology and apply it almost in the "foreign colour" to our culture and environment. There is nothing absolutely wrong in transferring culture it will be adapted to the new culture and environment.

Some Problems In Fostering Science And Technology

Experience has shown that attempts to employ science and technology to facilitate our voyage to the year 2020 are likely to collide with some problems.

Major of these are:

Attitudes of the People Towards Science and Technology

In the first place, many of the students have a negative attitude towards science subjects, Unfortunately, science subjects are not exactly easy to tackle. Mathematics, Physics and Chemistry are hard nuts to crack. Lazy children hate difficult subjects. Human beings as a rule try to avoid those things that demand some extra effort if and when they can. In many cases, the fear of science subjects is handed down from one generation to another.

Some children's fear of science subjects is simply based on rumours that these subjects are hard and should thus be avoided by those who want to obtain a full school Certificate.

On another level, parents as well as children consider the technical track of education to be dead -end path. While most children aspire to do the conventional subjects to lead them to university

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regular education from which they will graduate as Lawyers, Medical Doctors, Professors and so on, technical education is figured out by many as preparing blue-collar workers with terminal certificates. The parents therefore, encourage their children to reject their placement in technical-oriented educational programmes even when continuous assessment supports such a placement. The fact that there are several universities of technology offering degrees in technological areas and the fact that several polytechnics offer various courses in technical -oriented areas leading to diplomas and some nationally recognized certificates seem not to persuade many students and their parents to patronize technologically oriented education. A gradual change in the attitude of both students and parents is being noticed with the increasing prospects for science and technology experts in Nigeria.

Teacher's Attitude

Odilli (1988:255) observed that "teachers tend to be so conservative that a new approach disturbs us". If science teachers are willing to create a conducive climate for the learning of science, students will develop a positive attitude towards the learning of science subjects. Effective pedagogical procedures such as play, observation, drill, discover method, group assignment and project methods should be appropriately applied at the correct educational level and age of the children.

Teachers should first show interest in the teaching of science so that students can be infected positively. As teachers, we must renovate our attitude towards whatever science subject we teach, so that students may derive joy and pleasure in learning it.

Financial Hurdles

Science and technology as a field is an expensive curriculum. Funding may appear prohibitive at times. This is so partly because the training of teachers, the equipment for teaching science and technology and the learning materials including books are expensive. Since we import most of the science equipment at present in Nigeria, the cost in terms of foreign exchange is astronomically high. The government is making appreciable effort to fund science education. But the inordinate demand made the science education sometimes discourages the moves to promote science and technology generally.

Expertise Is Lacking

Denga, I. (1991: 69) observes that teachers of science and technology are generally in short supply in Nigeria. But even where they exist, they find it difficult to put their expertise into use because their working tools are either absent or in poor state. Within a short time of training, their skills fall to a disuse for want of practice. The importation of foreign experts who have the technical know-how to install the science and technology equipment and also teach in some cases is very expensive. To solve this problem, the existing institutions must intensify the production of science and technology teachers in order to meet the gaping need.

Non-integration of Technology into the Curricular Mainstream

Technology is still for the most part regarded as an ancillary service to the core curriculum. It looks like an optional subject in the secondary school system. It is this incidental look at technology which made Fafunwa (1985: 3) remind that:

"Whether we like it or not, we are living in the world where science and technology have become an integral part of the world culture and any nation that overlooks this significant truism does so at its own peril".

Strategies to Foster Science and Technology

The need for science and technology has been stressed. The problems militating against the full implementation of the laudable ideas surrounding science and technology have been listed and discussed. Now, the following strategies for implementation of science and technology are charted:-

1. Better life for science and technology teachers should be assured. If the need for science and technology for national development is that high, the teachers of these aspects of education should be motivated and encouraged through incentives like a special salary and housing allowance for the teachers teaching these areas. The brain-drain experienced in these areas through the loss off teachers to industries and other non-educational areas where they could help multiply their own type through teaching is unfortunate.
- A programme promising a better life for Science and technology teachers must be evolved immediately.
2. A science and technology culture should be developed among youths.
The indispensability of science and technology must be taught right from elementary school through primary, secondary and tertiary levels of education, bearing in mind Jerome Bruner's dictum that any subject can be taught at an intellectually honest level to children at any age. The language of science and technology should be taught to children. The science and technology concepts should be integrated or correlated with several subject so that the children will learn science without the threatening labels that characterize specialized science subjects. Specialization in the upper classes of secondary and tertiary levels of education is inevitable, however.
3. The significance of science and technology should be entrenched in the Nigerian philosophy of education. It is not too extreme a move to make school children recite some meaningful science slogans like they recite the national pledge. Such a recitation should be backed up with practical illustrations of what science and technology can do for a nation.
4. The present emphasis placed on admission of science students in the Nigerian universities should continue.
5. A special curriculum combining some science subjects with Arts and social sciences subjects should be evolved. This should be aimed at discouraging "pure" Arts and "pure" social sciences so that students with some aptitude in Science and Arts; or Science and Social Sciences would combine a science with a non-science subject. This practice will increase the number of science literates in Nigeria.
6. Educational Technology should be given more prominence in all the institutions where teachers are trained. Educational technology can be defined as a complex, integrated process involving the study of theory, practical procedures for devising, organizing and allocating resources which people can utilize in a systematic and scientific way to solve relevant human learning problems. The above definitions has been distilled from definitions by scholars of Educational Technology such as Mitchell (1978), Embling (1976) and Inyang -Abia (1988).
If teachers are well trained in the theory and application of instructional technology, it would be easier to concretize those aspects of learning that would otherwise be too intangible for learners to perceive or understand. The use of instructional media such as print and electronic media, projected and non-projected media, soft ware and hardware, audio, visual and audiovisual, big media and little media can make learning interesting and facilitate understanding.
7. A task -force approach is needed to ensure that science and technology budgets are utilized expeditiously and exactly as allocated. Furthermore, the present monetary incentives given to

the Nigerian universities who adhere strictly to the stipulated 60:40 science: other ratio should be maintained.

8. The state of science education at the secondary school level should be strengthened so as to facilitate the flow of the required number of science students into tertiary education.

Conclusion

In this paper, we have discussed that, without science and technology, our voyage to the year 2020 will be bumpy and uneventful. The significance of science and technology in economic, political, social and cultural development has been discussed. The problems which hinder the full implementation of science and technology in our Nigerian schools have been listed. The strategies for realizing our proposal to attain qualitative education by the year 2020 have been articulated.

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