

Re-Engineering Academic Planning and Quality Assurance for Improving Integrated Science Education in Nigeria

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Abstract

The development of science and technology is expectedly one of the ultimate goals of every responsible government. It remains the aspiration towards which all science programmes worldwide are geared. Though, the extent to which the target is approached differs from country to country and is a function of several variables including academic planning. The aim of this paper is to examine the challenges of academic planning for effective teaching and learning for science education. All in all, the paper x-rays the role of science education towards ensuring sustainable development and the need to strengthen all the mechanism of integrated science education through proper academic planning.

Keywords: Aspiration, science education, academic planning

Introduction

Science is a way of knowing things about the universe we live. The study of science provides bases for the utilization of facts, theories, laws and principles in technology. Science is a systematic study of nature or knowledge arranged in an orderly manner especially knowledge obtained by observation and testing of facts. The scientific method makes science a peculiar subject and distinguishes it from other fields of study by conferring on it a stepwise and systematic approach to obtaining knowledge thus devoid of guesses and imaginations not supported by verifiable facts.

Scientific knowledge could be a description of what has been observed or explanation of what is observed. But scientific observations are not just mere observations but required skill because the scientist knows by his training what to observe and what not to observe. The application of science is called technology

and these deals with utilization of results emanating from pure science. The study of science and its technology has led to development in the forms of provision of basic needs of modern day living from provision of food, shelter and clothing to healthier and life sustaining facilities.

The importance of science education to individual and nation cannot be over-emphasised. The development of a nation greatly depends on the level of scientific and technological literacy (Opara, 2003; Opara, 2004). The G-7 nations of world (Germany, United States of America, Japan, France, Italy, Britain and Canada) regarded as advanced nations are proud of advancement because of accruing benefits so far from science education both positively and negatively. Science education plays a dominant role in the development of nations. A nation that cannot use science and technology to better the lot of its people is not practicing science. The modern emphases on science education is not only beginning to change things but such a change is yet to become pronounced as to modify things drastically for a sustainable national development (Opara, 2002).

Academic Planning For Science Education; Need for Change

In spite of efforts made by Nigeria Government to the promotion of a sound educational policy, schools appear to have failed to meet the nation's expectations and realities especially in science education. According to Urevbu (1997), the expansion in the past two decades has largely ignored the educational provisions of the national policy. Nothing concrete has been done to promote the development of science education in schools.

Science education in Nigeria lags behind and is surrounded with various crises. These crises emerged from the academic planning for science education, which the missions are not well state. The missions are unclear and entangled in such a way that it becomes unachievable. There are misconceptions and negative perception of science education, which is different from popular science, which relates to the actual practice of the science community. According to Mordan (1978) in Bello (1992), says that today's schools must provide tomorrow's employees; people whose gifts and abilities must be developed to prepare them for life in the rapidly changing society. Science education by nature is very dynamic and the rate of knowledge explosion is even increasing. However, science education curricula are not changing as fast as would be expected and this has a negative impact on Nigerian development.

According to Ajeyalemi (1987), Science in Nigerian schools is still very pure, content-laden and teacher-centred, divorced from realities of the Nigerian socio-cultural environment, unmindful of the needs of majority of students, barren of important cultural, philosophical, historical and practical bases of science and totally not geared towards education for life, for work, for citizenship and for leisure. He also added that it is a general believe that Nigerian tertiary institutions have been producing more of 'scientific historians' than 'scientists', those who could only read and memorise scientific facts and principles and regurgitate these when needed but who could not think in or use science.

It is obvious that the curricula problem is often compounded by what is called teacher education crisis in which many Nigerian science teachers hardly update their knowledge after graduating from their

primary training. Such teachers cannot be productive because their knowledge both of the subject matter and pedagogy is obsolete. Many science teachers have not made effort to participate and improve on their knowledge base since teaching (Njoku,2003) nor have they participated in any in-service training since entering the profession. They are ignorant of new and better methods of teaching different topics in the curricula they, are charged to implement.

With regard to science education IN Nigeria, there is problem with the provision of facilities for effective and efficient teaching/learning. The facilities that include laboratory equipment are not equipped or are inadequately equipped (Ayodele, 2002). Some schools do not even have laboratory building, and if available the equipments is deplorable. This made practical work to be very difficult. Teaching resources are not just scarce but no budget is planned to provide some of them. (Opara,2005)

Another very serious is the issue of science teacher's motivation. The difficulty in recruiting and training of science teachers has been tracer to the low status accorded to these teachers and apparent loss of interested and attraction of science education teaching. The traditional respect and prestige enjoyed by these teachers have been eroded quite considerably (Awanbor, 1996) causing a number of science education teachers to drift into more respectable and lucrative from of employment to meet up to with the high cost of living. Nwaokolo (1993) broadly categorized the factors responsible for low status to include poor condition of services, teacher's negative personal and professional behaviors, teaching occupations semi-professional status and wider society negative influences.

There is no denying fact of poor teacher and student development plan. It is therefore not surprising that only very few people want to identify themselves as science teachers/students. There is the issue of low level of commitment to science education. Politicisedoes not provide the enabling framework for effective teaching and learning of science education. The society has become greatly monetarised, and the more money budget, the greater the importance attached. However, schools embark on a proliferation of science education programmes and end up spreading their resources thin aside from producing poor quality outputs. In the cases, students admitted to the science education were disappointed candidates in their chosen university. This situation has a negative effect on both the teachers/students development. Because of de-glamorization of science education, many students are not motivated to study them. They end up having negative perception and misconception of science education, which makes science relatively difficult (Elliot, 1983) and attain mystical nature in the school. The consequence of all this is poor enrolment and even poorer achievement in the subject (Durotimi, 1995; Oladjide, 1998; Iyobhebhe, 1997)

To illustrate the poor Nigeria participated in the second international science study, SISS in 1998. She came last in the primary schools category and second to the last secondary schools category. According to Okebukola (1995) inappropriate funding for science teachers training welfare, shortage of instructional materials, diminishing regard for the value of education in Nigeria. These are challenges of academic planning for science education in Nigeria.

Issues and strategies

The uniqueness of science education and its attendant problem raises a critical question. Why academic planning for science education? And what are the issues and strategies for improving science education?

Planning is the bedrock for survival, growth and development of all tertiary institutions. Bradley (1999) defines planning as the mental process of visualizing a set of event that one is determine to make happen in the future. It is continuous process that covers the operating period, year in year out. It also covers all cadre of management. Therefore, academic planning for science education should include programmes such as:

- Training and re-training of teachers to enhance efficiency and improved teaching/learning ;
- Welfare of teachers as incentive. i.e. the use of motivation for effective performance;
- Staffing and development planning;
- Research and development. Research must be dynamic i.e. areas and goals of research development must be specified; and
- Information and communication technology (ICT). This must move from manual manipulation to automation (computer processing).

Training and re-training of science teachS ERS

Science teachers education programmes should be re-organised to enable the beneficiaries acquire appropriate skills necessary for effective science teaching. Including using research findings to improve classroom practice. Science education programmes should be on strategies to improve pupil-centred classroom practices and interpretation and translation of the science curriculum contents into classroom activities. There must be training and retraining periodically so as to keep pace with development both in subject matter and methodology. This is because as in all areas of learning, there is no agreement as to what constitutes scientific literacy.

However, Showalfter (1974) as indicated in Gbamanja and Bassey (1995) stated that scientific literacy implies an in depth understanding, exhibition, appreciation and application of the nature of science, processes of science, scientific attitudes, concepts principles as well as interactions between science and technology, science and the universe and science in his/her ability to make incisive observations, design ways of solving our problems, choose instruments to investigate the problems, carry out investigations, and conceptualise and evaluate ourselves in our environment.

Welfare of teachers as incentive \motivation

Motivation is a basic key to job productivity. Therefore, to gain and sustain science teachers, motivation for high quality and high productivity there must be constant inter-play between theories and applied motivation and motivational framework from schools authorities. Motivation energies, direct, maintains, sustains and leads to improved performance and increased productivity. It brings about jobs enrichment, job enlargement, job enlargement, and job satisfaction. Positive motivation has a strong potency of

increasing science teacher's self-evaluation, positive self-concept and moral, which are conveyor-belt of effective performance and productivity.

An age-long axiom has it that the way a person sees himself and is seen by others can affect his/her attitude to work. A negative perception of the self may manifest such traits as the feelings of insecurity, financial worry. Lack of job motivation causes general unproductively (Ohakwe, 1994; Opara, 2005). The morale and remuneration of science teachers should be improved. This enhances their prestige, image, dedication and satisfaction.

Staffing and development planning

Government should institute educational policy framework that will consider science education as integral part of general education accessible to all. Deliberate efforts should be made to change science teacher's orientation and attitude to science education, research findings as a factor affecting their carrier and professional development. There should be adequate finances fees and other requirements for professional development.

Efforts should be made to finance our institutions so that science education teachers are adequately trained and the teacher's salaries and allowances paid promptly and promoted as at when due. Science education teaching occupation should resist the admission of unqualified and under qualified persons as science education teacher. There should be proper evaluation of career development and professionalism of these science teachers and cases of professional misconduct should be seriously dealt with.

Research and development

Implementing research-base teaching demands that resources for science teaching should be readily available. There is need to provide adequate number of teaching/learning sources. Science teachers should be made conscious of the necessity that they should conduct science education researches bases on their peculiar classroom based problems and experiences. Individuals and institutions must form partnerships in research to determine appropriate science education curriculum in Nigeria. Science education curriculum should be sensitive to our culture and be negotiated and tailored to individual and the needs of the country.

Klopfer (1969) directed our attention to two key components of scientific literacy: (1) the understanding of the key concepts and principles of science "survival science" which are related to one's life; (2) the understanding of the relation of science to culture so as to understand the relation of science and related technology on contemporary society. In other words, science education has domesticated in order to genre and creates a scientific and technological literate society. That means no matter how good the content of science programme will not fully achieve its aims and objectives.

Science education curriculum should adopt changes expected to meet up with the rapid increase in knowledge in the new world order regarding the why of science rather than restrict them to what and how of science. New approaches in science education should be used that periodic conduction of continuous assessment and evaluation of science education is highly needed to determine the level of

changes in comparison with what is expected. Science education supervisors, evaluators and examination board should ensure this.

There is also need to delete items of the content that are obsolete since there are complains of overloaded science curricula, select only relevant contents while dropping the others. This will relieve pressure on these science teachers who complain that the number of periods allocated to science education in the school timetable is too few. That these periods are not enough for meaningful teaching/learning activities since the curricula are overloaded coupled with population explosion in Nigerian classrooms.

Information and communication technology(ICT)

There has been emphasis on moving from manual manipulation to automation (computer processing). Information and communication technology's including electronics, computers hardware and software, robotics, computer aided design, fibred optical instruments, communication equipment, photovoltaic technology, biogenetics and yet other new inventions (Schuttle, 1988; Wokocha and Nosike, 1998). The complexity of science teaching and learning necessitates the use of information technology. The instructional system is being invaded by this technology: television, videocassette, videodisc or combinations of these technologies are changing the whole instructional pattern in industrialized and newly industrializing countries.

Facilitated by this development the role, duties and responsibilities of the science teacher will be expanded from teaching, research and community service to new tasks, like keeping up with rapidly expanding knowledge in the subject; collecting, formatting and presenting information via the new technologies; or diagnosing student needs and prescribing individual courses of study thus permitting students learn in a more individualized way. In this new role facilitated by effective academic planning the science teacher would spend less time preparing and presenting formal lessons/lectures to large student groups and more time on keeping pace with knowledge explosion, formatting the knowledge in students-accessible course wares and on counseling students.

Conclusion

The role of science education in sustainable development cannot be overemphasized. Poor science is a major issue facing Nigerian educational system. Therefore academic planning for science education must be emphatically geared towards; training and re-training of teachers; the welfare and motivation of teachers; staffing and development; information and communication technology. This is a challenge to academic planning for the development of science education in the 21st century.

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