

SCIENCE EDUCATION CURRICULUM: A CRITICAL APPRAISAL OF NATIONAL POLICY ON EDUCATION AND ITS IMPLEMENTATION

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Abstract

Functional education is determined by the quality of curriculum content and its implementation. This paper examines the concept of curriculum, science education and its goals on National Policy on Education and its degree of Implementation. Suggestions were made on how to improve on Implementation of science education curriculum.

Introduction

There have been a number of attempts to renew the science education curriculum since 1999. All these activities however occurred in piecemeal fashion, mainly to address the concerns and issues arising from the field at different times. One of the main problems is that the science education curriculum as a whole is fragmented and lacks a sense of progression and science attainment benchmarks for different grades. There is also a general public perception that standards are falling and that the science education curriculum does not prepare students for the world of work and for national citizenship (UNESCO, 2008).

We are in the post-modern generation where children are born and raised in an environment influenced by the Internet, and the new revolutions in science, philosophy and communications in all areas of life. Science says we live in an expanding universe and we increasingly communicate through visual and symbolic means. These shifts are resulting in a whole new culture and raise new questions about the way science education curriculum is to be understood, developed, revised and communicated.

The curriculum makers need to base their work upon the National Policy on Education, Nigeria's vision 20: 2020 on education and human

capital development, and global trends so that children will have opportunities for better educational programme.

As a result of such tooting global challenges as rapid urbanization and the HIV/AIDS Pandemic, massive unemployment, religious fundamentalism, terrorism, electoral fraud, drug related offenses, and women trafficking etc., there is therefore the dire need for the re-organization of the existing structure and composition of school programme of study.

Despite the wide recognition and acceptance accorded to the role of science education curriculum in our educational system, there seems to be problems in the effective implementation of these important educational document. These problem areas include how to operate; how to reconcile the standard in various schools; and how to make both the government and teachers committed and work towards the realization of the goals of science education curriculum as stipulated in the National Policy on education.

Concept of Curriculum

Curriculum, derived from the Latin word "currus" means "the path, the way, and the course" which implies to run a race. Curriculum refers to a series of organized knowledge and experience through which a learner is exposed to achieve some desired objectives. It involves the subject matter, the teacher, the learner and the environment where they interact. It is the totality of what is taught and learnt in school Ezeani (2006:27).

Oke and Brown (1982:14) define curriculum as “all the experiences a child has under the guidance of school”. Curriculum, according to Offorma (2005:8) is a programme which is made up of three components: programme of studies; programme of activities, and programme of guidance. Anwuka (2005:15) perceives curriculum as a vehicle through which education is attained. From this definition one understands education to mean all round development of the individual learner.

A curriculum is planned and presented to the interacting parties for implementation, and the success of any curriculum depends on its proper implementation. Educationists have always expressed deep concern over this, hence the popular question “To what extent is the implemented curriculum congruent with the planned curriculum?” Akudulo (1994:4)

Science Education and National Policy

Science education is a pre-requisite in science and technological development. Education through the study of science produces economic benefits and contributes to a country’s future wealth by increasing the productive capacity of its people Maduabum and Akuzilo (1986:12).

Science education encourages students to think and act as responsible scientists by providing opportunities for them to acquire knowledge and understanding of relevant concept and thoroughly practicing the problem-solving and practical skills associated with scientific process of enquiry for their advancement in science and technology.

Current goals of science education include: acquisition of scientific literacy; the development of independent learning skills; and application of science to solving societal problems. In recent past, another goal, the development of scientific attitude was added. The concept “scientific attitude” implies behaviour that demonstrate accuracy, honesty, open-mindedness, objectivity, non-bias, skepticism, and possession

of a critical questioning, and rational mind Gauld (1982:112).

A nation’s policy on education is government’s way blueprint for realizing that part of the national goals which can be achieved using education as a tool. The National Policy on Education (NPE, 2004) identifies that the goals of science education shall be to:

- i. cultivate inquiring, knowing and rational mind for the conduct of a good life and democracy;
- ii. produce scientists for national development;
- iii. service studies in technology and the cause of technological development; and
- iv. provide knowledge and understanding of the complexity of the physical world, the forms and the conduct of life.

In line with the current situation of science education curriculum, Beckner (1972:17) observes that “most important forces acting to change the society today emanate directly or indirectly from the scientific and technological advancement of the last and present centuries”. Some of these are space explorations, cybernetics, development of synthetic and medical advancements, nuclear and atomic physics, to mention but the four.

These demands, from our educational institutions, the redesigning of both intended and implemented science education curriculum to continually provide evolving skills to prepare graduates to function more effectively in their employment places and entrepreneurial ventures.

Implementation

Looking at the goals of science education stated above, some are yet to be achieved especially in the area of Information, Communication and Technology (ICT), though some efforts are being made by

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the governments, individuals and private syndicates. Also, the curriculum Organization of Nigeria (CON) and other bodies like Science Teachers' Association of Nigeria (STAN) are aptly cognizant of the gap in the emergent globalization forces of the time.

Some of the general objectives of science education as enunciated in the National Policy Section 9, sub-section 39 are:

- (i) Science education shall emphasize the teaching and learning process and principles.
- (ii) Special provisions and incentives shall be made for the study of the sciences at each level of the national education system.
- (iii) Government shall popularize the study of sciences and the production of adequate number of scientists to inspire and support national development.

Section 7, sub-section 39a of these objectives states that science education shall emphasize the teaching and learning of science process and principles which will lead to fundamental and applied research in the sciences at all level of education.

The scientific processes include, observing, classifying, describing, communicating, measuring, recognizing, and using spatial relations, drawing conclusions, making operational definitions, formulating hypotheses, recognizing variables, controlling variables, interpreting data; and experimenting. In addition to these are the developments of the skills of thinking creatively and independently. Some of these if not all are encompassed by the term critical thinking, and this is perceived as an important skill to be acquired by all students.

These skills would be directed towards use in the process of problem solving. The new focus is to use problem-solving towards solving real world problems not just research problems in specific science disciplines as has been the case, especially since the two involve different modes of problem solving.

The goals of these processes is to develop a value sensitivity by examining real life problems in the context of science, technology and society. Science provide knowledge while technology provides way of using this knowledge and our value concepts guide what we ought to do with both Hurd (1975:28).

Efforts made by government to review the existing science education curriculum have made it possible to integrate into the reviewed curriculum environmental problems such as Drug abuse and HIV/AIDS to mention but the two. Some of the missing process skills should be merged with the skills in the new basic science curriculum.

For proper implementation of these processes in science education curriculum, teachers need to use multiple teaching strategies, focusing on students needs towards making what is learned relevant to all students. Anderson (1983:495) in a consolidation of meta-analyses concluded that there is evidence supporting the use of inquiry teaching towards greater student achievement, however the use of multiple teaching strategies, including inquiry teaching, should be adopted by all teachers in order to meet different learning styles in the classroom. Inquiry method here implies activity-oriented so that students will be able to acquire practical scientific skills, techniques and attitudes. In so doing students will also be able to learn to seek and discover facts about nature for themselves.

Section 7, sub-section 39c of the National document states that special provisions and incentives shall be made for the study of the sciences at each level of the national education system. For this purpose, the functions of all agencies involved in the promotion of the study of sciences shall be adequately supported by government. In many institutions, the laboratories are

nonexistent and where they are available, their design is inconsistent with their functions. So what you find in these institutions is the traditional science, where the inquiry/discovery method is preferred.

The question there is: is the government actually providing those incentives and facilities especially to schools located at the rural areas? The obvious answer, of course, is no!

The addition of new units into the curriculum makes specific demands for science facilities. These facilities need to be adaptable to the teaching and learning of concepts. The subjects require grouping students and facilities to provide hand-on experiences. Our schools have not been adequately adapted to these new demands.

Section 7, sub-section 39d of the policy document emphasizes that government shall popularize the study of science and the production of adequate number of scientists to inspire and support national development. Current goals of science education include developing scientific literacy which requires making learners to understand the impact of science on them as individual and society. Christianson (1982:18) captures it thus:

What we are looking for, then, is a situation in which lay people demonstrate knowledge of both the potentialities and the called wisdom. As a classroom goal, wisdom about the scientific enterprises translates into the ability and failures in terms of the human and social forces that have formed them. Students will need to appreciate science as they will know it – not as a strict discipline, but as a cultural phenomenon, made of news reports, political disputes, technical papers, and imperfect solutions.

Popularization of science education by the government is the system of measures by which the government is aimed at the dissemination, appropriation and valuing of science education, which include critical thought, ideas, and values,

the history and sociology of scientific knowledge, how science is practiced and the results of scientific research.

Popularization of science education by the government helps to foster creativity and innovations and contributes to producing better trained human resources. It also promotes knowledge of current social environmental issues and the integration and communication of science and technology with other forms of cultural expressions.

The world governments have made collective commitment to dramatically expand science educational opportunities for children, youth and adults by 2015 (UNESCO, 2007). Participants at the World Education Forum in Dakar, Senegal, endorse a comprehensive vision of education, anchored in human rights, affirming the importance of learning at all ages and emphasizing the need for special measures to reach the poorest, most vulnerable and most disadvantaged groups in society. Many governments have targeted strategies to reach the poorest households and to encourage girl-child education.

Through some agents like the Association of Science and Technology Centre (ASTC), Science Teachers' Association of Nigeria (STAN), the number of scientific journals, internet site, books, films, and disseminating videos are now on the rise. More efforts are still needed especially in the areas of Information, Communication and Technology (ICT).

Conclusion

An educational programme of such a magnitude which the federal government is embarking upon through the National Policy on Education can only succeed when the overall objectives are clearly known and implementation carried out with thoroughness and dedication. No matter how well

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formulated a curriculum may be, its effective implementation is a *sine qua non* towards achieving the desired goals of education. Proper implementation therefore makes any educational policy blueprint meaningful.

Recommendation

For proper implementation of science education curriculum and the National Policy, the following recommendations are made:

1. Government should ensure adequate supply of the necessary infrastructures to schools to facilitate effective implementation of curriculum in schools.
2. The government should ensure proper budgeting and funding for curriculum review, production and implementation at all levels of education.
3. The National Policy should be reviewed in such a way as to meet the dynamic nature of our society.
4. The implementation process should be appraised at frequent intervals.
5. Curriculum Organization of Nigeria (CON), as a supervising agency, should be at the fore front of planning and implementation of curriculum in all institutions including science and technologically based institutions.
6. There should be proper monitoring of science education curriculum implementation by both the school heads agencies and government.
7. In-service training/workshop/seminar and conference should be organized to all science teachers who are one of the determinants of science curriculum, this is to familiarize them with the operational procedures of the school curricular.
8. Science teachers should be motivated to become more committed to effective implementation of science education curriculum.

9. Science teachers should be familiarized with the operational procedures of the school curricula.
10. Government should prepare relevant, valid and effective teaching and assessment of the science education curricula.

References

- Akudulo, L.R. (1994). Concept of curriculum implementation in Offorma: ed. *Curriculum implementation and instruction*. Onitsha: Uni world educational Publisher.
- Anderson, R.D. (1983). A consolidation and appraisal of science Meta-analysis. *Journal of research in science teaching*, 20, 5,495-509.
- Anwuka, A.G. (2005). Re-thinking Nigeria education curriculum implications. *Forum*. 5 (1), 6 – 19.
- Beckner W. & Cornett (1972). *The secondary school curriculum: Content and structure*. London: Intext educational Publishers.
- Christianson, D. (1982). Understanding science as a cultural phenomenon-mission for the 80's in M. Browe (ed) *education in the 80's: science*, Washington D.C.: NEA, 17 – 24
- Ezeani, E.(2006). Education in Nigeria: Problems, Delimma and perspectives. *A handbook for teachers, students, researchers, scholars and policy makers*. London: Veritas Lumen Publishers.

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- Federal Republic of Nigeria (2004). *National policy on education*. Lagos: Federal ministry of education.
- Guald, C.F. (1982). The scientific attitudes and Science Education: a critical reappraisal: *Science education*, 66, 1, 109 – 121.
- Hurd, P.D. (1975). Science, technology and Society: New goals for interdisciplinary science teaching. *The science teacher* 42, 2, 27 – 30
- Maduabum, M.A. & Akuezuilo, E.O. (1988). Constraints and quality of science education in Nigeria schools. Science teachers' association of Nigeria, 26th Annual conference proceeding, 97 – 101.
- Offorma, G.C. (2005). Curriculum for wealth creation. WCCI 3rd Biennial seminar lecture, held in F.C.O.E, Kano, on 25th October, 2005
- Oke, F.E. & Brown, D.P. (1982). *Curriculum and instruction*. London: Macmillan Press.
- UNESCO (2007). Education for all by 2015: Will we make it? Paris, UNESCO
- UNESCO (2008). Science education and curriculum Reform in Bhutam <http://portal.unesco.org/geography/en/e v.php->

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