

SCIENCE EDUCATION CURRICULUM INNOVATION FOR CHANGING COMMUNITIES IN NIGERIA: CHALLENGES AND PROSPECTS.

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Abstract

The strength of any society depends to a large extent on its curriculum. Innovations are useful in any educational system and in curriculum. This is because it is man's means of survival in rapidly changing communities. Science curricular in Nigeria has been designed to help student/learners achieve the objectives of science education. The delivery of this curriculum towards changing communities is faced with a lot of challenges. This paper therefore examined the concept of science education, curriculum innovation such as the need to teach and learn science through new technologies. Challenges such as inadequate funding of school, lack of infrastructure, equipment and materials, ignorance of the importance of curriculum innovation among others were discussed and the paper also offered hoped for the future generation. Recommendations such as motivation of teachers as the implementers of the curriculum, Training and retaining of teachers will help improve the science education curriculum delivery as well as implementation of the changes in the curriculum.

Keywords: Science, Science Education, Curriculum innovation

Education has been regarded as an instrument of change and also a sine-quo-non for national development. It prepares an individual for useful living in the society and his survival in a world of competition.

It is quite obvious that the society can easily be transformed once it has a culture rooted in science and technology education. Science education in schools should be made functional as it forms the bedrock of technological development. So, as Nigeria step up efforts towards changing communities, there must be a

strong stimulation and growth in the teaching and learning of science. The strength of any society depends to a large extent on the school curriculum. Various sciences curricular have been designed to help achieve the objectives of science education. Science education has introduced a lot of changes in our world today and it will continue to do so in the future (Orukotan, 2007). Achievement in science education will go a long way in reducing illiteracy and poverty which are impediments for national development.

The teaching of science is an important component of education in all countries, highly industrialized and developing alike. In Nigeria, science education is unable to meet the expected demands because of serious deficiencies such as outdated science curriculum, science teaching materials and other related factors. A curriculum for science is supposed to be a total program for all students enrolled in the school system, with sufficient alternative courses to accommodate the variations among pupils. Science as it is taught in schools has received relatively little attention and innovation.

In modern science, science teaching should be such that enable young people have access to new knowledge to expect change and to behave rationally and creatively towards the problems generated by changes. This is because change means progress (Afangidan, 2006). This progress means exploring new avenue to achieve a better result. In other to achieve this, we must overhaul the system of science

education to base it on knowledge and creativity and not on memorizing and examinations. Science teachers, curriculum developers and planners must also be innovative. The goals are challenged by many factors. To this end, this paper discussed curriculum innovation in science education in Nigeria secondary school for changing communities.

What is Science, Science Education?

Science has been defined in various ways by different individual. Science is crucial for technological advancement, national development and the total well-being of individuals. Science is an organized body of knowledge which is systemized and produced through careful observation, measurement and experiment which attempt to establish general laws or principles to describe any phenomenon to be studied (Ohaju, 2012). According to Adamu (2000), Science involves complex activities of man which result in producing a body of universal statements leading to the explanation of observable behavior of things that exist whose characteristics in themselves can be predicted. Ali (2002), posited that science involves “doing” and that it is more concerned with various investigative processes and activities with regard to developing, acquiring and controlling knowledge, skill, capacity and attitude about the natural factors of the environment. Science is a systematic process of obtaining testable, verifiable knowledge about nature and natural occurrences, utilizing careful observation and experimentation.

Science education is a combination of two words-science and education. Science education is a process of enculturation into science. It is a process that involves the act of teaching and learning of science through education. Science education has introduced a lot of changes in our world generally and our communities in particular through its study.

Curriculum Innovation

Curriculum is the sequenced contents or course of instruction needed by the learner who is expected to demonstrate some objectives or behavioral change, following instruction and experience in some contents provided by schools (teachers and administrators) and based on a structured form of continuing evaluation (Ali, 2001). According to Ezeliora and Eze (2000), curriculum includes all the planned and guided learning experience received by the learner under the guidance of the school to affect a change in behavior. Curriculum can be viewed as a systematically organized course of teaching and learning.

Innovation on the other hand is a lifelong and continuous process of social adaption and transformation. It's important in curriculum cannot be over emphasized. This is because human needs changes. Whenever there is change in the society, there is going to be change in the educational system which will then reflect in the curriculum. Innovation must be tied to the end product and improvement of education. The essence of introducing innovation in the curriculum is to effect some change that are expected to improve on the present educational practices that have been judged as deficient and incapable of meeting the aspiration of the ever-changing communities, especially on the current information age. When science curriculum contents are no longer addressing any of the societal issues, they have to be changed and replaced with the ones that have direct effect in treating the social needs of the people. Curriculum innovation refers to change in both methodology and content of the subject matter. Such change influences the essence and the method of performance of the learning activities. The change must be monitored and assessed to ensure that it is achieving the goals specified and that the effects of change meet

the expectation of both the designers and users (Udo, 2005).

Curriculum innovation is a planned process of deleting obsolete knowledge, ideas, methods, experiences, skills and substituting them with more current one for the purpose of effective curriculum. It is a deliberate phenomenon. That is, it is a planned and deliberate action aimed at revising and modifying an existing curriculum to make it more relevant to the varying needs and aspirations of the learner and to ever changing needs of the society. Hence, curriculum innovation is not an automatic and haphazard event. Curriculum innovation aims improving the organization of learning experiences with the view of making teaching and learning activities more meaningful and less tedious.

Ughamadu (2006), maintained that curriculum innovation is quite vital as it

- *Enables education practices to change from time to time so as to reflect the consequent changes in the society.*
- *Enables classroom teachers to acquired new knowledge that will make them more effective and productive.*
- *Enables teachers to solve instructional problem that they occasionally encounter in the teaching and learning process.*

In general, curriculum innovations are directed towards improving performance of the school system so as to be result oriented. For this reason, any innovation introduced into the school curriculum especially in the sciences must take into consideration the system of the school. Science curriculum can be viewed as all the experience in science provided by the school for the achievement of goals of science education in the learning. According to Adeyegbe(2004), curriculum generally is the hub of the activities in any educational endeavors hence, curriculum dictate what is to be taught, at what level, by

whom, with what equipment and for what purpose and assessed by what means. To this end, science curriculum does not only dictate but also guides every other process of implementing the program of activities.

Challenges Facing Science Curriculum Innovation in Secondary Schools in Nigeria

Science education cannot be meaningful to students unless certain challenges facing it are addressed. Among these are

- **Inadequate funding of schools:** Most often curriculum innovation faces a lot of problem, because of inadequate funds to recruit qualified science teachers, train and retrain the teachers, recruit capable technicians and supportive staff, build comfortable classroom, laboratory for practical to cope with the innovation. Aguokobguo (2002) and Erech (2005), identified lack of funding as a major factor that militate against curriculum innovation and implementation. Where there is inadequate fund, the anticipated change suffers a lot of serious setback because it will be difficult to implement the innovation effectively and efficiently.
- **Lack of infrastructure, equipment and material:** Science is activity based and student centered. Science cannot be taught effectively without adequate infrastructure and equipment. An innovation may not be fully effectively implemented in the absence of these facilities and this will impede achievement of anticipated results. This challenge has given room for teachers who now neglect the practical aspect which is weightier and has greater potential for developing critical thinking and objective reasoning ability in the student (Nwagbo, 2006).
- **Inability of teachers to effect the desired change or innovation:** Any innovation calls for knowledge, understanding technique and other abilities. Where these are lacking

then the knowledge gap will be a challenge in curriculum innovation. This to a large extent will make the teacher unable to implement the changed curriculum.

- **Ignorance of the importance of curriculum innovation:** This is another big challenge facing curriculum innovation. The society is dynamic and ever changing yet some people are very ignorant of the need for curriculum innovation. In addition, they are also ignorant that advance in science and technology usually call for extensive changes in the curriculum, so that the school does not expose the learners to irrelevant knowledge and skills.

- **Another major challenge is the need to teach and learn science, through new technologies:** Recent technologies challenged the traditional teacher-centered approach in teaching and learning. They provide instant access for student to materials prevailing supplied by the teacher, it enhances the role of the teacher as manager of the learning process rather than the source of content. These techniques include, the use of computer, computer Assisted Instruction (CAI), Computer Based Learner (CBL), Electronic Learning (E-learning) which make students active in the classroom. Hence the chalkboard and textbooks continue to dominate classroom activities in secondary schools. If computers are installed in secondary schools and other conditions are made available, the students will actively be engaged in the learning process rather than being passive absorbing lectures. Hence the usual problem solving approach like field work, project, laboratory group works, need to be sustained to enable students acquire “hand on” and ‘minds on’ skills. Active learning generates and sustains motivation and a student who is so motivated learn more easily (Abba and Ubandoma 2008). The learners have a sense of achievement as active learning encourages creativity and reduce conformity.

Finally, lack of appropriate communication channels disrupts the

implementation of curriculum. In fact, adequate formation is necessary about any curriculum innovation. Information about any new curriculum that is not properly and adequately disseminated to the people concerned, the implementation will suffer set back.

Prospects

Although the challenges enumerated seem enormous there is hope for the future generation as regards adequate curriculum innovation and implementation in secondary schools. Some of the prospects are:

(1) With the integration of Information, Communication Technology (ICT) into secondary school curriculum in Nigeria. Hence computer literacy will be fully ensured for both teachers and students.

(2) Innovation requires equipment, material infrastructures for effective science delivery in the school. The cost of science equipment should be made affordable and provision/supply of standardized materials for effective science delivery will go a long way helping the students to achieve their goal.

(3) Research results on the effects of innovations teaching style and better ways of improving other curriculum delivery would equip the teachers to better fulfill their roles.

Conclusion

Science is an indispensable tool for human and national development. Science education in schools should be made functional in terms of preparing students for sustainable living in the society. Hence issues concerning the teaching and learning of the subject must be taken very seriously. Curriculum issues on innovation should be placed very high if the aims and objectives of science education is to be actualized. To this end, both prospective teachers, and school administrators, should be well grounded and updated respectively on issues of curriculum innovation that gears

toward changing life of individual in the society.

Recommendations

The following recommendations if accepted and adopted should go long way in changing communities.

1. Government should above all, make teaching profession attractive by paying them as high as other professional in the other sectors like health, oil companies and special allowances paid to science teachers because they are not different. To obtain better result from teacher, Government should increase their take home.

2. Teacher as the implementers of the planned curriculum should be adequately motivated for improved efficiency and effective performance and they should be carried along.

3. Training & retraining of teachers should be an integral part of the curriculum so as to cope with innovations. Education is dynamic so practitioner in the field should be dynamic too.

4. Though there are challenges in innovation, the curriculum should still be reviewed from time to time in order to align it in a position to adequately address emerging issues at appropriate time.

5. The national policy on science and technology education should be revised.

This should be done to change the present emphasis on the acquisition of science process and principles, but to lay more emphasis on the acquisition of techniques of transferring knowledge into producing goods and services which are important for changing communities.

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