

SCIENCE CURRICULUM INNOVATION IN NIGERIA SENIOR SECONDARY SCHOOL: CHALLENGES AND PROSPECTS

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Abstract

Innovations are useful in any educational system and in curriculum, because it is man's means of survival in a rapidly changing environment. Hence, the strength of any society depends to a large extent on its curriculum. The technological strength of Nigeria depends squarely on the school science curriculum knowing that science and technology are tools for sustainable national development. Various science curricular have been designed to help achieve the objectives of science education. The delivery of this curriculum towards the set scientific and technological goals is challenged by many factors. This paper therefore examined curriculum innovation in the sciences in secondary school, such as the need to teach and learn science through new technologies, inadequate funding, lack of infrastructures, equipment and materials, inability of teachers to effect the desired innovation, amongst others. Although the challenges seem enormous, there is hope for the future. Recommendations are also given which will help improve the science curriculum delivery in Nigeria secondary school as well as implementation of the innovations.

For any nation, community and society to experience economic growth there must be a strong stimulation and growth in the teaching and learning of science. Hence a sound science educational system is accepted the world over as the bedrock of human development and progress.

Science is the foundation upon which any technological break through is built. Gbamanja (1991), stated that science is an organized and systematic knowledge dealing with man's understanding of the national powers. In the conditions of modern life, a scientifically and technological illiterate person is considerably circumscribed as playing his full potential in the socio-economic development of his community.

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.

In modern science, science teaching should be such that enabled 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 to ensure change will mean progress (Afangidan 2006). This progress mean exploring new avenue to achieve a better result or a result which is synonymous with the result but makes the new result well understood and easier to follow than the old technique. For the progress to be meaningful and scientifically reasonable, the science teachers, curriculum developers and planners must be innovative.

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Curriculum Innovation

Curriculum has been defined in various ways by different scholars. According to Mohammed (2007), curriculum is the experience a school system provides for its students. It can be viewed as all the experiences/activities (co curricula activities) provided under the auspice of school to bring about a change in the learner in the desired direction. Ibrahim and Yahaya, (2008) defined the term curriculum as a systematically organized course of teaching and learning. In formal education or schooling, a curriculum is the set of courses, course work, and content offered at a school or university.

As an idea, curriculum stem from the Latin word for race course, referring to the course of deeds and experience through which children grow and mature in becoming adults.

Science Curriculum can therefore be viewed as all the experience in science provided by the school for the achievement of goals of science education in the learning. Adeyegbe (2004) submitted that curriculum generally is the hub of the activities in any educational endeavors, since it dictate what is to be taught, at what level, by whom, with what equipment and for what purpose and assessed by what means. This then implies that science curriculum does not only dictate but also direct/guides every other process of implementing the programme of activities (Ugwu, 2008). Innovation in science education curriculum is inevitable in order to meet man needs. 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 effect of the change meet the expectation of both the designers and users (Udo, 2005). Okoye (2009) viewed curriculum innovation as ideas, approaches and materials introduced into education to improve the content of the curriculum in order to make it more relevant to the varying need of the learner and to every changing need of the society, improve instructional strategies and techniques in order to help the learners to learn faster and better improve organization of learning experience in order to make teaching-learning activities more meaningful and less tedious.

Innovation must be tied to the end product and improvement of education. This is because 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 society of today.

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.
- ✚ Provides the mean of trying new research findings.
- ✚ Enables classroom teacher to solve some instructional problems that they occasionally encounter in the teaching learning setting.
- ✚ Enables classroom teachers to acquire new knowledge that will make them more effective and productive.

In general curriculum innovations are directed towards improving performance of the school system so as to be result oriented. Hence any innovation introduced into the school curriculum must take into consideration the school system of the school.

Challenges Facing Science Curriculum Innovation in Secondary Schools

There are a lot of challenges facing curriculum innovation in the sciences in secondary school making is difficult for good quality education that is empowering and capable of bringing about sustainable development to be provided. Akpan (1999) noted that since 1968s government have been making efforts to improve science education in Nigeria such as restructuring of science curriculum content, regular teacher education programme for serving teachers, incentive to school teacher by

government, improve evaluation technique and strategies and review of infrastructure in school to create better opportunity for science teaching and learning. Despite these efforts, challenges facing science teaching and learning in term of innovation still persist for teachers, students and educational bodies.

First, is the need to teach and learn science in the senior secondary school, through new technologies brought about by recent innovation. Recent technologies challenge the traditional teacher-centered teacher 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, simulation instruction, Computer Assisted Instruction (CAI), Computer Based Learner (CBI), E - learning. Nigeria enhanced a policy on computer education in an attempt to keep pace with technological development worldwide. The plan was to establish pilot schools and diffuse the innovation thereafter first to all secondary schools and later to primary schools. However the plan could not go beyond distribution and installation of computers in schools. Hence the chalkboard and textbooks continue to dominate classroom activities in secondary schools in Nigeria. This is a major challenge.

A further challenge in innovation is the emphasis on active learning technique. Active learning as the name suggests is a process whereby learners are actively engaged in the learning process rather than passively absorbing lectures. Hence the usual problem solving approach like Fieldwork, guided discovery, project, laboratory works, programmed Instruction 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). Students have a sense of achievement as active learning encourage creativity and reduce conformity.

The third is the challenge of inadequate funding. Most often curriculum innovation faces a lot of problem, because of inadequate funds to recruit qualified teachers, train and retrain the teachers, recruit capable technicians and supportive staff, build laboratory for practical to cope with the innovation. Aguokobguo (2002) and Ereh (2005) identified lack of funding as a major factor that militate against curriculum innovation and implementation. Where there is inadequate fund, the anticipated change will suffer a serious set back because it will be difficult to implement an innovation effectively and efficiently (Ughamadu, 2006).

Fourthly is the challenge of infrastructure, equipment and material. Science is an activity-based and students centered and cannot be taught effectively without equipment and infrastructures. Also an innovation may not be fully effectively and efficiently implemented in the absence of these facilities and this will impede achievement of anticipated results. This challenge has given room or provided excuses 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 students (Nwagbo, 2006). Instead, they resort to expository method of teaching which is known for promoting rote learning and thus hindering transfer of learning.

Another major challenge is the inability of teachers to effect the desired change or innovation. Any innovation call for knowledge, understanding technique and other abilities. Where these are lacking then the knowledge gap will be a challenge in curriculum innovation. This will make the teacher unable to implement the curriculum.

There is also the challenge of most teachers, administrators, ministry of education officials being too conservative to effect change. They are often time suspicious of any new technique or innovation thus militating against any curriculum change.

Ignorance of the importance of curriculum change or innovation is a major challenge. 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 curriculum reconstruction so that the school does not expose the learner to irrelevant knowledge and skills.

Finally, lack of appropriate channels of communication necessary for dissemination of information about the revised curriculum is bound to disrupt the implementation of such a new curriculum. Infact, information about any curriculum innovation that is not properly and adequately disseminated to all the people concerned with the implementation will suffer some set back.

Prospects

Although the challenges enumerated seem enormous there is hope for the future as regards, adequate curriculum innovation and implementation. Some of the prospects are listed below.

1. With the integration of Information Communication Technology (ICT) into secondary school curriculum in Nigeria, computer literacy will be fully ensured both for teacher and students.
2. 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.
3. Innovation requires equipment for effective delivery. The science equipment centre already established in some part of the country would provide enough standardized equipment for effective delivery of instruction.

Conclusion

Science is an indispensable tool for societal challenges, human and national development. Issues concerning the teaching-learning of science must be taken very seriously. Curriculum issues especially on innovation cannot be relegated if the purpose of science education is to be actualized. Both prospective and in- service teachers, school administrators, ministry of education officials and other curriculum implementer should be well grounded and updated respectively on issues of curriculum innovations.

Recommendations

Based on the foregoing the following recommendations have been proffered

1. Government should have the political will as well as deliberate policy of pursuing science education. This should go beyond showing huge budgetary allocation to education (science and technology) which are most; time not feasible.
2. Implementers of the curriculum (teacher) should be adequately motivated for improved efficiency and effective performance and they should be carried along.
3. Training and 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.
4. Schools within our educational levels should be connected to the internet to enable teachers and students access information in conformity with the rapid demand of globalization which necessitated innovations.
5. 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.

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