

SCIENCE CURRICULUM DELIVERY IN NIGERIAN SECONDARY SCHOOLS: CHALLENGES AND THE WAY FORWARD

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Abstract

Science forms the bedrock of national sustainable development and this can be realized by effective science curriculum delivery. The role of Science as a vehicle for achieving sustainable development is conspicuous in many National Development Plans. For a proper and functional teaching and learning of science, the curriculum must be well articulated and implemented. The Nigerian Science Curriculum implementation is bedeviled with enormous challenges. This paper identifies some of these challenges and recommends the way forward for national development.

The curriculum can be defined as all the experiences or activities provided under the auspices of the school to bring about desirable change in the learners' behaviour. It is the design of a social group for the educational experience of learners or the experience of a school system for her students (Ugwu, 2008).

Science as a body of knowledge consist of ideas, skills and information about the world, nature and man (Ango, 1990). It is the foundation upon which any technological breakthrough is built. According to Gbamanja (2002), science is an organized and systematic knowledge dealing with man's understanding of the rational powers.

Science is a two-way activity that involves product (knowledge) and process (procedures of investigation). It involves an attitude of inquiry, observation and reasoning with respect to the world. Science can be developed through practice, observation and reasoning.

Science Education assist learners to develop attitude, knowledge and skills regarding the order in nature. It aims at producing scientifically literate citizens as well as producing potentials for scientific and technological man-power.

Awareness has been created about an ever-increasing gap between the scientific elite and the scientific illiterate. Scientific literacy is an aspect of cultural literacy which centers on a functional understanding of the nature of science (Mbah, Leghara, 2008).

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 to Nigeria's development. There is need to produce scientifically and technologically literate citizens that can sustain the natural environment and improve national development. The goals of science education include the development of independent learning skills and application of science to solving societal problems. It is only through a well designed and implemented science curriculum that these goals can be achieved (Ugwu, 2008).

It has generally been observed with serious dismay that the science curriculum in secondary schools in Nigeria is poorly implemented (Ali, 1998, Ibe and Nwosu, 2003 and Ogunleye, 2007). Ibe and Nwosu (2003) maintained that the teaching of science in secondary schools in Nigeria falls short of the expected standard. Consequently, students do not achieve as much as they ought to in science due to the problems related to the teaching – learning process Ali (2005). These facts clearly confirms the poor implementation of the science curriculum in our secondary schools. Adequate science curriculum implementation at all levels should be given a serious concern if the country is to make a meaningful impact in the area of science and technological (S&T) development.

The major challenges affecting effective implementation of the science curriculum in our secondary school system must be identified and properly addressed so as to achieve science education goals for national development.

Challenges to Adequate Implementation of Science Curriculum

- **Poor teacher preparation:** One of the problems of effective implementation of the science curriculum in secondary schools in Nigeria is poor teacher preparation. It is said that no educational system can rise above the quality of its teachers. Teachers have enormous responsibilities which must be backed up with adequate preparation and continuous professional development as curriculum developers and implementers.

It has been observed that many of our science teachers are poorly trained in either science content or methodology or even both (Okeke, 2001) and this adversely affects the implementation of the curriculum. Osuafor (2000) and Ugwu (2008) for instance worked on the problems and extent of implementation of instructional methods recommended from research results in science education respectively and found out that most of the innovative instructional methods are not frequently used by most teachers in their teaching work. According to Okebukola (in Adedibu and Olayiwola, 2007), the weakness of science teachers as a result of poor preparation include; lack of practical skills as a result of inadequate exposure to teaching practice; poor classroom control and management; lack of in-depth subject and entrepreneurial skills; inability to communicate effectively in English language; lack of professionalism; poor attitude to work and poor computer skills.

- **Poor curriculum planning:** Another problem facing the science curriculum delivery is the planner-executor problem. Most departments of planning, research and statistics in the schools board, see their job in terms of mere collection of data which they analyze and compute into quantitative education plans. The plans are then handed down to government officials without educating and training/retraining those who are to execute the plan. Ozuzu (2000), further agreed that most of the time the executors such as the teachers may not be properly informed on what exactly to do. He further viewed that unless the curriculum planner works together with those who execute programmes, there will exist the planning-execution problem.

- **Poor/inadequate science materials:** Science is experimental and so is best learnt by doing. Experimentation in science is solely dependent on the availability of science equipment/materials for its understanding, development and application. The provision of science equipment/ materials is grossly inadequate in schools (Ogunleye, 2007) and these adversely affect the implementation of science curriculum. According to Bolorunduro (1997) and Ugwu (2004) lack of inadequate laboratory facilities is a common feature in most of our primary and secondary schools. It is expected that in absence of laboratory equipment/ materials for teaching of science, improvised local materials should be an alternative but this is not forth-coming either.

One of the goals of education as it is documented in the National policy is “the acquisition of appropriate skills and the development of mental, physical and social abilities and contributing to the development of his society.” This goal will be difficult to achieve in a school system where equipment/materials for “doing science” is inadequate or totally absent.

- **Poor curriculum timing:** Curriculum planning and development takes time but these needs to be estimated and planned for. It takes time to develop materials needed, time to test them and time to publish and distribute published materials. It also takes time to disseminate information from the planning committee to the implementation committee. It equally takes time to train personnel to be used for planning and implementation. Most often however, the government will introduce a programme without allowing enough time for evaluation before another one is introduced. Time constraints are contributing to why the curriculum published by the NERDC has not been implemented in most schools by now.

- **Poor teacher motivation:** Motivation of teachers is generally necessary for effective implementation of the curriculum. Motivation of teachers entails caring for their welfare. This involves professionalization of teaching and placing them at par with their counterparts in other professions; introducing meaningful teachers salary structure; payment of enhanced science allowances; encouraging them to attend workshops, conferences and seminars on regular bases to update knowledge on the new

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development in their different areas of specialization and even evaluating them on regular bases to ensure quality. These points are rarely fulfilled in Nigerian educational system and it is adversely affecting the teaching profession and the implementation of science and other curricula. According to Ugwu 2005, Science teachers are not well cared for and they have been relegated to the background in the remunerative ladder. Gyuse and Ada (2005) submitted that their remuneration is not commensurate with their job.

If we are to keep our science teachers happy on the job and improve their professionalism, there must be a way of encouraging them through adequate supply of teaching materials and equipment, good bonuses as incentives for hard work and opportunity for continued professional development. This is essentially what education reform is all about. Sustaining the interest of professional science teachers entails guarding jealously the attractive conditions that lured them into the profession. This accordingly includes commensurable remuneration among other factors. It can be deduced from the foregoing therefore that no matter how well planned and designed the science curriculum might be, or how well qualified/ knowledgeable the teachers might be, without being well taken care of by the government, implementation of the curriculum will not receive the appropriate attention.

- **Over loaded curriculum content:** Science curriculum is overloaded with contents much of which is not only of little relevance to the general education for which secondary school is meant, but cannot be covered within the time limit (Adeyegbe 2004). From interaction with some science teachers on the extent of coverage of Senior Secondary One (SS1) science curriculum, at the end of the session, it was gathered that very few science teachers covered two-third of the SS1 Science curriculum. This is a clear indication that it is difficult to make teachers cover senior secondary school curriculum if an extra effort is not made. Any efforts towards covering the curriculum, always stresses both the teachers and the students and also jeopardize other school programmes. A lot of problems also accompany voluminous curriculum contents ranging from the teachers not being detailed in preparation at a time, leaving some topics untreated, use of improper instructional technique and even poor evaluation of the extent of achievement of the objectives of the lesson.

If the objective of science education is to be achieved for sustainable development, then it is necessary that curriculum planners off-load the curriculum.

Conclusion

Science and science education is very vital to our national development. The objective of science is to create citizens who understand science in a way that will enable them participate intelligently in critical thinking, decision making and problem solving situations. The science curriculum delivery must be geared towards these goals for sustainable national development.

Recommendations On The Way Forward

On the way forward for effective science curriculum delivery in Nigeria, the following recommendations are proffered:

1. Curriculum planners in the sciences should work together towards a reduction of content in every science curriculum to reduce the problem of irrelevant and overloaded curriculum. Classroom teachers should be co-opted in the selection of relevant topics to be eliminated.
2. Curriculum implementers (the teachers) should be adequately motivated for improved efficiency and effective performance in science curriculum delivery.
3. Training and retraining of teachers should be an integral part of the curriculum. Education is dynamic. The practitioners (teachers) in the field must be dynamic.
4. Science curriculum review should be carried out at every five years interval so as to align it in a position that could adequately address emerging issues at appropriate time.
5. To reduce the cost of funding science education, a committee of science teachers should be set up at every Local Government Area for improvisation of science manipulative materials. This should consist of science teachers from every area of science, some curriculum planners and developers to be trained on what could be improvised and how on different subject areas.
6. School community relationships should be strengthened and the society should show greater interest in supporting curriculum development in schools.

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