



Challenges of Effective Implementation of New Secondary School Physics Curriculum in Public and Private Schools in Nigeria

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ABSTRACT

Physics is one of the science subject taught in Nigerian secondary schools. Due to its application in science and technology, it is being considered as the basic subject of science, technical and engineering courses. Literature has revealed a lot of challenges facing the implementation of senior secondary school physics curriculum in private and public schools in Nigeria. In the light of these, this paper focused on Concept of Physics Curriculum, Nature and Objectives of Physics Curriculum, Concept of Curriculum Implementation in Physics, Curriculum Implementation in Private and Public Schools in Nigeria the paper as well discussed the challenges of physics curriculum implementation and provide the way forward.

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INTRODUCTION

Physics is one particular subject that is playing a major role in the development of science and technology in the world. Its relevance has also permeated through all aspects of human existence in the universe. The economic potential of developed nations rests squarely on their advancement in science and technology and physics played a major role in that aspect. Physics indeed is the pillar of technological and scientific development of most developed nations in the world. The laws, principles and theories of physics are being applied in solving many problems of man on earth. Atadoga (2010) pointed out that physics is the heart of science and pillar of all technological activities. Many developed nations like USA, Japan, France, China and Russia attained their positions of world power as a result of development in science and technology and physics played a key role in that direction. In consonance with this assertion, Okoroh (2003) posits that unless one understands the foundation of physics and links it with applied knowledge, one cannot call oneself an educated person in a country like Russia.

However, despite the relevance of physics to scientific and technological breakthroughs of nations, the subject has been faced with a myriad of problems in Nigeria. Some of the problems according to Usman (2011) include: poor performance of students, low enrolment, and gender disparity, lack of laboratory equipment and shortage of competent manpower. Some teachers lack accurate knowledge of physics subject matter and update knowledge (Imo, 2009).

Ogunleye in Usman (2011) highlighted some factors prevailing against students' understanding and poor performance in secondary school physics to include: overloaded curriculum, uneven distribution of curriculum content, difficult nature of physics concepts, lack of competent physics teachers and non-functional physics curriculum. The new secondary school physics curriculum in Nigeria is designed specifically to encourage all students to achieve their spiritual, intellectual, scientific potential as well as understand the relevance of learning physics in their daily lives. It is important to note that, it is one thing to develop/design curriculum, it is another thing to implement it effectively (Ahmadi, 2015). Ahmadi further stressed that the objectives of any level of education cannot be achieved if the planned programme for such level of education is not well implemented. Onyeachu (2008) observed that no matter how well a curriculum of any subject is planned, designed and documented, implementation is important. That is to say that any well planned, designed and documented curriculum without effective implementation is worthless.

Concept of Physics Curriculum

Curriculum as the name implies has been defined by many educators in different ways. Saidu (2009) viewed curriculum as planned learning activities to be covered within a specific period of time under the leadership of a school. In physics education, curriculum refers to all the pre-selected planned learning activities to be covered within a

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specific period of time under the closed supervision of the school. A physics curriculum could as well refer to a well-defined and prescribed course of studies, which students must fulfil in order to pass a certain level of education. It is learning activities, planned and designed for students to learn over a period of time in school. Curriculum according to (NERDC, 2004) is an important element of education in which overall objectives of education depend largely on the nature of the curriculum. Ahmadi (2015) defined curriculum as a particular form of specification about practice of teaching. Ahmadi further sees curriculum as not a package materials or syllabus of ground to be covered rather it is way of translating any educational idea into a hypothesis testable in practice. Curriculum in physics education therefore, encompasses all the learning experiences which students are expected to learn during their years of schooling.

Nature and Objectives of Physics Curriculum

The nature of physics is such that the development of physical theories often requires creativity at every stage. The development of physical theories is usually seen as a two-way process that commences with experiments or observation. This development according young and Freeman (2008) follows an indirect path with blind alleys wrong guesses, and discarding of unsuccessful theories in favour of more promising one.

The curriculum is the backbone of any educational system. The reason being that it is from the curriculum that what should be taught, how it should be taught and to who should it be taught. Physics curriculum therefore is all the learning experiences that the child is supposed to learn and expose to. It is the planned and unplanned programmed of activities that are geared towards giving and individual knowledge, skills and attitude that goes to satisfy national aspiration. The general objectives of the SSS Physics Curriculum as stated in the Curriculum document of (FRN. 2009) are:

- i. To provide basic literacy in Physics for functional living in Society.
- ii. To acquire basic concepts and principles of Physics as preparation for further studies
- iii. To acquire essentials scientific skills and attitudes as preparation for technological application of physics, and

iv. Stimulate and enhance creativity

Also in effort to reposition the development of Science and Technology education, the Federal Government of Nigeria (FRN. 2009) came up with the new secondary school Physics curriculum. The curriculum adopted the thematic approach where the curriculum is arranged in six themes and the spiral arrangement of the content. Although it shares some similarities with the first curriculum which was developed based on conceptual approach and spiral in nature. The concept of spiral curriculum entails arrangement, where simpler concepts are handled at a lower level while complex ones are handled at a higher level when the learner is more intellectually matured i.e from simple to complex. The idea is for the teacher to align the level of difficulty of a topic to the level of the learner or learning a particular related concept will help the learner learn a higher ordered concept which promote meaningful learning of Physics concepts.

The New Senior Secondary School Physics Curriculum also has some unique features which include the introduction of a new theme on 'Physics in Technology' and emphasis on inculcation of entrepreneurial skills in the students. This guide has therefore been developed to avoid the pitfalls at the First National Senior Secondary School Physics Curriculum. It begins by helping you to understand the features of the new SSS Physics Curriculum (Unit 1). It then shows you how to break the curriculum contents into teaching syllabus; teaching syllabus into scheme of work, and the scheme of work into unit planning. The New Curriculum also demands teachers to use modern teaching approach. The unit 3 explains what constitutes a modern teaching approach, the steps and format for planning a lesson based on this approach. This is followed by sample lesson plans and the teaching of difficult concepts in units 4 & 5 respectively. Considering the fact that Physics teaching cannot be successful without assessing the deployment of appropriate assessment techniques and relevant resources. Attempt was made in the curriculum to provide teachers with useful ideas on how to assess students learning in Physics in (unit 6) and how to source and use resources for optimum benefits in Physics instruction (unit 7). Table 1 shows the structure of Nigerian SSS Physics Curriculum.



Table 1: Number of Topics Covered in each Theme per Year for SS 1 – SS 3

S/N	Themes	SS 1	No. of Topics	SS 2	No. of Topics	SS 3	No. of Topics
i.	Interaction of matter, space and time	✓	7	✓	7	-	-
ii.	Conservation principle	✓	3	✓	4	✓	2
iii.	Waves, motion without material transfer	-	-	✓	7	✓	2
iv.	Fields at rest and in motion	✓	3	-	-	✓	5
v.	Energy quantization and the duality of matter	✓	2	✓	1	✓	4
	Physics in technology	✓	3	✓	2	✓	10
	Total		18		21		23

Source: N.E.R.D.C., Lagos (2012) Key:

✓ Means theme taught in this class

- Means theme not taught in this class.

Concept of Curriculum Implementation in Physics

Issues related to curriculum implementation has been a source of concern to physics educators. Various definition of curriculum implementation has been given by experts. In physics education, curriculum implementation simply means putting the curriculum into work in line with achieving the stated objectives. Mpa (2007) defined curriculum implementation as the task of translating the curriculum document into the operating by the combined efforts of the students, teachers and others concerned. In his view (Okebukola, 2004) defined curriculum implementation as the transition of the objectives of the curriculum from paper to practice. In agreement with Okebukola assertion. Ivowi (2004) sees curriculum as the translation of theory into practice, or proposal into action. Obanya (2004) look at curriculum implementation as day-to-day activities which school management and classroom teachers undertake in the pursuit of the objective of any given curriculum. Obanya (2007) states that effective curriculum is the one that reflects what the learner eventually takes away from an educational experience as the process of putting all that has been planned as curriculum through the combine effort of the teacher, learner, school administrators, parents as well as interaction with physical facilities, instructional materials. Psychological and social environment. Garba (2005) posits that curriculum implementation connotes putting the curriculum into work for the achievement of the goals for which the curriculum is designed. In summary, curriculum implementation in physics connotes the alignment of all the learning activities or planned into practice through the teacher and other stakeholders involved to achieve the stated objectives of the curriculum.

Physics Curriculum Implementation in Private and Public Schools in Nigeria

In Nigerian secondary schools, implementation of physics curriculum rest squarely on the teachers, administrators and ministries of education. Its implementation at both private and public schools seems to face many challenges. Physics is very crucial for effective livelihood in contemporary world, given its vast application in medicine, agriculture, engineering and other fields. It is therefore, a necessity that students of physics in secondary schools, where the foundation of physics is taught, are provided with ample opportunity to acquire knowledge and skills offered by physics. This is opportunity for secondary school students to acquire physics concepts, laws, principles and skills have been built into the secondary school physics curriculum. In essence, the curriculum though adjudged satisfactory in its philosophy, objectives and content, (NERDC, 2008) said it has fallen short of expectation in its implementation due to challenges. The challenges of the implementation according to Awofala and Awofola (2011) include lack of sufficient number of qualified teachers, inadequate equipment to endure the performance of related students' activities and the nature of the subject that appears to be difficult.

Curriculum implementation in both public and private schools has been an issue of concern among educators. Some authors linked students' poor students' performance in physics as due to poor curriculum implementation. Great Schools (2010) pointed out that there is similar discrepancy between curriculum development in public and private schools. Great schools lament that public school are mandated to follow guidelines that set out specific

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and assessment procedure which creates certain amount of quality control while private schools choose whatever curriculum and assessment model they wish. Great Schools further asserts that in public schools, average class size is large while private schools provide small classes with low student-to-teacher ratio. This small class size may give a teacher a source of relief in implementing the physics curriculum in private schools. Oyeacha (2008) observed that no matter how well a curriculum of any subject is planned, designed and documented, implementation is important. No curriculum could be said to achieve its objectives without effective implementation.

CHALLENGES OF PHYSICS CURRICULUM IMPLEMENTATION

The primary goal of every curriculum is the achievement of its objectives. Amadi and Lukman (2015) opined that the achievement of objectives of any level of education depends largely on effective implementation of its planned programmes. A lot of challenges has been affecting the implementation of senior secondary school physics curriculum in Nigeria. Some of the challenges of curriculum implementation in physics are:

Lack of Qualified Physics Teachers

One of the major challenges affecting physics curriculum implementation is lack of qualified teachers. Ajibola (2008) pointed out that most of the teachers are not qualified to teach the subject introduced in the new senior secondary school curriculum. The bane of curriculum implementation in Nigerian secondary schools has been attributed to non-qualified teachers. Lassa (2007) described the teacher as the key element to proper development of the child and consequently they are needed in greater number in secondary schools. The National Policy on Education (2013) states that no education system can rise above the quality of its teachers. Ukeje (2006) remarked that teachers are the pivot of any educational system, and that upon their number, their quality and devotion depend on the success of any educational system, and that upon their number, their quality and devotion depend on the success of any educational system. Indeed, teacher plays important role in the implementation of physics curriculum.

Inadequate Instructional Materials for Teaching Physics

Materials for teaching and learning of physics are reported by the researchers to be

inadequate in most secondary schools. Without adequate instructional materials, implementation of the curriculum could not be effective. Ajayi (2009) in a study on relationship between availability of instructional materials and curriculum implementation in Nigerian secondary schools found a significant level of relationship between the two. Anyokogu (2002) found that a relationship did exist between availability of school facilities and implementation of school curriculum. Without adequate facilities and materials in schools, physics curriculum will not be implemented effectively. Instructional materials are designed to promote effective teaching/learning experiences, and also is resource materials to curriculum implementation.

Non-Involvement of Physics Teachers in Decision Making and Curriculum Planning

Teachers are the implementers of curriculum. However, in Nigeria, it is very rare to see teachers involve in decision making and planning of physics curriculum. Obinna (2007) observed that in most cases teachers are deliberately neglected when major decisions on education and matters concerning their welfare are taken. The teacher plays an important role in the implementation of the school curriculum and in interpreting programmes, goals, objectives and course content to students (Ajiboye, 2005). The relevance of any curriculum is determined only when it is implemented and teachers play a significant role in that regard. Lack of involvement of teachers, according to Akuezuilo, (2006) equally hinders the curriculum whose key implementers are not well oriented to the teaching of such curriculum.

Poor Funding of Education

There is public outcry about the poor funding of education by governments at all levels of education. The funds allocated to education in Nigerian budget seems to be inadequate year in and year out. This is a serious issue in curriculum implementation in Nigerian secondary education system. This ugly trend of underfunding of education in Nigeria was argued by Gwany (2006) where said that the education industry is usually the first and easiest victim of budget cut during austerity and low profile, structural adjustment and other economy reforms strategies. The present level of underfunding by the state, the public sector of education has witnessed stagnation and decay (Nwachukwu, 2005). There is no way teachers can perform effectively where there is no money for the payment of salaries, purchase of equipment, books, furniture, and other

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facilities. This serious shortfall and inadequacies in education funding manifest in over-crowded classrooms, libraries and laboratories, where they exist. Infact due to lack of political will and determination in providing quality education for citizens, from 2009- 2013 budgetary allocation shows that Nigerian government had not met the required 26% of budget recommended by UNESCO. For instance, in 2009, 2010, 2011, 2012 and 2013, the total allocation and percentages for education stood at N33.63bn, (6.4%), N295.3bn (7.5%), N306.3bn (7.9%), N400. 15bn (8.43%), and N426.53 (8.7%) (FME, 2009-2013) report.

Absence of Teacher's Motivation

Motivation is one key psychological variable that can make someone to act and perform. Infact motivation can help an individual to do his/ her job effectively and without weakness. Teacher motivation according to Ofoeegbu (2011) are those factors that operate within school system which if not available to the teacher would hamper performance, cause stress, discounted and frustration all of which subsequently can reduce student quality output. That is to say that to improve student performance in physics, teachers must be motivated when teacher's salaries, allowances and other entitlements are not given to them, they cannot implement the content of the curriculum effectively. If the incentive attached to the implementation do not satisfy the teachers and resource personnel, the most that can be expected is that they will not implement it well.

Inadequate Time

Concerns are usually raised by teachers about the inadequate time to implement the curriculum. Time for instance is the teachers' most vital resource and the amount of time needed to implement the curriculum seems to be grossly inadequate and this make it impossible to implement the curriculum effectively. For example, each new curriculum to be implemented demand that teachers should prepare a comprehensive lesson plans and materials in order to be familiar and ready to teach the new concepts and skills. These cannot happen when time is not adequate.

WAY FORWARD

Based on the discussion in this paper, the following recommendations are proffered:

1. Both states and federal government should take payment of teachers' salaries seriously. This is because when teachers are paid on

time and when due, they will put on more efforts to teach and implement the curriculum.

2. Government at all levels should ensure that instructional facilities are provided in schools for teaching and learning of physics. This is because no effective teaching and learning of science physics in particular would take place without teaching facilities.
3. Adequate funds should be given to education in Nigerian budget. This would enable the purchase of laboratories equipment and purchase of relevant books that would assist in effective curriculum implementation.
4. Teachers should be involved in decision making. This is because teacher are the implementers of curriculum and no education can rise above the quality of its teachers.

CONCLUSION

This paper has x-rayed the challenges facing the implementation of physics curriculum in Nigerian public and private secondary schools. The paper further discusses issues relating to the concept of physics curriculum, its nature and objectives, concept of curriculum implementation in physics and curriculum implementation in public and private schools. The paper pinpoint the way forward that could help in addressing the challenges of curriculum implementation.

The issue of curriculum implementation should be taken seriously. This is because, if curriculum is not effectively implemented, the result would be production of half-baked graduates that could be employable. This could seriously jeopardize the development of manpower in the country and hence drawn the country back among the community of nations. The issue of funding education should be given upmost priority by government and private organizations. Since no education would function well without adequate funding.

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