

ASSESSMENT OF THE IMPLEMENTATION OF BASIC SCIENCE AND TECHNOLOGY CURRICULUM IN JUNIOR SECONDARY SCHOOLS, NIGER STATE.

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Abstract

This research work assessed the Basic Science and Technology curriculum implementation in Junior Secondary Schools in Niger State, Nigeria. The study was conducted using four objectives which were translated in to research questions. Descriptive survey design was adopted with sample size of 60, which were randomly selected across the 30 junior secondary in Bosso and Chanchanga Local Government Areas. The instruments used for data collection were questionnaire titled Assessment of Basic Science and Technology Curriculum Implementation Questionnaire. Mean, Standard Deviation and frequency and percentage were used for descriptive analysis. The research findings from this analysis reveals that: the Basic Science and Technology curriculum content is not being properly implemented; most of the Basic Science and Technology institutional material are not available and the few that are available are not adequate. Based on these findings five recommendations were proffered which include; all people concerned with the implementation of Basic Science and Technology curriculum content should be actively involved and committed to ensure the effective implementation of Basic Science and Technology curriculum in Nigeria, Basic Science and Technology teachers need to be conversant with the appropriate and newly discovered teaching methods and strategies and as well employ them while teaching Basic Science and Technology, Basic Science and Technology instructional materials and resources should be made available to the schools, there is need to consider teacher motivation, and provide adequate classrooms for Basic Science and Technology lessons and Quality assurance officials should put more effort and perform their duties accordingly.

Key words: Assessment, Basic science and Technology, Curriculum, implementation

Introduction

Basic Science and Technology is one of the subjects offered at junior secondary school level of Nigeria education. The subject was structured to assist learners to develop interest in science and technology. The aim is that by the end of the junior secondary school, presently known as basic 9, science and technological appreciation would have been activated and sustained, and foundation laid for students' entrance into science and technology courses at senior secondary level of education as stated in the National Curriculum for Junior Secondary Schools 1998 (Obioma, 2007). Furthermore, the national curriculum maintains that, the subject of Basic Science and Technology which was then Basic Technology is to be offered in junior secondary schools so as to reduce widespread ignorance about science and technology, lay a firm foundation for national development and inspire an increase in skill acquisition. Basic Science and Technology is a subject that introduces students at the junior secondary level of education in Nigeria, to the fundamental and basic in science and technology.

In the light of the feedback on the Implementation of the 9-Year basic education curriculum (BEC) received and the contemporary global and national concerns, the Nigerian government revised the 9- Year BEC in 2012 in line with global best practices as in Kenya -7 subject,

Tanzania- 8 subject, United States of America -6 subject, Malaysia and Indonesia -9 subject offerings (Obioma, 2012). The curriculum revision process involved identification and grouping of related disciplines such as Basic science, Basic Technology, Physical and Health Education and Information Technology to create a new composite or cluster of Revised BEC subject called Basic Science and Technology . Key concepts in the former curricula now form integrating threads for organizing the contents of the new subject into a coherent whole.

The new BEC was developed in response to Nigeria's need for relevant, dynamic and globally competitive education that would ensure that learners at the Basic Education level are capable to compete favourably anywhere in the world in terms of knowledge, skills, techniques, values and aptitude. Thus the new 9-Year BEC addressed among other things, the issue of value re-orientation, poverty eradication, critical thinking, and entrepreneurship and life skills. Implementation of the new 9-Year BEC commenced nationwide, in Primary 1 and JSS 1 classes in September, 2008, while the old curriculum (the 6-3-3-4 Curriculum) was systematically being phased out. The first batch of JSS students graduated in June, 2011 after writing the Basic Education Certificate Examination (BECE). By September, 2014, the cohort of pupils that benefited from the use of BEC at the primary school level entered class one of the Junior Secondary School (Obioma, 2012).

The framework of the New Basic Education Curriculum according to Adeniyi (2012) reflects the following:

- i. The curriculum is designed to properly target pupils and students' needs and interests to make provision for appropriate core and elective subjects for a well-rounded education at the different age levels
- ii. The lower and Middle Basic Education Curricula (for primary 1-6) will be in full use by the year 2014 and the Upper Basic Education Curriculum (for JS 1-3) will be achieved by the year 2011
- iii. Every child is expected to complete primary 6 before being placed in Junior Secondary (JS1)

The development of science and technology is also recognized worldwide as vital for a nation's overall economic development. When used effectively science and technology is able to improve productivity and meet the needs of society. This has been demonstrated in the developed nations, and more recently in the newly industrialising nations, where science and technology have been responsible for more than half of the increase in productivity. The quest for technological advancement and industrial revolution therefore demands for a robust and inclusive science and technology curriculum at basic level of education. The curriculum should appeal to all learners and relevant to their need, regardless of backgrounds. Pupils are likely to learn better when they are interested in the subject and the subject is also relevant to their need, hence it becomes important to prepare curriculum that will be relevant and adequately cater for the need and interest of the pupils. There is evidence that using relevant context leads to a better understanding of the concepts involved compared to traditional teaching (Ramsden, 1997, Osborne & Collins, 2001) but a curriculum that uses content that is relevant and related to familiar and interesting phenomena and experiences in the local environment of the pupils may lead to a more meaningful learning (Nganunu, 1998).

In order to reduce ignorance in relation to science and technology and help lay a solid foundation for true national development, Basic Science and Technology has been accorded a place in the school curriculum as a core subject like English and Mathematics.

Damole (2011) stated that in the Nigerian education continuum, basic education as the foundation requires a sound knowledge of science and technology. This is not only because science and technology has a tremendous impact on all social institutions but because science teaching is "somewhat on the downside. The 9 years Basic Science and Technology Curriculum (BSTC) is therefore a restructuring and re-engineering of the revised core curriculum for Primary science and integrated science of Junior Secondary school currently in use.

In the selection of content for the new Basic Technology curriculum, Globalization, Information and communication Technology (ICT) and Entrepreneurship were the three major issues considered to be crucial in the development of a child, important to the nation, and influencing the contemporary world of knowledge. Thus in the aspiration for identification with contemporary development globally, it has become inevitable for Nigeria to incorporate relevant content into the school curriculum.

The new Basic Science and Technology (BST) curriculum now comprised of four subjects-basic science, basic technology, physical and health education and information technology. The objectives of the present BST curriculum are to reduce subjects overload and content repetition at Junior Secondary School (JSS) and also to adequately prepare students at JSS for SSS learnings and activities in science and technology subjects (Federal Ministry of Education, 2007). It is expected that this new curriculum will now serve as a preparatory (prerequisite) subject for science and technology subjects such as Physics, Chemistry, Biology, Agricultural Science, Health Education, computer related subjects, Technical Drawing, Basic Electronic, Metal Work, Wood Work, Auto-Mechanic at SSS level. However, there has been a lot of criticism on the effectiveness of the present basic education curriculum of which BST curriculum is included (Nwaubani & Azuh, 2014). Hence the need to assess the implementation of the new Basic Science and Technology curriculum to determine whether it is achieving the objective of introducing it.

Statement of the Problem

Basic Science and Technology in the junior secondary schools in Nigeria, is yet to reach its full potentials and engender full knowledge and vocational competences among Nigerian youths. This is because Basic Science and technology is confronted by myriads of problems such as which militate against its proper and efferent teaching in junior secondary schools. The experience of the researcher as a science and technology educators and interaction with other colleagues revealed that there has been a lot of criticisms in the field about this curriculum in terms of its implementation. This study therefore sought to assess the extent to which basic science and technology curriculum is being implemented in junior secondary school in Niger State and the problems inherent in the implementation of the already reformed curriculum.

Aim and Objectives of the Study

The aim of the study is to assess the implementation of basic science and technology curriculum in Junior Secondary Schools in Bosso and Chanchanga Local Government Area.

The specific objectives are to;

1. Ascertain the teaching methods used by basic science and technology teachers in the implementation of the basic science and technology curriculum in Nigeria Junior Secondary Schools.
2. Identify the available instructional materials used in the implementation of basic science and technology curriculum in Nigeria Junior Secondary Schools.
3. Determine the adequacy of the available instructional material used in the implementation of the curriculum.

4. Identify the problems associated with the implementation of the basic science and technology curriculum in Nigeria Junior Secondary Schools.

Research Questions

The following are the guided research questions:

1. What are the teaching methods used by science and technology teachers in implementing Basic Science and Technology curriculum at Junior Secondary Schools?
2. What are the available instruction materials used for implementing Basic Science and Technology in Nigeria Junior Secondary Schools?
3. How adequate are the available instructional materials used for implementing Basic Science and Technology curriculum?
4. What are the problems associated with the implementation of the basic science and technology curriculum in Nigeria Secondary Schools?

Research Methodology

The descriptive survey design was adopted for the study. The design is appropriate since the study assessed the implementation of Basic Science and Technology curriculum in Junior Secondary Schools. The population comprised of Basic Science and Technology teachers and principals in Bosso and Chanchanga local government area of Niger state. The sample size used for the conduct of this study was 60 respondents, 15 principals and 45 Basic Science and Technology teachers from the two local government areas used for the study. A random sampling technique was used in the study. Assessment of Basic Science and Technology Curriculum Implementation Questionnaire was used for data collection. The questionnaire was divided into two sections, sections A and B. Question in section A dwells on the bio-data of respondent and a guide on how to respond to the questionnaire items. While Section B consists of 33 items raised in the four research questions.

Items under the research question 1 and 4 are responded to using the following scale.

Strongly Agree (SA) = 4 points

Agree (A) = 3 points

Disagree (D) = 2 points

Strongly Disagree (SD) = 1 point

While items under research question 2 and 3 are responded to using the scale:

Available/Not Available and Adequate/Not Adequate respectively

The questionnaire used by researcher was validated by 3 lecturers in the Department of Industrial and Technology Education Federal University of Technology Minna for appropriate correction in order to produce the relevant information needed for answering the research questions. The validated questionnaire was used to collect data for this study. Cronbach's alpha reliability method was used to determine the internal consistency of the instrument for the data collection. The researcher paid a visit to the schools concerned to administer the questionnaire. The questionnaire administered to teachers and principals were duly returned, presenting 100% return rate.

The data collected was analysed using frequency count, statistical mean score method and Standard Deviation to agree or disagree on the respondents' opinion on a particular item contained in the instrument. The mean score of each item was computed by multiplying the frequency of each response mode with appropriate nominal value and divided by the sum obtained under each item with the number of the respondents to an item. The means of 2.50 was used as decision point for every questionnaire item for research question 1 and 4.

Consequently any items with a mean response of 2.50 and above was considered to be agreed and any item with mean score of 2.49 and below was considered disagreed.

Results

Descriptive Analysis

The following descriptive statistics were presented to answer the research questions:

Research Question 1

What are the teaching methods used by science and technology teachers in implementing Basic Science and Technology curriculum at Junior Secondary Schools?

Table 1: The mean and standard deviation scores for the teaching methods used by science and technology teachers in implementing Basic Science and Technology curriculum at Junior Secondary Schools.

| S/N | Item | Mean | Standard Deviation | Remarks |
|-----|---|------|--------------------|----------|
| 1 | Basic Science and Technology teachers often used cognitive development methods of teaching such as Discussion Method, Questioning/Socratic Method, Team Teaching Method, Talk Chalk/Recitation Method, Field Trip/Excursion Method and Team Teaching Method | 2.20 | .410 | Disagree |
| 2 | Basic Science and Technology teachers often used Affective Development Method of teaching such as Modelling Method, Simulation Method, Dramatic Method, Simulation Games and Role-Playing Method | 2.15 | .489 | Disagree |
| S/N | Item | Mean | Standard Deviation | Remarks |
| 3 | Basic Science and Technology teachers often used Psychomotor Development Methods of teaching such as Inquiry Method, Discovery Method, Process Approach Method, Demonstration Method, Laboratory/Experimentation Method, Programmed Learning Method, Dalton Plan/Assignment Method and Project Method | 2.10 | .718 | Disagree |
| 4 | Basic Science and Technology teachers used traditional method of teaching such as lecturing, dictation, teacher led discussion and explanation. | 2.60 | .616 | Agree |
| 5 | Basic Science and Technology teachers used modern method of teaching such as problem – based learning, didactic games methods, brainstorming, heuristic method | 2.25 | .550 | Disagree |

Table 1 revealed that the respondents disagreed with all the items (2.10 to 2.25) except item 4 with the mean score 2.60. This showed that the mean value of each item was below the cut-off point of 2.50, indicating that all Basic Science and Technology teachers do not use cognitive developments method, affective development method, psychomotor development method, traditional method and modern method of teaching.

Research Question 2

What are the available instruction materials used for implementing Basic Science and Technology in Nigeria Junior Secondary Schools?

Table 2

Frequency and percentage of the available instruction materials used for implementing Basic Science and Technology in Nigeria secondary school.

| S/N | ITEMS | FREQUENCY | | PERCENTAGE (%) | |
|-----|--|-----------|---------------|----------------|---------------|
| | | Available | Not Available | Available | Not Available |
| 1 | Textbooks | 60 | 0 | 100.00 | 0.00 |
| 2 | Charts | 44 | 16 | 73.33 | 26.67 |
| 3 | Flat Pictures | 38 | 22 | 63.33 | 36.67 |
| 4 | Posters | 45 | 15 | 75.00 | 25.00 |
| 5 | Cartoon | 12 | 48 | 20.00 | 80.00 |
| 6 | Real Objects | 47 | 13 | 78.33 | 21.67 |
| 7 | Mock-up | 0 | 60 | 0.00 | 100.00 |
| 8 | Science and Technology Resource Centre | 0 | 60 | 0.00 | 100.00 |
| 9 | Chalkboard/Whiteboard | 60 | 0 | 100.00 | 0.00 |
| 10 | Flannel Board | 3 | 57 | 5.00 | 95.00 |
| 11 | Multimedia Projector | 4 | 56 | 6.67 | 93.33 |
| 12 | Computer Assisted Instruction | 4 | 56 | 6.67 | 93.33 |
| 13 | Internet | 4 | 56 | 6.67 | 93.33 |

The data presented in Table 2 shows that majority of the respondents indicated that Textbooks, Charts, Flat-pictures, Posters, Real-Objects and Chalkboard/Whiteboard are available for implementing Basic Science and Technology in Nigeria secondary school.

Research Question 3

How adequate are the available instructional materials used for implementing Basic Science and Technology curriculum?

Table 3

Frequency and percentage of the adequacy of the available instruction materials used for implementing Basic Science and Technology in Nigeria secondary school.

| S/N | ITEMS | FREQUENCY | | PERCENTAGE (%) | |
|-----|---------------|-----------|--------------|----------------|--------------|
| | | Adequate | Not Adequate | Adequate | Not Adequate |
| 1 | Textbooks | 55 | 5 | 91.67 | 8.33 |
| 2 | Charts | 26 | 34 | 43.33 | 56.67 |
| 3 | Flat Pictures | 0 | 60 | 0.00 | 100.00 |
| 4 | Posters | 18 | 42 | 30.00 | 70.00 |
| 5 | Cartoon | 1 | 59 | 1.67 | |

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|----|--|----|----|--------|--------|
| 6 | Real Objects | 12 | 48 | 20.00 | 80.00 |
| 7 | Mock-up | 0 | 60 | 0.00 | 100.00 |
| 8 | Science and Technology Resource Centre | 0 | 60 | 0.00 | 100.00 |
| 9 | Chalkboard/Whiteboard | 60 | 0 | 100.00 | 0.00 |
| 10 | Flannel Board | 0 | 60 | 0.00 | 100.00 |
| 11 | Multimedia Projector | 0 | 60 | 0.00 | 100.00 |
| 12 | Computer Assisted Instruction (CAI) | 0 | 60 | 0.00 | 100.00 |
| 13 | Internet | 0 | 60 | 0.00 | 100.00 |

The data presented in Table 3 shows that only Textbooks and Chalkboard/Whiteboards are adequately available for implementing Basic Science and Technology curriculum while other materials such as real objects, mock-up, resource centre, CAI, charts etc. are not available for the implementation BST curriculum.

4.2.4 Research Question 4

What are the problems associated with the implementation of the basic science and technology curriculum in Nigeria Secondary Schools?

Table 4

The mean and standard deviation scores for the problems associated with the implementation of the Basic Science and Technology curriculum in Nigeria Secondary Schools.

| S/N | Items | Mean | Standard Deviation | Remarks |
|-----|--|------|--------------------|----------|
| 1 | There are no adequate instructional materials for proper implementation of Basic Science and Technology curriculum in my school. | 2.90 | .968 | Agree |
| 2 | There is no teacher motivation in my school. | 2.85 | .671 | Agree |
| 3 | There are no adequate classrooms for Basic Science and Technology lessons in my school. | 2.60 | .883 | Agree |
| 4 | There are no adequate and up to-date Basic Science and Technology textbooks in my school. | 1.95 | .826 | Disagree |
| 5 | There are no adequate funding for proper implementation of Basic Science and Technology curriculum. | 3.10 | .788 | Agree |
| 6 | There are no adequate workshops and laboratories for Basic Science and Technology lessons in my school. | 3.15 | .587 | Agree |
| 7 | Lack of technology tools and equipment affect the implementation of Basic Science and Technology curriculum | 3.25 | .786 | Agree |
| 8 | Insufficient power supply makes the operating of available Basic Science and Technology equipment difficult | 3.25 | .639 | Agree |

| 9 | The use of resource person is not always considered in the implementation of Basic Science and Technology In junior secondary schools. | 3.15 | .587 | Agree |
|-----|---|------|--------------------|----------|
| 10 | Most of junior secondary school students are not interested in Basic Science and Technology lesson. | 1.90 | .641 | Disagree |
| 11 | There are no qualified Basic Science and Technology teachers in my school. | 1.50 | .761 | Disagree |
| S/N | Items | Mean | Standard Deviation | Remarks |
| 12 | Our community members have negative attitudes towards Basic Science and Technology education which also affect the implementation of Basic Science and Technology curriculum at Junior Secondary School | 2.10 | .447 | Disagree |
| 13 | Basic Science and Technology teachers develop apathy to workshop practice due to lack of motivation. | 2.50 | .607 | Agree |

The data presented in Table 4 shows that up to-date Basic Science and Technology textbooks, students interest in Basic Science and Technology lesson, Basic Science and Technology teachers qualification, community members attitudes towards Basic Science and Technology education are not problems associated with the implementation of the basic science and technology curriculum in Junior Secondary Schools in Niger state while apathy to workshop practice due to lack of motivation, Insufficient power supply, adequate classrooms, no adequate funding, lack of technology tools and equipment and among others are the problems of implementing BST curriculum at Junior secondary schools in Niger State.

Discussion of Findings

The findings of this study on research question one revealed that Basic Science and Technology Teachers do not uses all the teaching method available to them especially modern methods in implementing the curriculum content of Basic Science and Technology. This is in line with the findings of Nwosu, & Ibe, (2012) and Albert, (1990) respectively, who found that the teachers place much emphasis on teaching method and the implementation of the course contents which is mostly dominated by the use of traditional techniques of instruction notably the lecture method to the detriment of other instructional strategies.

Finding number two and three indicated that majority of the schools junior secondary schools in the study areas lacked necessary instructional materials. It was further revealed that the instructional materials that are available are not adequate. This agreed with the Damole's view (1999) who opined that teaching and learning resources are challenges to curriculum implementation. There is limited procurement and supply of these resources in schools. Instructional materials and equipment are all in short supply or may not be available at all – no books or writing material, no science apparatus, inadequate or out-of-date library.

The fourth finding revealed that, there are lots of problems Identified with the implementation of Basic Science and Technology curriculum In Nigeria Secondary Schools. These problems includes; no adequate instructional materials, no teacher motivation, no adequate classrooms,

no adequate funding, no adequate workshops and laboratories, lack of technology tools and equipment, insufficient power supply to operate the available Basic Science and Technology equipment, none usage of resource person in the implementation of Basic Science and Technology and Basic Science and Technology teachers develop apathy to workshop practice due to lack of motivation. These problems are significantly affecting the implementation of Basic Science and Technology curriculum. This tallied with the findings of Chukwunke & Chikwenze (2012) and Eya & Elechi, (2011) who revealed that the problems of the implementation of Basic Science and Technology are lack of materials, facilities, current textbooks, equipped library and workshop. The authors further stressed that there is no adequate commitment on the part of the government to ensure that appropriate instructional resources and materials are provided for the implementation of the Basic Science and Technology curriculum.

Conclusion

The study assess the implementation of Basic Science and Technology in Junior Secondary Schools and the objectives set for this purpose is to determine the teaching methods used, availability and adequacy of instructional materials and the problems associated with the implementation of Basic Science and Technology curriculum.

The main findings of the study revealed that Basic Science and Technology teachers often used all the teaching methods available to them in the implementation of Basic Science and Technology curriculum, that Textbooks, Charts, Flat-pictures, Posters, Real-Objects, Chalkboard/Whiteboard, Cartoon, Flannel Board, Multimedia Projector, Computer Aided Instruction and Internet are available with the percentages ranging from 5.4 – 100% and Textbooks, Charts, Posters, Real-Objects, Chalkboard/Whiteboard and Cartoon are adequate with the percentages ranging from 1.67% - 100 %.

The findings further revealed some problems associated with the implementation of Basic Science and Technology curriculum in Nigeria secondary schools to include;

- i. No adequate instructional materials.
- ii. No teacher motivation.
- iii. No adequate classrooms.
- iv. No adequate funding.
- v. No adequate workshops and laboratories.
- vi. Lack of technology tools and equipment.
- vii. Insufficient power supply to operate the available Basic Science and Technology equipment.
- viii. None usage of resource person in the implementation of Basic Science and Technology.
- ix. Basic Science and Technology teachers develop apathy to workshop practice due to lack of motivation.

Recommendations

Based on the research findings, the following recommendations were made to help in effective implementation of Basic Science and Technology curriculum in Nigeria:

1. All people concerned with the implementation of curriculum content to start from teachers, principals, parents, and supervisors should be actively involved and committed to ensure the effective implementation of Basic Science and Technology curriculum in Nigeria;

2. Basic Science and Technology teachers need to be conversant with the appropriate and innovative teaching methods and strategies and as well employing them while teaching Basic Science and Technology;
3. Basic Science and Technology Instructional materials and resources should be made available to the schools, and Basic Science and Technology teachers also need to be knowledgeable on how to make use of these Instructional materials and resources;
4. There is need to consider teacher motivation, and provide adequate classrooms for Basic Science and Technology lesson. The students and community members need to be interested and give active support to the teaching and learning of Basic Science and Technology as an educational programme.
5. Quality assurance officials should put more effort and perform their duties accordingly.

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