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Assessment of the Implementation of Basic Science Programme in Junior Secondary School in Nasarawa West Zone

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Abstract
This research was designed to assess the implementation of basic science programme in Junior Secondary Schools in Nasarawa West Zone of Nasarawa state. Specifically, the study intends to find out whether the curriculum content of the Basic Science Programme are taught to the students as specified, the availability, adequacy and utilization of facilities, the quality and quantity of teachers, the teaching methods employed by teachers and the performance of students in the Basic Science Programme in Junior Secondary School Certificate Examinations (JSSCE) in the state. The assessment of the implementation of basic science programme involves the collection of data and the use of data to assess the effectiveness of the quality of new science programme. A total of eighteen Junior Secondary Schools were sampled and questionnaires were administered to both teachers and students to collect the datas. The result of the study revealed these findings. Basic science programmes in Nasarawa West Junior Secondary Schools are being implemented to a large extent, facilities available for the implementation of Basic Science Programmes are not adequate and there is a significant different between the mean perception of rural and urban teachers on the extent of the implementation of the basic science programme curriculum in Nasarawa West Zone. In conclusion, it has been proved in the course of this study that there is no significant difference in the mean achievement scores of male and female students in basic science achievement test for junior secondary School students in Nasarawa West Zone. It has also been proved that Nasarawa West Zone has enough qualified teachers that can enhance the implementation of the basic science programme in junior secondary schools. Furthermore, it has been proved that the facilities available for the implementation of basic science programme are inadequate and underutilized. It has also been proved that lecture method, discussion method, group investigation, field trip/excursion, guided discovery and cooperative method are the methods of teaching commonly adopted by teachers. Recommendations were proffered to enhance the effective implementation of basic science programmes in Nasarawa West Zone.
Keywords: Basic Science, Programme, Curriculum content, Implementation, Material Resources.

1. Introduction

The importance of science and technology to national development in the life of any country cannot be over-emphasized. This is because knowledge and skills in science and technology are very vital in the development of any society. Mulemwa (2002) points out that, the fast changing applications of science and technology and the global reliance on its processes and products in all areas of human endeavor have made them invaluable that any society or country without them risks being alienated from the global village. This means that for an individual to be well-grounded in science, and competent enough to face the challenges of life in his society, he or she must have gone through a science programme that is well planned, assessed and implemented.

The 6-3-3-4 system of education operates a curriculum with comprehensive opportunities for all candidates having varying talents and abilities to acquire different and relevant skills through technical, commercial and vocational subjects. The prevailing system of education in the country also lays great emphasis on the teaching of science and technology at all levels of the 6-3-3-4 education structure. With the adoption of the National Policy on Education, the Basic Science programme was introduced as core subject at the Junior Secondary School level to introduce students to the world of science and to prepare them for higher education in science and technology. Basic science is a science subject taught at the lower, upper primary and lower upper

basic junior secondary school levels. Basic Science in junior secondary school is a course of study which is devised and presented in such a way that students gain the concept of the fundamental unity of science, the commonality of approach to problem of scientific nature and helps students to gain an understanding of the roles and functions of science in everyday life and the world in which they live. Baiki**,** (2000)**,** and Agbo, (2008) stated that, basic science is the bedrock to advance studies in science, technology and engineering**.**

The implementation of the basic science programme started in July, 2006 with the appropriation of the UBE fund to the Universal Basic Education Commission (UBEC) and subsequent disbursement to States. The education programme is regarded as a reinforcement of the 6-3-3-4 policy on education rather than a new policy in itself. The New Basic Science curriculum was approved by the National Council of Education (NCE) in December 2005. There is no doubt that the curriculum is the bedrock of any educational reform of which the Basic Science is not an exception.

The main objectives of the basic science programme according to the National Policy on Education (2000) include:

* To prepare students to acquire adequate laboratory and field skills,
* Inculcation of meaningful and relevant knowledge in basic science,
* The ability to apply scientific knowledge to everyday life in matters of personal and community health, and agriculture; reasonable and functional scientific attitudes.

Laudable as the objectives of teaching basic science appear, one is not sure whether these objectives are achieved as documented evidences (NRC, 1996 and Hancer, 2006) have shown that most primary and junior secondary school teachers in Nigeria by standards do not know the objectives of the basic science talk less of implementing them. Among the resources for the implementation of basic science programme, the basic science teachers occupies a strategic position as the quality of teachers in any educational programme determine to a large extent the quality of the system itself (Onyedrian, 2010).

For the past several years (2007-2012), the percentage of students who obtained a credit pass in basic science was low in Nasarawa State. For example, the JSSCE results that were released in 2012 (for the three geo-political zones) showed that 33.9%, 38.6% and 21.5% of students obtained a credit pass in basic science respectively. It was observed that, the percentage of credit pass for basic science was particularly low compared with introductory technology and home economics subjects. Reasons among others such as language problems and poor attitudes to teaching and learning of Basic Science by both the teachers and the students (Sambo, 2012).

The need to assess the implementation of the basic science programmes after almost seven years of its establishment has been stressed by Ortyoyande, (2006), FRN, (2007), Ajaja and Kpangbon (2007), Ajelem, (2008), Ajaja, (2009), and Balasa, and Bello, (2008), respectively. Generally, when a programme is assessed some data related to the programme are collected, analysed and interpreted so that decisions regarding the programme can be made. These decisions may lead to programme improvement, programme re-planning and personnel improvement, among others.

From the foregoing, it is evident that the implementation of basic science programmes in most junior secondary schools in Nigeria may be unsatisfactory. The situation in Nasarawa State may not be an exception; hence the need to assess the implementation of what exists in the basic science programme in Nasarawa State, which involve the assessment of basic science programmes should involve the collection of data and the use of such data to assess the effectiveness of the quality of new science programme (Onwuegbuna, 2005). Mustapha, (2001), further maintained that, educational programmes are assessed to determine the extent to which the purposes for such programmes are being achieved.

The need for constant assessment of the implementation of science programmes, such as the basic science programmes in junior secondary schools cannot be over-emphasized, if such programmes are to develop appropriately. According to Mulemwa (2005), the consequences of unmonitored programmes may be devastating. For example, the implementation of the programmes may be frightened, the result of which, the quality of products from such programmes may not stand the test of time and it will be difficult for policy makers and administrators to be informed of the challenges confronting such programmes, hence, plans for addressing these challenges will not be put in place. It is in view of these that this study intends to assess basic science programme implementation in junior secondary schools in Nasarawa State, Nigeria.

2. Methodology

2.1 Instruments for data collection

Three questionnaires were used to analyze the data obtained from the different junior secondary schools sampled that were applied to the teachers and students by the researcher who instructed them with respect to the procedures to be followed, i.e. Basic Science Material Resources Assessment Checklist (BSMRAC), Basic Science Implementation Assessment Questionnaire (BSIAQ) and Basic Science Achievement Test (BSAT).

2.1.1 BSMRAC is a checklist; it contains the required minimum material resources for Basic Science

Programmes Implementation. In developing this instrument, copies of the National Curriculum for junior Secondary Schools for Basic Science were obtained and the methods of instruction recommended. BSMRAC consist of seven (7) different material resources which was used to identify the availability of these resources for the implementation of the Basic Science Programmes in Nasarawa State. BSMRAC was divided into seven (7) columns with the headings 'items' and "Number" available respectively. The necessary teaching resources for the implementation of the Basic Science Programmes were listed under the column labeled 'items'. The research assistants will record the number of each available teaching resource under the column labeled "Number" and "Number" available. BSMRAC will be used to answer research question 3, 4, & 5 and hypothesis 1, 2, & 3 respectively.

2.1.2 BSIAQ was developed to obtain responses from the respondents on the actual implementation problems of the Basic Science Programmes in the State. This section has three points type of response scale. Major problem, Minor problem and No problem, scoring 3, 2 and 1 respectively. It contains 24 likely implementation problems of Basic Science Programmes in Nasarawa State. BSIAQ will be used to answer research questions 1,2,3,4, 6, 7, & 8 based on students' responses on the instruments, and hypotheses 1,2,3,4 and 5 respectively.

2.1.3 BSAT was developed by the researcher using a table of specification for segment of the curriculum to determine the extent to which JSS-III Basic Science students have understood the content areas of the basic science curriculum. The instrument consist of sixty (60) objectives items in basic science. The items were of the multiple choice type with 4 alternative answers; A, B, C and D. Each student will be required to tick the correct answer in the space available. One (1) mark will be awarded for any correct answer. BSAT will be used to answer research question 6, 7, and 8 and hypothesis 4 and 5, while the JSSCE Grades in their final Examination results (Table, 2-4) was used in answering research questions 6, 7, and 8.

Table 1: Table of specification or Test blue-print on BSAT

	CONTENT AREAS		PROCESS OBJECTIVES		
			Lower cognitive processes	Higher Thinking Processes	Total Number of Items
S/No	ITEM	Percentage (%)	60	40	100
1	Diseases and Ecology	21	7	5	12
2	Evolution and Genetics	27	10	6	16
3	Cells and its environment	13	5	3	8
4	Reproduction	13	5	3	8
5	Work, Energy and Power	13	5	3	8
6	Particulate nature of Matter	13	5	3	8
	Total	100	37	23	60

3. Research Questions

The following research questions will be answered in the course of this study:

(a) To what extent is the curriculum content of Basic Science Programme being implemented in Nasarawa State?
(b) What are the facilities available for the implementation of the Basic Science Programme in Nasarawa State
(c) How adequate are the facilities provided for the implementation of the Basic Science Programme in Nasarawa State?
(d) To what extent are the facilities provided for the implementation of Basic Science Programme utilized?

4. Research Hypotheses

The following null-hypotheses will be tested at 0.05 level of significance:

Ho_1. There is no significant difference between the mean responses of Rural and Urban teachers on the extent of implementation of the curriculum content for Basic Science programme in Nasarawa State.

Ho_2. There is no significant difference in the provision of material resources for Basic Science between urban and rural junior secondary schools in Nasarawa state.

Ho_3. There is no significant difference in the level of utilization of material resources between urban and rural junior secondary schools in Nasarawa State.

Ho_4. There is no significant difference in the mean achievement scores of male and female students of Basic Science in Nasarawa State.

5. Sample Distribution

The selection of the schools, principals, basic science teachers and students was purposive. It was purposive because there was a need to assess the 59 junior secondary schools in Nasarawa west zone. In all, the 59 Junior Secondary Schools, all the principals were used because of the small size. All the JSS III students who wrote JSSCE as the external examinations were also used. This decision was informed by Hurd's (2006) suggestions for use of entire population where a study deals with a relatively small population. In all, 105 principals, 1316 Basic science teachers made up 450 for Biology, 242 for Chemistry, 164 for Physics, 460 for integrated science teachers, as well as 28,766 basic science students formed the sample size. The breakdown of the subjects that made up the sample size in both Rural and urban areas are shown in Table 2:

Table 2: Population of GJSS/Students and Basic science Teachers in Nasarawa West Senatorial Zones of Nasarawa State

	GJSS/Student Population		Basic Science Teacher Population	
Zone	Location		Location	
	Rural	Urban	Rural	Urban
NWSZ	37 (**789**)	22 (**676**)	403	302
Total	59(**1465**)		**705**	

Source: Nasarawa State Ministry of Education 2012

6. Statistical Techniques

The statistical techniques used were the survey design. The survey design was suitable for this research work since it is aimed at eliciting information from the opinion of subjects of this study.

7. Results and Data Analysis

This result presents the information gathered from the questionnaires and the analysis of data obtained from the sampled 1316 JSS Students from Nasarawa west zone. However, in most instances, the data shown here are a pool of all the responses, with the exception of the situations where there was a significant difference between urban and rural schools, and where this was stated in the text.

Table 3: **Showing the extent to which curriculum content of Basic Science Programme is being implemented**

Research Question 1: To what extent is the curriculum contents of Basic Science programme taught to students in Nasarawa West junior secondary schools as specified?

Research Hypothesis 1: There is no significant difference between the mean responses of Rural and Urban teachers on the extent of implementation of the curriculum content for Basic Science programme in Nasarawa west.

S/No.	Item	SA	A	D	SD
2	The Government Junior Basic Secondary has adequate facilities for teaching and learning of basic science.	28 (45.2%)	27 (43.5%)	5 (8.3%)	2 (1.2%)
3	The school has provided highly qualified Nasarawa indigenes for admission into Basic Science Programmes	27 (43.5%)	18 (29.9%)	14 (22.6%)	3 (4.9%)
8	The study of Basic Science provides every student with the opportunity to acquire skills, knowledge and right attitude.	8 (12.9%)	42 (67.7)	10 (16%)	12 (3.4%)
9	Basic Science classroom programme provides students with ability to apply scientific knowledge in everyday life.	20 (32.3%)	38 (61.3%)	4 (6.4%)	0 (0%)
10	Basic Science classroom programme provides students with adequate laboratory and field skills	8 (12.9%)	45 (72.6%)	6 (9.7%)	3 (4.8%)

Source: Field Survey, 2012.

Table 3 shows the reaction from respondents with regards to the extent to which curriculum content of basic science programmes are implemented. A look at the table shows that majority of the respondents strongly agree and agree that the programme is being implement. For instance, items 2 and 3 on the questionnaire reflect that 88.7% and 72.5% of the respondents strongly agree that the basic science curriculum is being implemented. Since majority of the respondents seem to agree on this fact, we can therefore conclude that the basic science programme curriculum is being implemented to a large extent.

Table 4 Showing significance of difference between the mean perception of rural and urban teachers on the extent of the implementation of the curriculum in Nasarawa West Senatorial Zone using t-test.

S/No.	Variable	No	Mean	S.D	t_{cal}	t_{table}	Decision
1	Urban	30	86.8	8.2		2.00	Significant
2	Rural	32	90.4	6.7	15.8		Significant

= 0.05, df = 60

The table above shows the t-test analysis for the significance of difference between the mean responses of rural and urban teachers on the extent of the implementation of the Basic Science Programme in Nasarawa West Senatorial District. Results from the analysis show that the calculated value is given as 2.00. Since the calculated value is higher than the table value, the hypothesis 2 is rejected meaning there is a significant difference between the mean responses of rural and urban teachers on the extent of the implementation of the curriculum content for the basic science programme in Nasarawa West Senatorial District.

Table 5: How adequate are the available facilities for the implementation of Basic Science Programme in Nasarawa West Senatorial District.

Research Question 2: What are the facilities available for the implementation of the Basic Science Programme in Nasarawa State.

Research Hypothesis 2: There is no significant difference between the mean perceptions of rural and urban teachers on the availability and utilization of facilities for the implementation of Basic Science Programme in Nasarawa West Zone.

S/No.	Item	Very Adequate	Adequate	Not Adequate	None
1	Material resources	18 (12.9%)	27 (19.3%)	50 (35.7%)	45 (32.1%)
2	Library resources	55 (39.3%)	7 (5%)	39 (27.9%)	39 (27.9%)
3	Equipment	48 (34.3%)	35 (25%)	54 (38.6%)	3 (2.1%)
4	Flip charts	25 (17.9%)	16 (11.4%)	20 (14.3%)	79 (56.4%)
5	Models	44 (31.4%)	37 (26.4%)	52 (37.1%)	7 (5.1%)

Source: Field Survey, 2012.

Table 4 above shows the level of adequacy of facilities for the implementation of Basic Science Programme in Nasarawa West Senatorial District. Based on the reaction from respondents (teachers and students), it is observed that with regards to material resources, only 32.2% of the respondents are of the opinion that facilities are very adequate and adequate respectively. For Library resources, only 44.5% hold the opinion that facilities are adequate. With regards to flip charts, 29.3% of the respondents only hold the view that facilities are very adequate and adequate. Only with respect to Equipment and models that most respondents are of the view that facilities are very adequate and adequate. Hence, since most of the respondents claim that materials or facilities are not adequate. It can be concluded that facilities available for the implementation of Basic Science Programmes in Nasarawa West Senatorial District are not adequate.

Table 6 below, shows significant difference between the mean responses of rural and urban teachers on the availability of facilities for implementing basic science programmes in Nasarawa West Senatorial Zone using T-test analysis.

S/No.	Variables	No	Mean	S.D	t_{cal}	t_{table}	Decision
1	Urban	30	71.8	14.7	4.29	2.00	Significant
2	Rural	32	55.2	16.3			Significant

= 0.05, df = 60

The table 4 shows the t-test analysis of significance of difference between the mean perception of urban and rural teachers on the availability of facilities for the implementation of the Basic Science Programme. Results from the analysis show that the calculated value of t is given as 4.29 while the table value is given as 2.00 at 0.05 level of significance and at degree of freedom of 60. The decision is that hypothesis 2 is accepted because the calculated value of t is higher than the table value, hence there is a significant difference between the mean perception of urban and rural teachers on the availability of facilities for the implementation of basic science programmes in Nasarawa West Senatorial District.

Table 7: Showing significance of difference between the perception of basic science teachers on students on the availability of facilities in urban and rural schools for implementation of basic science programme.

Research Question 3: How adequate are the available facilities for the implementation of Basic Science Programme in Nasarawa West Senatorial District.

Research Hypothesis 3: There is no significant difference between the mean responses of Basic Science Teachers and students on the availability of facilities in rural and urban Junior Secondary schools in Nasarawa

West Zone.

S/No.	Item	Very Adequate	Adequate	Not Adequate	None
1	Material resources	18 (12.9%)	27 (19.3%)	50 (35.7%)	45 (32.1%)
2	Library resources	55 (39.3%)	7 (5%)	39 (27.9%)	39 (27.9%)
3	Equipment	48 (34.3%)	35 (25%)	54 (38.6%)	3 (2.1%)
4	Flip charts	25 (17.9%)	16 (11.4%)	20 (14.3%)	79 (56.4%)
5	Models	44 (31.4%)	37 (26.4%)	52 (37.1%)	7 (5.1%)

Source: Field Survey, 2012.

Table 6 above shows the level of adequacy of facilities for the implementation of Basic Science Programme in Nasarawa West Senatorial District. Based on the reaction from respondents (teachers and students), it is observed that with regards to material resources, only 32.2% of the respondents are of the opinion that facilities are very adequate and adequate respectively. For Library resources, only 44.5% hold the opinion that facilities are adequate. With regards to flip charts, 29.3% of the respondents only hold the view that facilities are very adequate and adequate. Only with respect to Equipment and models that most respondents are of the view that facilities are very adequate and adequate. Hence, since most of the respondents claim that materials or facilities are not adequate. It can be concluded that facilities available for the implementation of Basic Science Programmes in Nasarawa West Senatorial District are not adequate.

The table 8 below shows significance difference between the perception of basic science teachers and students on the availability of facilities in urban and rural schools for implementation of basic science programme.

S/No.	Variables	No	Mean	S.D	t_{cal}	t_{table}	Decision
1	Teachers	62	137.6	22.8			Significant
2	Students	78	113.9	16.5	41.7	1.98	Significant

= 0.05, df = 60

The table above shows the analysis of the mean perception of the basic science teachers and students using t-test in order to determine if any significant difference exists in the perception on the availability of facilities for the implementation of basic science programmes. Results from the analysis shows that the calculated value of t is 41.7 while the table value is given as 1.98 at 0.05 level of significance and degree of freedom of 138. Since the calculated value of t is higher than the table value, hypothesis 3 is rejected meaning there is a significant difference between the mean responses of basic science teachers and students on the availability of the facilities for the implementation of basic science programme in Nasarawa West Senatorial District.

Table 9: Showing mean achievement scores of students in Basic Science Programme in Junior Secondary Schools in Nasarawa West Senatorial District.

Research Question 4: What is the mean achievement of students in basic science programme in Junior Secondary Schools in Nasrawa West Zone?

Research Hypothesis 4: There is no significant difference in the mean achievement scores of male and female students of basic science in Nasarawa west Zone.

Variable	Total No.	Total scores	Mean	Standard Deviation
Male	8	140	17.5	3.87
Female	10	173	17.3	4.47

Source: Field Survey, 2012.

Table 6 above shows the mean achievement of selected students (8 boys and girls) in an achievement test for basic science. The students were selected from each of the schools in the Area Inspectorate Offices in Nasarawa West Zone. Results show that male and female students of mean achievement of 17.5 and 17.3 respectively while their standard deviations are given as 3.87 and 4.47 respectively.

8. Conclusion

It has been proved in the course of this study that there is no significant difference in the mean achievement scores of male and female students in basic science achievement test for Junior Secondary School students in Nasarawa West Zone. It has also been proved that Nasarawa West Zone has enough qualified teachers that can enhance the implementation of the basic science programme in Junior Secondary Schools. Furthermore, it has been proved that the facilities available for the implementation of basic science programmes are inadequate and under-utilized. It has also been proved that lecture method, discussion method, group investigation, field

trip/excursion, guided discovery and cooperative method are the methods of teaching commonly adopted by teachers in Nasarawa West Zone Junior Secondary School teachers.

9. Reccommendation

Having examined the assessment of basic science programme in Junior Secondary Schools in Nasarawa West zone, it is important to forward some recommendations that can enhance effective implementation of basic science programmes in Nasarawa West zone Junior Secondary Schools. The recommendation is as follows:

(a) Instructional materials, teaching aids and facilities should be provided by the Ministry of Education in conjunction with the Nasarawa State Government. These teaching resources, materials and facilities should be supplied to Junior Secondary Schools in the state in order to complement the facilities available in such schools. This will go a long way in addressing the problem of inadequacy of learning facilities.

(b) Workshops and seminars should be organized for teachers of basic science in Junior Secondary Schools in order to sensitize them on how to effectively and maximally use instructional materials and facilities. This will ensure the learning facilities are not in any way under-utilized.

(c) More basic science teachers should be recruited and trained by the government in order to facilitate the effective implementation of the basic science programme in Junior Secondary Schools.

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