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Approaches for Administering Science Education Curriculum Reform at Universal Basic Education Level in Nigeria

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ABSTRACT

The Universal Basic Education (UBE) programme was introduced in Nigeria in September 1988. Following this, in 2008 the Federal Government of Nigeria, through the Nigerian Educational Research and Development Council (NERDC) developed and introduced the 9-year Basic Education Curriculum (BEC) in schools by realigning all extant Primary and Junior Secondary School curricula to meet the key targets of the UBE programme. Given some contemporary and national concerns and to make the curriculum more practical, relevant, interest-generating to young learners and in line with global best practices, the 9-year BEC was recently revised in 2012 and its implementation commenced in September 2014. This research work examined the approaches for administering science education curriculum reform at the universal basic education level in Nigeria. A survey research design was used. The population of the study comprised 899 teachers under the state Universal Basic Education Board (SUBEB) who participated in SUBEB-COE capacity building workshop on core subjects, ICT and phonics from Obudu and Ogoja Local Government Areas. The sample consists of 327 teachers drawn from the population using the "Yaro Yamane formula". A simple random sampling method was used to draw the respondents and a science education curriculum administering questionnaire (SEGAQ) was developed and administered to the respondents. Mean (X), standard deviation (SD) and t-test were the statistical analysis employed. The findings indicated that the teachers under the state Universal Basic Education do not adequately possess the required approaches in both teaching and learning for administering the science curriculum reform at the UBE level of education in Nigeria. Based on the findings, it was recommended that the government should embark on retraining the UBE teachers to enhance their knowledge in the implementation of the UBE programme. Also, adequate funds and material resources should be made available to the schools for the effective sustainability of the programme.

Introduction

Science and Technology are two inseparable agents of social and economic transportation. These two potent sources had in no small measure contributed to the modernization of our society. Despite the enormous benefits science and technology seem to offer, it is still treated with lip service in some countries especially Nigeria. Some scholars have seen the education sector as one which has betrayed the Nigerian quest for scientific and technological take-off. Others like Agah and Ovute (2018) observed that Nigerian education is fast losing its significance. Thirteen years after Agah and Ovute's observation, the education system, especially public schools have completely lost the confidence people have in it. Every sector of society appeared not satisfied with the product of the schools from primary to tertiary level. Lots of excuses have been given in literature as reasons for the school's inability to produce graduates who meet the needs and expectations of society. The things pupils/students learn in schools are embedded in the curriculum used in shaping them and there is a need to properly assess the approaches teachers employ in administering science education curriculum.

Scholars have tried to offer a variety of definitions of curriculum. For example, Pearson Education (2003) defined curriculum as the subjects that are taught by a school, college, etc. or things that are studied in a particular subject. Mohammed's (2007) curriculum is the experiences a school system provides for its students. Agusiobo (2003) defines curriculum as an organized framework that sets out the content that the children are to learn: the progress through which children achieve these goals and the context in which teaching and learning occur. The things to be learnt include planned and unplanned activities by the school. These experiences are acquired within and outside the school environment. When people feed the things to be learnt that are not in line with societal needs, the call for reform becomes necessary. Also, when the products of the schools fail to display the experience acquired or claimed to have been acquired while in school, both the teachers, students and curriculum need to be re-examined. The teacher is of paramount interest in this study. This is because the teacher's quality, knowledge and skills possessed in a given area of specialization are the needed panacea for implementation of any curriculum. These make the teacher the most important determinant of what the student learns (Hammond, 2001).

In this 21st century, Nigeria needs a basic science education programme that makes every Nigerian child on graduation match with their counterparts globally. This required the child to be equipped sufficiently with the knowledge, skills and experiences needed for an initial entry into the labour markets in Nigeria and other parts of the world (Eddy & Akpan, 2009). In trying to mould a Nigerian child to be of the above calibre, a curriculum reform called Universal Basic Education (UBE) was introduced in 1999. This reform was just a re-adjustment of the 6-3-3-4 system of education which was born in 1983. The 6-3-3-4 system consisted of six years of primary school education, three years of junior secondary education and three years of senior secondary education, four years of post-secondary education (Omotayo, Ikebereme & Maduewesi, 2018). The Universal Basic Education (UBE) system or 9-3-4 system on the other hand consists of 3 years in lower basic, 3 years in middle basic and 3 years in upper basic, the first 9 years in seen as basic education periods. On successful completion of this 9-year basic education period, the student can then proceed to the senior secondary school where he/she spends 3 years and subsequently make to post-secondary education to spend 4 years.

Basic Science and Technology is one of the core subjects on which the Nigerian child is expected to be trained. The overall objectives of the Basic Science and Technology Curriculum for UBE according to NERDC (2008) is to enable the learner to:

- Develop interest in science and technology
- Acquire basic knowledge and skills to meet societal needs
- Apply their scientific and technological knowledge and skills to meet societal needs.
- Take advantage of the numerous career opportunities offered by science and technology
- Become prepared for further studies in science and technology.

These objectives are highly qualitative and need to be translated into reality as well as being sustained. The translation and sustenance of these objectives are dependent on the strategies teachers employ in teaching and learning science as well as funding science activities. The actualization of Education for All (EFA), Sustainable Development Goals (SDGs) and National Economic Empowerment and Development Strategies (NEEDs) in Nigeria depend largely on the efficient implementation of the UBE programme.

Statement of the Problem

It is not enough to produce a curriculum; it is even more important to put in place machinery that will ensure that its deals are realizable through effective classroom practices. For instance, even though their implementation (administration) of the Revised 9-year Basic Education Curriculum (BEC) has commenced systematically in Primary 1 and JSS1, it is known that the structures and appropriate activities that foster effective implementation of the curriculum are either inadequate or lacking in Nigeria schools. Foremost among the myriad of challenges of Basic Education in Nigeria are issues of teacher quality and development, lack of enough specialist teachers, death of relevant support materials for teachers and inadequate supervision and mentoring of teachers.

Based on the foregone, the question that becomes germane is: what approaches and role have the teachers in the implementation of science education reform curriculum? It is against this backdrop that this research is concerned to provide an answer to the question.

Purpose of the Study

The main purpose of the study is to investigate the approaches teachers under the state universal basic education board will employ for administering science education curriculum. Specifically, the study seeks to:

1. Determine the approaches employed by teachers under the state universal basic education board in Ogoja and Obudu L.G.A. to teach science.
2. Ascertain the science learning approaches teachers inculcate in pupils/students.
3. Determine how funding of science activities influences the teaching and learning of science at the UBE level.

Research Questions

1. How do the approaches employed by teachers under the state universal basic education board in Ogoja and Obudu L.G.A. to teach Basic Science differ?
2. To what extent do teachers feel they have inculcated science learning approaches on pupils/students?
3. To what extent have funding, and science activities influenced the teaching and learning of science at the UBE level?

Hypotheses

These hypotheses were tested at a 0.05 level of significance.

H_{01}: There is no significant difference in the approaches employed by State Universal Basic

Education in Obudu and Ogoja L.G.As in teaching science.

H_{02}: There is no significant difference in the way teachers within State Universal Basic Education from Obudu and Ogoja feel they inculcate science learning approaches in pupils.

H_{03}: There is no significant difference in the way, teachers of SUBEB, in Obudu and Ogoja L.G.As feel funding influences science activities.

Methodology

Design

A survey design was used for this research. Nworgu (2008) describes a survey design as one in which data concerning the characteristics features or facts about a given population are collected systematically. In this research, information shall be collected from the opinion of teachers within the state Universal Basic Education Board (SUBEB) on approaches for administering basic science and technology at the UBE level.

Area of the Study

The research was carried out in Ogoja and Obudu Local Government Areas, representing two Local Governments out of the five local government areas that make up the Ogoja Education zone in Cross River State.

Population of the Study

All teachers within the state universal basic education board who participated in the SUBEB-COE Akamkpa capacity-building workshop on core subjects, ICT/phonics, from Ogoja and Obudu shall be from the population of the study. The population size shall comprise 899 teachers. 466 teachers from Ogoja while 438 shall come from Obudu.

Sample and Sampling Technique

The sample shall consist of 327 teachers. The sample size shall be determined using the "Yaro Yamane" formula. A simple random sampling technique will be used in drawing 168 and 159 teachers from Ogoja and Obudu Local Government Areas respectively.

Data Collection

The instrument used for data collection was the Science Education Curriculum Administration Questionnaire (SECAQ) developed by the researchers. The instrument is made up of 18-item statements concerning the approach teachers employ to administer science education curriculum in the classroom and funding of science activities. It is a 4-point Likert rating scale to which the respondents will be required to indicate their level of feelings. Three experts in science education, measurement and evaluation, from the University of Calabar validated the instrument. The reliability of the instrument was 0.81 and it was established using Cronbach Alpha. The questionnaire was administered to the sample teachers within the state Universal Education Board who participated in the UBE-COE capacity-building workshop. The entire questionnaire was returned as they were filled and collected back at the spot.

Data Analysis Technique

Mean (X) and standard deviation (SD) as well as t-test analysis were used to answer research questions and test null hypotheses. The analysis was done using SPSS and the hypotheses were tested at 0.05 level of significance.

Results

Table 1: Mean and Standard Deviation of teacher's Responses on approaches for administration of Science Curriculum.

S/N	TEACHING APPROACHES	$\bar{X}$	SD
1.	The subject I studied had nothing to do with science	3.42	0.65
2.	The content of basic science is difficult to teach	2.88	0.69
3.	I use good basic science textbooks in teaching science	1.99	1.04

4.	I teach basic science using a practical approach	2.07	1.07
5.	I am afraid of performing an experiment	2.81	0.82
6.	I produce my instructional materials for teaching science	2.49	0.91
	Total Mean and Standard Deviation	***2.61***	***0.86***
	LEARNING APPROACHES		
7.	I ensure that students take notes in science class	2.99	0.75
8.	I guide students/pupils to perform practical work/experiment	3.00	0.62
9.	I allow students/pupils to observe and describe natural events	2.85	0.72
10.	I don't make students/pupils appreciate scientific knowledge as constructed by people	2.22	1.16
11.	I encourage students/pupils to explain natural events using scientific terms accurately	3.06	0.64
12.	The students/pupils in my class do not pose questions about natural events	2.74	0.68
	Total Mean and Standard Deviation	***2.81***	***0.76***
	Funding of Science Activities in School		
13.	The government provides my school with a science laboratory	1.98	1.06
14.	I am paid a special science allowance	2.28	1.02
15.	I have not been sponsored by any science retraining programme	2.25	0.98
16.	I am provided with science instructional materials which cannot produce	2.36	1.01
17.	The existing science equipment in my school is not maintained	1.96	1.02
18.	Funds are not allowed for the purchase of science resources and materials.	2.25	1.03
	Total Mean and Standard Deviation	***2.18***	***1.02***

Research Question 1:

How do the approaches employed by teachers within SUBEB to teach Basic Science in Obudu and Ogoja Local Government Areas differ?

Table: Independent t-test analysis of Teaching Approaches

Variable	**N**	**X̄**	**SD**	**SEM**	**t-cal**	**Sig**
Obudu	159	45.20	11.15	0.88		
					1.34	0.18
Ogoja	168	43.58	10.85	0.84		
Total	**327**	**88.78**	**22.00**	**1.72**		

From Table 2, it can be observed that the mean response of SUBEB teachers from Obudu L.G.A is 45.20 while that of Ogoja L.G.A is 43.58. The mean value of teachers from Obudu L.G.A is higher than that of Ogoja L.G.A. This indicates that the teaching approaches employed by SUBEB teachers from Obudu are greater than those of their Ogoja L.G.A counterparts. Thus, the teaching approaches used by the two L.G.As SUBEB teachers are not the same.

Research Question 2

To what extent do SUBEB teachers in Obudu and Ogoja feel they have inculcated science learning approaches in students?

Table 3: Independent t-test analysis of Science Learning Approaches

Variable	**N**	**X̄**	**SD**	**SEM**	**t-cal**	**Sig**

Obudu	159	47.96	9.81	0.78		
					2.25	0.03
Ogoja	168	45.47	10.16	0.78		
Total	**327**	**93.43**	**19.97**	**1.56**		

Table 3 above revealed that Obudu L.G.A. SUBEB teachers have a mean of 47.96 on the inculcation of science learning approaches on students, whereas their Ogoja L.G.A. counterparts have a mean of 45.47. This indicates that Obudu L.G.A. SUBEB teachers have higher feelings of inculcating science learning approaches in students than their Ogoja L.G.A. counterparts.

Research Question 3

To what extent have funding science activities influenced the teaching and learning approaches of students/pupils?

Table 4: Independent T-test Analysis of Funding Science Activities

Variable	**N**	**X̄**	**SD**	**SEM**	**t-cal**	**Sig**
Obudu	159	42.47	7.52	0.60		
					0.60	0.18
Ogoja	168	41.33	7.54	0.58		
Total	**327**	**83.80**	**17.07**	**1.18**		

From Table 4, we observed that the mean value of SUBEB teachers from Obudu L.G.A. is 42.47 whereas that of their Ogoja counterparts is 41.33. Although the mean value of Obudu L.G.A. SUBEB teachers is slightly higher than that of their Ogoja L.G.A. counterparts, the closeness of the mean score shows that the two groups have similar views of the influence of funding science activities on teaching and learning of science at UBE level.

Hypothesis 1

H_{o1}: There is no significant difference in the approaches employed by Obudu and Ogoja L.G.As SUBEB teachers in the teaching of science.

The analysis of this hypothesis in Table 2 above shows that, the t-computed is 1.34 with 0.18 level of significance. The 0.18 level of significance obtained at 1.34 was compared with the 0.05 level of significance set by the researchers. Since the 0.05 set by the researchers is less than 0.18 obtained at t = 1.34, the null hypothesis was upheld. This means that there is no significant difference in the approaches employed by Obudu and Ogoja L.G.As SUBEB teachers in teaching science. The difference observed in the mean score may have been due to sampling error.

Hypothesis 2

H_{o2}: There is no significant difference in the way teachers with SUBEB from Obudu and Ogoja feel they inculcate science learning approaches in students/pupils.

This hypothesis was analysed using Table 3. The results of Table 3 indicated that t-computed is 2.25 with the level of significance as 0.03. The 0.03 level of significance at t = 2.25 was compared with 0.05 and the result was found to be significant. This implies there is a significant difference in the way teachers within SUBEB in Obudu and Ogoja feel they inculcate learning approaches in students/pupils. From the mean scores of Obudu L.G.A SUBEB teachers, they seem to hold a higher opinion in the way they inculcate science learning approaches on students/pupils than their Ogoja L.G.A counterparts.

Hypothesis 3

H_{o3}: There is no significant difference in the way teachers within SUBEB in Obudu and Ogoja feel funding influences science activities.

Table 4 above shows that t-computed is 1.36 with a 0.18 level of significance. The 0.05 level of significance and the result was not significant. This means that there is no significant difference in the way teachers of SUBEB in Obudu and Ogoja feel about funding influencing science activities. The slight difference observed in the mean values of the two groups may be due to errors in sampling.

Discussion and Conclusion

The result of this research indicated that teachers within SUBEB from Obudu and Ogoja do not show any statistically significant difference in the approaches they employed in teaching basic science. Although the mean response of Obudu teachers was higher than their Ogoja L.G.A counterparts, the hypothesis tested showed no significant difference. The outcome of this result may have been affected by the fact that; the instrument was administered to the teachers towards

the end of a training workshop. Moreover, the respondents are all products of colleges of education who have gone through the same minimum academic standards of the National Commission for Colleges of Education (NCCE) in Nigeria. They were exposed to the same content in the various colleges and are therefore likely to have acquired similar experiences.

The analysis of the SUBEB teaching approaches indicated that: the teachers are subject generalists that is a teacher teaches all the subjects, the areas of specialization notwithstanding. This does not go well with the implementation of the basic science curriculum. Also, the teachers find some basic science content difficult to teach. They lacked good textbooks for science teaching and they indicate a phobia of conducting science practicals. The above findings show that the SUBEB teachers do not adequately possess approaches for implementing science education curriculum reform at the universal basic education level in Nigeria.

As to the learning approach, the activities of the SUBEB teachers can be described as being below standard. There is a need to improve students'/pupils' science learning approaches to enhance the implementation of the Basic Science Education Curriculum reform. The SUBEB teachers do not possess the required teaching skills that would enable the implementation of the basic science curriculum at the UBE level.

The funding activities of the basic science curriculum are another area that demands serious attention from the government and non-governmental agencies. The findings of the research indicate that science equipment is not adequately maintained. This implies that the science education curriculum reform may not be well implemented. Adequate funds should be provided for purchasing teaching materials, refurbishing deteriorating ones and as well maintaining existing materials for the sustainability of the reform in science education curriculum.

Bearing in mind that some of the teachers within the UBE programme are unqualified to handle sciences, it becomes expedient to retrain them in the area of science. This can be done by sponsoring the teachers to attend workshops and seminars that are targeted at the new demands of their job.

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