

Strategies for Implementing Science Education Curriculum Reform at Universal Basic Education Level in Nigeria.

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ABSTRACT

The study examined the strategies for implementing science education curriculum reform at universal basic education level in Nigeria. A survey research design was used. The population of the study was 1799 teachers under the Federal Teacher's Scheme (FTS) who participated in UBE - UNN capacity building workshop on core subjects, ICT and Phonics from Ebonyi and Enugu states. The sample consisted of 327 teachers drawn from the population using "Yaro Yamene formula". Simple random sampling method was further used to draw the respondents from the two states and a science education curriculum implementation Questionnaire (SECSIQ) was administered on the respondents' Mean (\bar{x}), standard deviation (S.D) and t-test were the statistical analysis employed. The findings indicated that the teachers under the Federal teacher's scheme do not adequately possess the required strategies in both teaching and learning for the implementing 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 of the UBE teachers to enhance their knowledge in the implementation of the UBE programme. Also, adequate fund sustainability of the programme and material resources should be made available to the schools for effective.

INTRODUCTION

Science and Technology are two inseparable agents of social and economic transformation. These two potent sources had in no small measure contributed to the modernization of our society. Despite the enormous benefits science and technology seems 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 Nigerian quest for scientific and technological take-off. Others like Eze (2019) observed that Nigerian education is fast losing its significance. Twelve years after Eze's observation, the education system, especially public schools has completely lost the confidence people have on it. Every sector of the society appeared not satisfied with the product of the schools from primary to tertiary level.

Lots of reasons had been given on literature as reasons for the school inability to produce graduates who meet the needs and expectations of the society. The things pupils/students learnt in schools are embedded in the curriculum used in shaping them and there is need to properly assess the strategies teachers employ in implementing science education curriculum.

Scholars have tried to offer variety of definitions of curriculum. For instance, curriculum is seen as the experiences children are exposed to under the supervision of schools (Wheder, 1967). Offorma (2014) in an attempt to give an elaborate definition of curriculum calls it a programme of activities dealing with what the student should learn, how the things should be learnt, why it should be learnt.



The things to be learnt include planned and unplanned activities by the school. These experiences are acquired within and outside the school environment. Where people feel the things to be learnt is not in line with societal needs, the call for reform become 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 needs 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 learn (Hamond, 2016).

In this 21st century, Nigeria needs a basic science education programme that makes every Nigerian child on graduation to match with their counterparts globally. This required the child to be equipped sufficiently with knowledge, skills and experiences needed for an initial entry into the labour market in Nigeria and other parts of the world (Eddy & Akpan, 2009). In trying to mould a Nigerian child to be of the above caliber, a curriculum reform called Universal Basic Education (UBE) was introduced in 1999. This reform was just a readjustment 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 in post-secondary education (Omotayo, Ikebereme & Maduwesi, 2008). The Universal Basic Education (UBE) system or 9-3-4 system on the other hand consisted of 3 years in lower basic, 3 years in middle basic and 3 years in upper basic, the first 9 years is seen as basic education periods. On successful completion of this 9 years basic education period, the student can then

proceed to the senior secondary school where he/she spends 3 years and subsequently move to post secondary education to spend 4 years.

Basic science and technology is one of the core subjects in which the Nigerian child is expected to be trained on. The overall objectives of Basic Science and Technology Curriculum for UBE 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 need.
- Take advantage of the numerous career opportunities offered by science and technology. Become prepared for further studies in science and technology (NERDC, 2007).

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

Purpose of the Study

The main purpose of the study was to investigate the strategies teachers under the Federal teachers scheme employed for implementing science education curriculum. Specifically, the study sought to:

- determine the strategies employed by teachers under the federal teachers scheme in Ebonyi and Enugu State to teach science

- ascertain the science learning strategies teachers inculcate on pupils.
- determine how funding of science activities influence teaching and learning of science at UBE level.

Research Questions

1. How do the strategies employed by teachers within Federal Teachers Scheme (FTS) to teach Basic Science and Technology in Enugu and Ebonyi State differs?
2. To what extent do teachers feel they have inculcated science learning strategies on pupils?
3. To what extent have funding science activities influenced the teaching and learning of science at the UBE level?

Hypotheses

These hypotheses were tested at 0.05 level of significance.

Ho₁: There is no significant different in the strategies employed by FTS teachers in Enugu and Ebonyi State in teaching science.

Ho₂: There is no significant different in the way teachers within FTS from Enugu and Ebonyi feel they inculcate science learning strategies on pupils.

Ho₃: There is no significant different in the way teachers of FTS in Enugu and Ebonyi State feel funding influence science activities.

Research Method

A survey design was used for this study: Nworgu (2016) describes a survey design as one in which data concerning the characteristics features or facts about a given population are collected in a systematic manner. In this study, information is collected from the opinion of teachers within federal teachers scheme (FTS) on strategies for implementing the

basic science and technology at the UBE level.

Area of Study

The study was carried out in Ebonyi and Enugu State, representing two states out of the five states that make up south-eastern geopolitical zone in Nigeria.

Population of the Study

All teachers within the federal teachers' scheme under UBE who participated in UBE - UNN capacity building workshop on core subjects, ICT/Phonics, from Enugu State. Ebonyi and Enugu state formed the population of the study. The population size was 1799 teachers within FTS. 923 teachers are from Ebonyi while 876 are from Enugu State.

Sample and Sampling Technique

The sample consisted of 327 teachers. The sample size was determined using "Yaro Yamane" formula. Simple random sampling technique was used in drawing 168 and 159 teachers from Ebonyi and Enugu State respectively.

Data Collection

The instrument used for data collection was Science Education Curriculum Implementation Questionnaire (SECIQ) developed by the researchers. The instrument is made up of 18-items statements concerning the strategies teachers employed to implement science education curriculum in the classroom and funding of science activities. It is a 4point likert type scale to which the respondents were required to indicate their level of feelings. Three experts in science education, measurement and evaluation, from university of Nigeria, validated the instrument. The reliability of the instrument was 0.81 and it was established using Cronbach's alpha. The questionnaire was administered to the sample teachers within Federal teachers scheme (FTS) of UBE

programme who participated in UBE - UNN capacity building workshop in core subjects, ICT/phonics in Ebonyi and Enugu state between May and June, 2010. The entire questionnaire was returned as they were filled and collected back at spot.

Data Analysis Technique

Mean (\bar{x}) and standard deviation 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 tested at 0.05 level of significance.

Table 1: Mean and Standard Deviation of Teacher's Responses on Strategies for Implementation of Science Curriculum

S/N	Teaching Strategies	\bar{x}	SD
1	The course 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 textbook in teaching science.	1.99	1.04
4	I teach basic science using practical approach.	2.07	1.07
5	I am afraid of performing experiment.	2.81	0.82
6	I produce my instructional materials for teaching science.	2.49	0.91
	Total mean/Standard deviation	2.61	0.86
	Learning strategies		
7	I ensure that students take not in science class.	2.99	0.75
8	I guide pupils to perform practical work/experiment.	3.00	0.62
9	O allow pupils to observe and describe natural events.	2.85	0.72
10	I don't make pupils appreciate the fact that scientific knowledge are constructed by people.	2.22	1.16
11	I encourage pupils to explain natural events using scientific terms accurately.	3.06	0.64
12	The pupils in my class do not pose questions about natural events.	2.74	0.68
	Total mean/Standard deviation	2.81	0.76
	Funding of Science activities in school		
13	Government provide my school with science laboratory.	1.98	1.06
14	I am paid special science allowance.	2.28	1.02
15	I have not been sponsor any science refraining 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 are not maintained.	1.96	1.02
18	Funds are not allowed for purchase of science resources materials.	2.25	1.03
Total mean/Standard deviation		2.18	1.02

Research Question 1: How do the teachers scheme (FTS) to teach Basic Science and Technology in Enugu and Ebonyi state differ?

Table 2: Independent t-test analysis of teaching strategies.

Variable	N	Mean	SD	SEM	t	Sig
Enugu	159	45.20	11.15	0.88	1.34	0.18
Abonyi	168	43.58	10.85	0.84		
Total	327	88.78	32.00	1.72		

From table 1, it can be observed that the mean response of FTS teachers from Enugu state is 45,20 while that of Ebonyi state is 43.58. The mean value of teachers from Enugu state is higher than that of Ebonyi state. This indicates that the teaching strategies employed by FTS teachers from Enugu State are greater than that of their

Ebonyi state counterpart. Thus the teaching strategies used by the two state FTS teachers are not the same.

Research Question 2: To what extent does FTS teachers in Enugu and Ebonyi feel they have inculcated science learning strategies in student?

Table 3: Independent t-test analysis of science learning strategies

Variable	N	Mean	SD	SEM	t	Sig
Enugu	159	47.96	8.81	0.78		
Abonyi	168	45.47	10.16	0.78	3.35	0.18
Total	327	93.43	19.97	1.57		

Table 2 above revealed that, Enugu state FTS teachers have a mean of 47.96 on the inculcation of science learning strategies on students, whereas their Ebonyi state counterpart have a mean of 45.47. This indicates that Enugu state FTS teachers have higher feeling of inculcating science

learning strategies on students than their Ebonyi state counterparts.

Research Question 3: To what extent have funding science activities influenced the teaching and learning strategies of pupils?

Table 4: Independent t-test analysis of funding science activities.

Variable	N	Mean	SD	SEM	t	Sig
Enugu	159	42.47	7.52	0.60	0.60	0.18
Abonyi	168	41.33	7.54	0.58		
Total	327	83.80	15.07	1.18		

From table 3, we observed that, the mean value of FTS teachers from Enugu state is 42.47 whereas that of their Ebonyi counterparts is 41.33. Although the mean value of Enugu state FTS teachers is slightly higher than that of their Ebonyi state counterparts, the closeness of the mean score show that the two groups have similar view of the influence of funding science activities on teaching and learning of science at UBE level.

Hypothesis 1

Ho₁: There is no significant different in the strategies employed by Enugu and Ebonyi state FTS teachers in teaching science. The analysis of this hypothesis in table 1 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 0.05 level of significance set by the researchers. Since the 0.05 set by the researchers is less that 0.18 obtained at t-1.34, the null hypothesis was upheld. This means that there is no significant different in the strategies employed by Enugu and Ebonyi state FTS teachers in teaching sciences. The different observed in the mean sore may have been due is sampling error.

Hypothesis 2

Ho₂: There is no significance difference in the way teachers within FTS from Enugu and Ebonyi feels they inculcate science learning strategies on pupils. This hypothesis was analysis using Table 2. The results of Table 2 indicated that t-computed is 2.25 with level of significance as 0.025. The 0.025 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 teacher within FTS in Enugu and Ebonyi feel they inculcate science learning strategies on pupils. From the mean scores of Enugu state FTS teacher, they seem to hold a higher opinion in the way they inculcate science learning strategies on pupils than their Ebonyi state counterparts.

Hypothesis 3

Ho₃: There is no significant difference in the way teachers within FTS in Enugu and Ebonyi feel funding influence science activities.

Table 3 above shows that t-computed is 1.36 with 0.18 level of significance. The 0.05 level of significance and the result was not significant. This means that, there is no significant differences in the way teachers of FTS in Enugu and Ebonyi feel about funding influence science activities. The slight difference observed in the mean values of the two group may be due to error in sampling.

Discussion and Conclusion

The result of this study indicated that, teachers within FTS from Enugu and Ebonyi do not show any statistically significant difference in the strategies they employed in teaching basic science and technology. Although the mean response of Enugu teachers was higher than their Ebonyi state counterparts, the hypothesis tested show no significance difference. The outcome of this result may have been affected by the fact that, the instrument was administered on 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 contents in the various colleges and are therefore likely to have acquired similar experiences. The analysis of the FTS teaching strategies indicated that the teachers are subject generalist that is a teacher teaches all the subjects, the areas of specialization notwithstanding. This do not go well with the implementation of the Basic Science Curriculum. Also, the teachers find some basic science contents difficult to teach. They lacked good textbooks for science teaching and they indicate phobia in conducting science practical. The above findings show that the FTS teachers do not adequately possess strategies for implementing science education curriculum reform at universal basic education level in Nigeria.

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

The funding activity of basic science curriculum is another area that demands serious attention by the government and non-governmental agencies. The findings of the study indicate that science equipments are not adequately maintained. This implies that the science education curriculum reform may not be well implemented. Adequate fund should be provided for purchasing of 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 become expedient to retrain them in 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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