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Evaluation of the Implementation of the Senior Secondary School Physics Curriculum in Nigeria

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ABSTRACT: *The study evaluated the Implementation of the Senior Secondary School Physics Curriculum in Nigeria. The purpose was to determine whether physics curriculum was implemented the way it should be or not. The study adopted the descriptive research design of the survey type. The population comprised all public senior secondary 3 physics teachers and students in Nigeria. The sample consisted of 60 teachers and 600 students selected through the multistage sampling procedure from six states selected from three geopolitical zones in Nigeria. Four research questions were raised for the study and the data collected were analysed using descriptive statistics of frequency counts, percentages, means and standard deviations. The results revealed that the contents of the curriculum were not fully implemented, the schools had qualified physics teachers, the teachers were moderately experienced and that classes had large population of students. It was recommended that the school authorities should implore physics teachers to work harder and more experienced teachers recruited.*

KEYWORDS: evaluation, implementation, curriculum, instructional and infrastructural facilities

INTRODUCTION

The development of a nation leans greatly on the kind of education put in place. The needs and values of such a nation determine the educational policy. The National Policy on Education by the Federal Republic of Nigeria (2007) pointed out the need to train Nigeria citizens to be able to manipulate their environment towards the development of the society.

Writing on this concept, "Education is the inculcation of values and information, taught for the purpose of functional living of an individual and growth of the society in which he lives" (Ehindero, 1986). Education prepares individual for effective participation in the society. Ogunsanmi (2000) reported that Education is a serious matter for consideration for any society in

an attempt to achieve her goals and objectives. There is no doubt that quality education vastly increases the productivity and potentials of individuals and by extension, the societies they take part of. Therefore, education is a powerful instrument of change and development of any society. Curriculum is a means of bringing the objectives of education into reality. Hence, if curriculum is faulty stated or not well implemented it may affect the purpose of national policy on Education. The objective of any level of education cannot be achieved if any planned curriculum for such level of education is not well implanted. Onyeachu (2008) asserted that no matter how well the curriculum of any subject is planned, designed and documented, if it is not properly implemented the curriculum may not achieve its goals and objectives. Babalola (2004) remarked that, it is at the implementation stage that many excellent curriculum plans and other educational policies are marred without any trace.

Justification

From the researchers experience as a teacher for several years, Senior Secondary School Physics Curriculum as planned, designed and documented by the Federal Ministry of Education FME (1985) and revised 2007 appears not to be effectively implemented according to the guiding principles and contents therein at every unit. Physics teachers, though diverse in their academic qualifications and experiences appear to address the teaching of physics curriculum from their own understanding. It appears they avoided the complex topics, some of them teach the theory aspect alone and avoid the practical skills which make physics more interesting and stimulates the students to have positive attitude to physics and other related courses. These may be accountable for the dwindling performance and high failure rate in Physics Senior Secondary School Certificate Examination (SSCE) at both internal and external examinations. The researchers noted that there appears to be inadequate evaluation procedures put in place to ascertain whether the senior secondary school Physics curriculum is been implemented the way it should be or not. Therefore these challenges call for raising of some research questions for the study:

1. To what extent is the physics curriculum content being implemented?
2. What are the conditions engendering the inability to implement physics curriculum?
3. Are there enough periods on the class time-table for Physics curriculum implementation?
4. At what level do physics teachers introduce students to practical works?

Objectives of the Study

The overall aim of the investigation is to evaluate how the Physics curriculum is implemented in Nigeria Secondary Schools with a view to identifying the root cause of the problem as well as underlying factors that might account for disparity, if any, on curriculum implementation specifically, the purpose are to:

1. Determine the appropriateness of the Senior Secondary School Physics Curriculum in meeting the philosophy of Nigeria Secondary Education System.

2. Find out if, the evaluation of the implementation of Physics Curriculum in Nigeria Secondary Schools is successful.
3. Evaluate the extent of implementation of the Senior Secondary School Physics Curriculum Content
4. Determine the experience and qualifications of Physics teachers.
5. How populated the students are in the classes.

Research Questions

The following research questions were raised to investigate the study

1. To what extent are the physics curriculum contents being implemented?
2. Are there qualified physics teachers in schools to implement the curriculum?
3. How experienced are the physics teachers?
4. How populated are physics classes in the schools?

RESEARCH METHODOLOGY

The study was a descriptive research design of the survey type in that questionnaire was used to collect data for the purpose of interpreting and describing prevailing conditions on the way senior secondary school physics curriculum is being implemented.

Population

The population for this study comprised all public Senior Secondary 3 physics students and physics teachers teaching in Nigeria.

Sample and Sampling Techniques

The sample for this study consisted of 60 Physics Teachers and 600 SSS 3 students selected from 60 Secondary Schools in three of six geopolitical zones of Nigeria. The multistage random sampling procedure was used to select the sample and this type of sampling procedure was used because the selections involved more than one stage. At the first stage, six states were randomly selected from the three geopolitical zones. At the second stage, 10 schools were randomly selected from each of the six states and the final stage, 10 students each were randomly selected from each school and one physics teacher teaching them making a total number of 600 students and 60 physics teachers sampled for the study.

Research Instruments

Three self-developed research instruments were used in this study. These are:

(I) Physics Teacher's Evaluation Questionnaire (PTEQ)
(II) Physics Student Evaluation Questionnaire (PSEQ)
(III) Analysis of Curriculum Average in Physics (ACCP)

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Validating the Instruments

All the Instruments were subjected to the process of validation. Some experts in psychometrics and evaluation ascertained that the instruments fulfilled face, content and construct validity qualities. The evaluation Questionnaires were adopted from the senior secondary school physics curriculum of the Federal Ministry of Education (2004) and the Federal Ministry of Education has validated the contents.

RESULTS

This section presents the analysis of data for the study. Presentation of data involved the analysis of the evaluation question raised for the study. Findings were also presented.

Question 1: To what extent are the physics curriculum contents being implemented?

To answer the question, responses on items 1-38 of Physics Students Evaluation Questionnaire (PSEQ) were obtained and subsequently subjected to statistical analysis involving frequency counts, percentages, mean and standard deviations. The results are presented on Table 1.

Table1: Physics Student's Evaluation Questionnaire (PSEQ) on Implementation of Curriculum Contents.

S/N		N	MIN	MAX	MEAN	STD	F	%	F	%	F	%
	SPACE, TIME AND MOTION											
1	Motion	546	1	3	2.93	.276	4	.7	28	5.1	517	94.1
2	Position, distance and displacement	546	1	3	2.92	.319	7	1.3	31	5.7	508	93.0
3	Time	546	1	3	2.90	.361	10	1.8	37	6.8	499	91.4
4	Speed and velocity, acceleration	546	1	3	2.82	.478	21	3.8	59	10.8	466	85.3
5	Rectilinear acceleration	546	1	3	2.73	.590	41	7.5	65	11.9	440	80.6
6	Fundamental and derived units	546	1	3	2.79	.550	37	6.8	41	7.5	468	85.7
7	Scalar and vectors	546	1	3	2.86	.439	19	3.5	40	7.3	487	89.2
8	Equations of uniform accelerated motion	546	1	3	2.79	.512	27	4.9	58	10.6	461	84.4
9	Projectiles	546	1	3	2.78	.556	38	7.0	42	7.7	466	85.3

10	Equilibrium of forces	546	1	3	2.82	.532	36	6.6	29	5.3	481	88.1
11	Simple harmonic motion	546	1	3	2.74	.592	43	7.9	56	10.3	447	81.9
	CONSERVATION PRINCIPLES											
12	Work, energy and power	546	1	3	2.82	.478	22	4.0	54	9.9	470	86.1
13	Heat energy	546	1	3	2.83	.466	20	3.7	55	10.1	471	86.3
14	Electric charges	546	1	3	2.81	.491	24	4.4	55	10.1	467	85.5
15	Linear momentum	546	1	3	2.78	.529	29	5.3	64	11.7	453	83.0
16	Mechanical energy	546	1	3	2.74	.593	43	7.9	57	10.4	446	81.7
	WAVES											
17	Production and propagation of wave	546	1	3	2.58	.749	86	15.8	60	11.0	400	73.3
18	Types of waves	546	1	3	2.54	.773	95	17.4	60	11.0	391	71.6
19	Properties of waves	546	1	3	2.46	.819	115	21.1	64	11.7	367	67.2
20	Light waves	545	1	3	2.41	.840	126	23.1	68	12.5	352	64.5
21	Sound waves	546	1	3	2.37	.850	133	24.4	76	13.9	337	61.7
22	Application of light and sound waves	546	1	3	2.38	.843	129	23.6	78	14.3	339	62.1
	FIELD											
23	Electromagnetic waves	546	1	3	2.36	.841	130	23.8	91	16.7	325	59.5
24	Description and property of fields	546	1	3	2.36	.819	120	22.0	111	20.3	315	57.7
25	Gravitational field	546	1	3	2.40	.814	115	21.1	97	17.8	334	61.2
26	Electric field	546	1	3	2.46	.772	95	17.4	106	19.4	345	63.2
27	Magnetic field	546	1	3	2.44	.783	100	18.3	106	19.4	340	62.3

28	Electromagnetic field	546	1	3	2.44	.800	107	19.6	92	16.8	347	63.6
29	Simple A.C. circuits	546	1	3	2.36	.829	124	22.7	99	18.1	323	59.2
	QUANTA											
30	Particle nature of matter	546	1	3	2.35	.837	129	23.6	97	17.8	320	58.6
31	Elastic properties of solids	546	1	3	2.39	.835	125	22.9	84	15.4	337	61.7
32	Crystal structure	546	1	3	2.38	.845	130	23.6	78	14.3	338	61.9
33	Fluids at rest and in motion	546	1	3	2.35	.852	136	24.9	85	15.6	325	59.5
34	Molecular theory of matter	546	1	3	2.32	.871	147	26.9	75	13.7	324	59.3
35	Models of the atom	546	1	3	2.25	.896	167	30.6	74	13.6	305	55.9
36	Nucleus	546	1	3	2.24	.893	168	30.8	81	14.8	297	54.4
37	Energy quantization	546	1	3	2.14	.925	200	36.6	69	12.6	277	50.7
38	Wave particle paradox	546	1	3	2.09	.937	217	39.7	63	11.5	266	48.7

From Table 1, it was discovered that the first two sections of the physics curriculum content was found to be fully implemented by physics teachers. Though they were not 100% covered. The first two sections are “space, time, motion and conservation principles”. While “waves, field and quanta” were averagely implemented. It could be inferred that the physics curriculum contents were not implemented as expected particularly the “Quanta” subtopics. That is “wave particle paradox and energy quantization” percentages were almost below average which did not conform with the document standard given by the Nigeria Educational Research Development Council (2007).

Question 2: Are there qualified physics teachers in schools to implement the curriculum?

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Table 2: Frequency Counts and Percentages showing number of Teachers and their Qualifications

									QUALIFICATION			
S/N	STATES	N	F	%	SEX	N	F	%	S/N		F	%
1	Ekiti		9	17	Male	53	39	73.6	1	NCE	4	7.5
2	Osun		10	18.9	Female		14	26.4	2	B.Sc	17	32.1
3	Delta		6	11.3	Total		53	100	3	B.Ed	4	7.5
4	Edo		9	17.0					4	B.Sc+PGD	16	30.2
5	Kano		9	17.0					5	B.ScEd	8	15.1
6	Kaduna		10	18.9					6	Others	4	7.5
	Total		53	100							53	100

Table 2 showed the frequency counts and percentages of teachers and their qualifications. In Ekiti and Osun States, 9 and 10 teachers, Delta and Edo, 6 and 9 teachers while Kano and Kaduna had 9 and 10 teachers respectively. Out of the 53 teachers, 39 are male while 14 are female. In terms of qualifications, 4 were NCE, 17 BSc,4 B.Ed, 16 BSc plus PGDE, 8 BSc Ed while 4 others are with higher degrees. This revealed that the schools had qualified physics teachers that implemented the curriculum.

Question 3: How experienced are the physics teachers?

Table 3: Frequency counts and Percentages showing number of Teachers and years of Teaching Experience

NO OF TEACHERS			EXPERIENCE	
	F	%	F	%
1-3	33	62.3	13	24.5
4-6	14	26.4	16	30.2
7-10	4	7.5	7	13.2
Above 10	2	3.8	17	32.1
TOTAL	53	100	53	100

Table 3 revealed that 33 physics teachers out of 53 teachers that served as respondents had just 1-3 years teaching experience, 14 teachers had 4-6 years' experience, 4 teachers had 7-10 teaching experience while only 4 had taught for more than 10 years. It can be stated that majority of the physics teachers were not well experienced. 54.7% of the teachers had taught for only 6 years while 45.3% had more than 6 years teaching experience. They are moderately experienced.

Question 4: How populated are physics classes in the schools?

Table 4: CLASS SIZE/POPULATION
NO OF STUDENTS

S/N		F	%
1	1-10	3	5.7
2	11-20	20	37.7
3	21-30	12	22.6
4	31-40	11	20.8
5	41-50	3	5.7
6	51+	4	7.5
TOTAL		53	100

Table 4 showed the responses of the physics teachers in respect if the population of students in their various schools. 3 (5.7%) of the teachers said there were 1-10 students, 20(37.7%) stated that there were 11-20 students, 12(22.6%) had 21-30 students, 11(20.8%) had 31-40 students, 3(5.7%) had 41-50 students while 4(7.5%) had above 51 students offering physics in their schools. This is a welcome development in the quest towards technological developments of the nation.

DISCUSSION

The findings of the study revealed that the contents of the curriculum were not fully implemented. This implies that only certain part of the curriculum contents were implemented by teachers. The non-holistic implementation of the content of the curriculum might be due to lack of teachers' in-depth understanding of the entire curriculum contents. This is favourably supported by the findings of Folayan (2019), Akinterinwa(2014), Adeleke(2006), Babafemi(2007) that the Nigeria secondary school curriculum implementation, which is the focal point in curriculum design, did not give the students the necessary skills to earn a living in the society. They posited that the National Policy on Education was well structured a d the contents were adequately defined but the implementation calls for question.

The study showed that there were qualified teachers in schools to implement the curriculum. The findings negates the research work of Omosewo(2009) who posited that many teachers handling the science subjects in most of our secondary schools specializes in science, not in science education. Therefore, these teachers lacked appropriate instructional strategies for teaching and often used lecture method which was not appropriate in all cases to teach science but can be used with other methods to achieve the aims and objectives of the curriculum.

The study showed that teachers in the schools were moderately experienced. The finding agrees with the National Policy on Education (2004) that, teachers are the prime executors of the government policies on Education and as such, their operational performance and vision could make or mar the future of Nigeria. Also, Folayan (2019) observed that possession of teaching

qualification significantly influenced teaching effectiveness. This is to say that, qualification is equipped with the techniques and technology of learning as well as the psychology of learning.
The study showed that population of classes was large. The finding agrees with the submission if Federal Ministry of Education (2002) that, for the purpose of effective implementation of the curriculum, a maximum of 40 students per class is recommended. Similarly, Adebule & Akomolafe (2014), Folayan (2019) stressed that inadequate classroom spaces have resulted in overcrowding in schools.

CONCLUSION

It can be concluded that the contents of the physics curriculum were not fully implemented. Though there were qualified and moderately experienced teachers in the schools but there are other variables that are certainly not adequate.

Recommendations

Based on the findings of this study, the following recommendations were made:
1. Physics Curriculum Contents should be fully implemented in schools in accordance with the recommended standard and each section should be implemented to compliment the other.
2. Principals should give priority to physics, imploring the physics teachers to work harder to ensure that the four periods on the timetable for physics in the week are judiciously used to cater for theory and practical aspects.
3. Inspections should be routinely carried out on physics teachers, note of lessons, diaries and scheme of work to determine the level of physics curriculum Content implementation.

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