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Survey of Teachers' and Students' Views on the Level of Implementation of Secondary School Physics Curriculum and Students' Performance in Bauchi Education Zone, Bauchi State, Nigeria

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Abstract: *This study investigated the Survey of Teachers' and Students' Views on the Level of Implementation of Secondary School Physics Curriculum and Students' Performance in Bauchi Education Zone, Bauchi State, Nigeria. The study adopted a Descriptive Survey research design employing a random approach. Twenty Physics teachers were sampled with at least one Physics teacher and a student from each of the senior science secondary schools in the zone. Ten schools used for the study were selected from the twenty-three public schools within the Bauchi Education Zone of Bauchi State using random sampling techniques. The reliability of the instrument was computed using the Cronbach alpha reliability coefficient index. [1]The reliability was found to be an Inter-rater of a value of 0.76. The instrument was validated by three experts among these include: Dr. Joseph J. Mawak, Department of Measurement Evaluation, Prof. Isa Sa'idu and Dr. I. S. Usman, Department of Science and Technology Education, Faculty of Education University of Jos, Nigeria. The instrument for the study was a researcher-designed Level of Implementation of Physics Curriculum (LIPC) questionnaire which consisted of 95 items. Two research questions and Two research hypotheses were formulated and tested at 0.05 alpha level. The hypotheses were tested using the Pearson Chi-Squared test, mean and Pearson Product Moment Correlation method. The Statistical Package for Social Sciences (SPSS) Version 25 statistical tool was used to analyse the data. Findings from the study showed that: there was a significant relationship between teachers' views on the level of implementation of Senior Secondary School Physics Curriculum and there were significant factors responsible for the implementation of Senior Secondary School Physics Curriculum. It was therefore recommended among others that Physics teachers with lower academic qualifications such as Nigeria Certificate in Education (NCE) and Higher National Diploma (HND) should embark on in-service study that can improve their teaching qualification. This study can be replicated further in a wider population of senior science secondary*

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schools in Bauchi State and other parts of the country to factors that influenced the level of curriculum implementation and students' performance in senior secondary school Physics.

Keywords: Curriculum, Implementation, Performance and Physics.

Introduction

Physics is an important science subject because of its contributions to the scientific and technological development of society. As a result of its application and importance, Physics is one of the subjects required for all Science related courses in tertiary institutions; for example, in Medicine, Engineering and Physical Science. Physics is defined as the study of the relationship between matter and energy in its entire ramifications. Thus, for the proper understanding of scientific and technological subjects. To (Ukeje, 2016) opined that Physics plays a vital role in the development of any society in many ways in electronics developing transistors, diodes and integrated circuits(ICs) which allowed the development of radio transmitters and receivers, televisions and also modern machines for health services machines like X-rays were developed from the knowledge of Physics for used in taking images of the internal structure of patients and treatment of cancer and ultrasound to scan the human body for diagnosis in hospitals and other health centres services and so on. The contributions of Physics toward making the world worth living and boosting the prestige of several nations are too numerous to mention. To have an adequate foundation and knowledge in Physics that will be needed for the advancement and development of science and technology, there is a need for Physics students to have an understanding of Physics ideas, through proper curriculum implementation and adequate instructional strategies.

The West African Senior School Certificate Examination (WASSCE) Chief Examiners Reports in Physics subject (2016; 2017; 2018 & 2019) revealed that candidates' weaknesses in Physics were traceable to a lack of knowledge of the basic principles, concepts, laws, and their appropriate applications to explaining and solving Physics problems. Bauchi recorded 1.73%, 1.84%, 1.91%, 2.34%, and 2.72% students' performance in Physics for the years 2014, 2015, 2016, 2017 and 2018 respectively with a mean percentage of 2.11%. The reports identified factors responsible for students' weak performance in Physics including students' poor understanding of Physics concepts, negative attitudes toward the subject and other situations which may arise due to inappropriate use of teaching strategy by teachers in teaching Physics and students' misconceptions of some concepts. Studies on student understanding of Physics concepts show that many students turn out to be very absent-minded and inattentive in Physics class. After being taught a concept, but could not memorize or recall such a concept with ease (Ofoeegbu, 2011). The reason for this difficulty may vary but this could sometimes be related to the abstract and quantitative nature of the subject, the improper implementation of the curriculum and also the teaching method being used to explain such concepts. It is now widely acknowledged that inappropriate implementation of the curriculum impedes students' meaningful understanding and good performance in Physics.

The curriculum word is of the Latin language. It means 'racecourse'. In education, it means 'work field of students' or race course of the students. It consists of two words and a course. The word 'course' mean curriculum and race refers to student's experiences and activities. A teacher performs his teaching activities given the curriculum. (Ukeje & Willis 2007, as cited in Ukeje, 2016:93) define curriculum as "an interrelated set of plans and experiences which a student completes under the guidance of the school".

The term curriculum has been defined in many different ways by many researchers and scholars, among such are: (Locklear, 2012) stated that a Curriculum is a planned set of courses that is presented to teachers to arrange teaching and learning at a certain level. According to (Ofoeegbu, 2011) Curriculum is a guide in designing courses

that consist of outer cycles namely Principles, Environment, and needs that involve practical and theoretical considerations that will have a major effect in guiding the actual process of course production. From the definitions, the concept has been divided into four related components: What is the end product of instruction – the objectives; What is studied - the content; How are the study and teaching done – methodology; and How are the results of teaching assessed – evaluation.

The functionality of the Four stated components of the curriculum depends on how each of the components implemented is interrelated. Teachers are the key drivers in any curriculum implementation. No matter how good a curriculum is, the success or failure depends largely on the ability or inability of the teacher to execute it as originally stated by the planners. The National Policy on Education, Federal Republic of Nigeria (FRN, 2013) stated that No educational system can rise above the quality of its teachers (FRN, 2013). A related study on the level of competence in Physics attained by prospective Physics teachers. It was observed that the effectiveness of the stated objectives and content of the Physics Curriculum is a function of the level of competence of the Physics teacher. One of the major factors responsible for the level of competence of teachers could be traced to their academic qualifications.

(Ukeje, 2016) view curriculum implementation as the process of putting all that has been planned as curriculum documents into practice in the classroom through the combined effort of the teacher, school administrators, learner, and parent as well as interaction with physical facilities, instructional materials, and learning environment. In summary, curriculum implementation in Physics connotes the alignment of all the learning activities planned into practice through the teacher and other stakeholders involved to achieve the stated objectives of the curriculum. Teachers are not involved in curriculum planning. Over the years, the issue of policy changes in the educational system which started with the 6-3-3-4 system, 6-5-4 system also came and how the 9-3-4 system among others has led to confusion in learners as to which subjects are to be offered in certificate examinations because subjects offered at certificate exams changes alongside the changes in educational system.

The Nigerian Educational Research and Development Council (NERDC, 2012) stated in the new senior secondary school Physics curriculum that, the objectives of Physics in the secondary school curriculum are to; Provide basic literacy in Physics for functional living in society, acquire basic concepts and principles of Physics as preparatory for further studies, acquire essential scientific skills and attitudes as a preparatory for technological application of Physics, stimulate and enhance creativity and provide a course, which is complete for students not proceeding to higher education, while it is at the same time a reasonable adequate foundation for a post-secondary Physics course. To achieve these objectives, the curriculum in Physics is expected to reflect adequate content coverage (Stephen, 2016).

A functional Physics laboratory is a well-equipped Physics laboratory with all the resources needed for meaningful practical exercise. However, educational researchers reported that most secondary schools in Nigeria have no Physics laboratory and few that have it are rather ill-equipped (Asiyai, 2012). There are not enough functioning Physics apparatuses in the schools. No meaningful teaching and learning of Physics can take place without practical exercises to aid the understanding of the theoretical or otherwise, abstract knowledge that the students acquire in class.

The primary goal of every curriculum is the performance of its objectives. (Asiyai, 2012) opined that the performance of objectives of any level of education depends largely on the effective implementation of its planned programmes. A lot of challenges have been affecting the implementation of senior secondary school Physics curricula in Nigeria. Some of the challenges of curriculum implementation in Physics are a lack of Qualified

Physics Teachers, Inadequate Instructional Materials for Teaching Physics, Poor Funding of Education, Absence of Teachers' Motivation, and Overloaded Curriculum and Instructional Materials for Teaching Physics.

The main aim of this study was to Survey Teachers' and Students' Views on the Level of Implementation of the Secondary School Physics Curriculum and Students' Performance in the Bauchi Education Zone. This study addressed the following objectives

1. determine teachers' and students' views on the level of implementation of senior secondary school Physics curriculum;
2. determine the relationship between students' academic performance and the level of implementation of senior secondary school Physics curriculum;

Research Questions

The study sought answers to the following research questions:

1. What are teachers' and students' views on the level of implementation of senior secondary school Physics curriculum in Bauchi Education Zone?
2. What is the relationship between students' academic performance and the level of curriculum implementation of senior secondary school Physics in Bauchi Education Zone?

Hypotheses

The following null hypotheses formulated were tested at a 0.05 level of significance.

1. There is no significant relationship between teachers' and students' views on the level of implementation of the Senior Secondary School Physics Curriculum.
2. There is no significant relationship between students' academic performance and the level of implementation of senior secondary school Physics curriculum.

METHODOLOGY

The study adopted a descriptive survey design to gather data on teachers' level of implementation of the Senior Secondary School Physics Curriculum based on teachers' instructional materials, teachers' qualifications and experience, the level of curriculum content coverage and evaluation procedures.

The instrument used in this research was a Researcher-designed Instrument, called; the Teachers' Level of Implementation of Physics Curriculum (LIPC) Questionnaire. The instrument is made up of two sections; Section A and B. Section A contains two parts, Parts A & B. Section B was Physics Students' Academic Performance Records (PSAR). Part A solicited the following information on the respondents such as: Sex, Teacher Experience, and Teacher Qualification, (That is, demographic information). Part B gathered information on the Teachers' and Students' Views on the Level of Implementation of the Senior Secondary one (SS1) Physics Curriculum. The views taken into consideration were the Nature, Objectives, Content, and adequacy of Instructional Materials and Personnel available for the Implementation of the Senior Secondary School Physics Curriculum. Section B tracked the exam scores of SS I Physics students' academic performance records.

The methods used for data analysis for this study were descriptive statistics (mean and standard deviation), and Pearson chi-squared test governed by the research questions and hypotheses stated. These were undertaken using Statistical Package for Social Sciences (SPSS) Version 25 was used throughout the process.

The research questions were answered using mean ranking. In analyzing the stated hypotheses, the Pearson Chi-square test was used to test the two stated hypotheses. The hypotheses were tested at $\alpha = 0.05$ level of significance. In this process, the mean scores and standard deviation were employed to answer the research questions using 3.0 as the index score for agreement. The index score was based on the suggestion of (Locklear, 2012) who opined

that a benchmark for the remark of the survey instrument should be based on average (5 + 4 +3 + 2 + 1=15÷5=3). Any statement having a mean greater than or equal to 3.00 was considered agreed and also any statement having a mean less than 3.00 was considered disagreed. The grand mean of any research question was the average of all the individual item means. On the other hand, any hypothesis with a P value of <0.05 was rejected and a hypothesis with a P value of ≥ 0.05 was retained (Locklear, 2012).

RESULTS

Research Question One

What are teachers' and students' views on the level of implementation of senior secondary school Physics curriculum in Bauchi Education Zone?

To answer this research question, the mean, grand mean and standard deviation calculated are presented in Table 1.

Table 1

Descriptive Statistics on Teachers' and Students' Views on Physics Curriculum Implementation

S/N	Items	N	Mean	Std. Deviation	Decision
1.	I have a good knowledge of the strategy known to be effective for the teaching of Physics for good implementation	20	5.00	0.000	Agreed
2.	My qualification influences the implementation of the Physics curriculum.	20	5.00	0.000	Agreed
3.	Students' attitude to Physics affects my interest in teaching the subject which variably leads to poor implementation of the curriculum.	20	5.00	0.000	Agreed
4.	I give attention to slow learners for effective implementation of the Physics curriculum	20	5.00	0.000	Agreed
5.	I have a good understanding of Physics concepts to encourage Physics Implementation.	20	4.95	0.224	Agreed
6.	I am properly motivated to encourage good implementation	20	4.85	0.366	Agreed
7.	I give positive support in promoting the Implementation of the Physics curriculum.	20	4.70	0.470	Agreed
8.	I can't Implement the Physics Curriculum.	20	4.65	0.489	Agreed
9.	I have good characteristics influence such as interest in the effective implementation of the Physics curriculum.	20	4.55	0.510	Agreed
10.	I lack good mastery of the subject to Implement the curriculum.	20	4.35	0.489	Agreed
11.	I don't have good knowledge of the methodology to Implement the curriculum.	20	4.25	0.444	Agreed
12.	I effectively Implement the Physics curriculum which fosters good performance of my Students.	20	4.20	0.410	Agreed
13.	I do not relate with Physics curriculum professionals to enhance the Implementation	20	4.15	0.366	Agreed
14.	My school is well resourceful for effective Implementation of the Physics curriculum.	20	4.10	0.308	Agreed

15.	The physics curriculum suffers because I am overloaded with other academic/office responsibilities.	20	4.10	0.308	Agreed
16.	I am adequately prepared for effective curriculum Implementation.	20	4.05	0.224	Agreed
17.	Large class sizes affect my effective Implementation of the Physics curriculum.	20	4.05	0.224	Agreed
18.	I am versed in the knowledge of Concepts relevant to the Physics curriculum.	20	4.05	0.826	Agreed
19.	I have the opportunity to undertake a professional development programme to enhance my pedagogical skills in Physics	20	4.00	0.795	Agreed
20.	My Attitude Affects Curriculum Implementation.	20	3.95	0.510	Agreed
21.	I always feel confident in teaching difficult topics in Physics the Effective Implementation of the curriculum	20	3.95	0.510	Agreed
22.	I always feel reluctant to teach difficult topics in Physics	20	3.90	0.912	Agreed
23.	My school has sufficient science equipment necessary for the Implementation of the Physics curriculum	20	3.75	0.786	Agreed
24.	The physics curriculum is overloaded which Influences my effective Implementation	20	2.50	1.192	Disagreed
25.	Lack of motivation affects my interest in Physics curriculum Implementation.	20	2.35	0.875	Disagreed
	Grand Mean		**4.22**		**Agreed**

Source: Field Study (2021)

The output of descriptive statistics presented in Table 1 indicates that all the items of the variable teachers' views have mean scores above 2.0. The mean scores of teachers' views items from .35 to 5.00. The grand mean of teachers' views is 4.22 which is above the benchmark of five five-point Likert scale of 3.0. The result indicates that the teachers of senior secondary schools in the Bauchi education zone have views on the level of implementation Physics curriculum.

Research Question Two

What is the relationship between students' academic performance and the level of implementation of senior secondary school Physics curriculum in Bauchi Education Zone?

To answer this research question, the Pearson correlation coefficient calculated is presented in Table 2.

Table 2

Correlations Between Students' Academic Performance and Physics Curriculum Implementation

Variables	N	Academic Performance	Curriculum implementation	Sig. (2-tailed)
Academic Performance	20	1	.121	.611
Curriculum implementation	20	.121	1	.611

Source: Field Study (2021)

The analysis in Table 3 indicates that the Pearson correlation coefficient between students' academic performance and the level of implementation of senior secondary school Physics curriculum has a magnitude of 0.121, indicating not significant and thus a moderately weak relationship between the treatments.

Hypotheses

Hypothesis One

There is no significant relationship between teachers' and students' views on the level of implementation of the Senior Secondary School Physics Curriculum.

To test this hypothesis, the data collected were analyzed using Pearson Chi-square test statistics. The summary of the analysis is shown in Table 3.

Table 3

Pearson Chi-Squared Test for Teachers' and Students' Views on the Level of Implementation of Senior Secondary School Physics Curriculum

Variables	N	Mean	S.D	S.E.M	X^2	M.D	df	α	P-value	Decision
Teachers Views	20	3.38	.225	2.64821	44.835	1.22	2	0.05	0.00	Rejected
					43.765	2.61200				
Curriculum Implementation	20	2.6120	.12722	.02845						

Source: Field Study (2021).

Table 3 shows the mean relationship in responses of Physics teachers' and students' views on the level of implementation of senior secondary school Physics curriculum in the Bauchi education zone. The result from the table shows teachers' views have a mean of 3.38 and an S.D. of 0.225. While Physics Curriculum Implementation responses have a mean of 2.6120, standard deviation of 0.12722 and mean deviation of 2.61200 with Pearson chi-squared statistic, $X^2 = 44.835$, degrees of freedom 2, corresponding to $P<0.001$. The result shows a small mean relationship of 1.22 which is significantly small and a P-value of 0.001 along with Pearson chi-squared statistic, $X^2 = 44.835$. The P-value is less than the alpha value of 0.05 that is $P < 0.05$. This implies that the null hypothesis which states that there is no significant relationship between the mean views of Physics teachers on the level of implementation of Physics curriculum in the Bauchi educational zone is rejected.

Hypothesis Two

There is no significant relationship between students' academic performance and the level of implementation of senior secondary school Physics curriculum.

To test this hypothesis, the data collected were analyzed using Pearson chi-squared test statistics. The summary of the analysis is presented in Table 4.

Table 4

Pearson Chi-Squared test for Students' Academic Performance and the Level of Implementation of Senior Secondary School Physics Curriculum

Variables	N	Mean	S.D	S.E.M	X^2	M.D	df	α	p-value	Decision
Curriculum Implement.	20	2.6120	.12722	.02845	51.614	2.61200	2	0.05	0.00	Rejected
Academic	20	69.05	17.136	3.832	28.425	69.050				

Achievement

Source: Field Study (2021)

Table 4 shows the mean difference between students' academic performance and the level of implementation of senior secondary school Physics curriculum in Bauchi Education Zone, Nigeria. The result from the table shows Physics Curriculum Implementation responses having a mean of 2.6120, standard deviation of 0.12722 and mean deviation of 2.61200 with Pearson chi-squared statistic, $X^2 = 51.614$. While the Students' Academic Performance responses have a mean of 69.05, a standard deviation of 17.136 and a mean deviation of 69.050 with Pearson chi-squared statistic, $X^2 = 51.614$. The result shows a P-value of 0.001 along wa with a pdf of 2. The p-value is less than the alpha value of 0.05 that is $P < 0.05$. This implies that the null hypothesis which states that there is no significant relationship between students' academic performance and the level of implementation of senior secondary school Physics curriculum in Bauchi education zone, Nigeria is rejected. That is to say, there is a significant relationship between students' academic performance and the level of implementation of senior secondary school Physics curriculum in Bauchi Education Zone, Nigeria.

DISCUSSION

This study was conducted to investigate the level of curriculum implementation and students' performance in senior secondary school Physics in the Bauchi education zone. A significant result has been dictated in teachers' and students' views on the level of curriculum implementation of senior secondary school Physics and factors that affect curriculum implementation of senior secondary school Physics. The results are in favour of curriculum implementation indicating that external factors affect the level of implementation of the Physics curriculum which can also militate students' academic performance.

The result in Table 1 indicates that the following teachers' and students' views are considered as factors that influence the effective implementation of senior secondary school Physics curriculum: good knowledge of the strategy known to be effective for the teaching of Physics, qualification influence the curriculum implementation of Physics, Students' attitude to Physics affected the teacher's interest to teaching the subject which variably leads to poor implementation of the curriculum, and giving attention to slow learners.

Other factors that negatively influence the effective implementation of the Physics curriculum include: Lack of motivation affects the teacher's interest in Physics curriculum implementation, reluctance to teach difficult topics in Physics, overloaded Physics curriculum and large class size. The findings of this study are similar to that of the (Nwachukwu, 2015) study which also revealed that the non-use of student-centred teaching methods and the lack of teachers' and learners' motivation influenced the implementation of the curriculum for Physics. The study concluded that for effective implementation of the curriculum; students-centred teaching methods should be employed and learners be motivated. The study recommended that the teachers of Physics should be in-serviced on learner-centered methods and they should focus more on arousing learners' motivation.

The analysis in Table 2 indicates that the Pearson product-moment correlation coefficient between students' academic performance and the level of implementation of senior secondary school Physics curriculum, is not significant thus a moderately weak relationship between the treatments. This is also confirmed by the test of hypothesis computed in Table 4 that there is a significant relationship between students' academic performance and the level of implementation of senior secondary school Physics. The findings of this study are also similar to that of (Usman & Abubakar, 2019), earlier related. The study was conducted mainly to find the Level of Physics Curriculum implementation and Factors Responsible for Non-coverage of the Curriculum and their Effects on Students' Performance.

CONCLUSION

This section presents the conclusion of the findings of the study according to the stated research questions of the study. With the views of the teachers on the factors affecting the implementation of the Physics curriculum, it was established that positive factors of the teacher towards the subject a positive role in causing the student to learn the subject effectively and thus achieve good grades in the subject. An increase in teachers' level of implementation of curriculum leads to an increase in students' academic performance in any given subject. Teachers, being the implementers of the curriculum, are expected to fully implement the curriculum for better students' academic performance in Physics.

RECOMMENDATIONS

Based on the findings of this study, the following recommendations were made:

1. Qualified Physics teachers should be employed to teach in senior secondary schools most especially in rural areas where qualified teachers are very few compared to urban schools in the Bauchi education zone.
2. Physics teachers should allow students to learn how to do and discover science themselves to improve their academic performance in Physics, rather than spoon-feeding them the laws, principles, and theories of science.
3. Based on the findings it is recommended for the government and the stakeholders to motivate teachers through salary increments and other incentives that will have a positive attitude towards Physics teaching.

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