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Evaluating the Implementation of Physics Curriculum in Senior Secondary Schools in Kafanchan Municipal, Kaduna State, Nigeria

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ABSTRACT

This study assesses the implementation of the senior secondary school Physics Curriculum in Kafanchan Municipal, Kaduna State, Nigeria. It employs both Evaluation and Descriptive Survey Research Designs. The target population consists of physics teachers and SS3 students studying physics in Kafanchan Municipal. Using a multistage sampling procedure, 20 physics teachers and 50 SS3 students were selected. Three research instruments were used for data collection: the Teachers' Evaluation of Physics Curriculum Implementation Questionnaire (TEPCIQ), the Students' Evaluation of Physics Curriculum Implementation Questionnaire (SEPCIQ), and the Physics Resources Observation Checklist (PROCL). A five-point Likert scale, ranging from Strongly Agree (SA) to Strongly Disagree (SD), was used, with a grand mean score of 3.0 as the threshold for evaluation. The instruments were validated by five experts. Reliability testing using the split-half method produced coefficients of 0.85 for TEPCIQ and 0.89 for SEPCIQ, while the inter-rater method established a reliability index of 0.93 for PROCL. Data were analyzed using percentages, frequency counts, descriptive statistics (mean and standard deviation), and inferential statistics, including independent samples t-test and ANOVA. The findings revealed a significant difference in the implementation of performance objectives in the physics curriculum based on teachers' qualifications. In conclusion, the study recommends employing qualified physics teachers to ensure effective curriculum implementation in senior secondary schools.

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INTRODUCTION

The development of a nation depends solely on its level of skills in science and technology. The knowledge of science and technology, with its applications, made some countries like China to stand out economically among the comity of nations. Therefore, the need for Nigeria to advance scientifically and technologically cannot be overemphasized. To get this realized, emphasis can be laid on the implementation of the concepts of science curriculum generally and physics curriculum in particular, in order to enhance national development. Furthermore, the curriculum for science subjects in Nigerian schools are properly designed and developed with clear objectives stated at every Education level in its National policy on Education. The implementation stakeholders are properly identified and prepared materials and strategies are clearly stated for smooth implementation (FRN, 2014). In Nigeria, Physics is taught as one of the science subjects at the senior secondary school level of education. Taofeeq, Gana, Gimba and Salako (2022) viewed physics as the natural science that involves the study of matter and its motion and behaviour

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through space and time, along with related concepts such as energy and force. This simply mean that the knowledge of physics is relevant and applicable to every aspect of human endeavour.

Physics is an area of study that is absolutely necessary for the development of science, technology and industry. This is because scientific development is essential for better quality of life, sustainable development of the planet, and peaceful coexistence among people (Omwirhiren, 2015). The United Nations Educational, Scientific and Cultural Organization (UNESCO, 2015), further opined that from the immediate basic essentials of life such as access to water, food and shelter, to other issues such as management of agricultural production, water resources, health, energy resources, biodiversity, conservation, environment, transport and communication physics provides the basis for action at local, regional, national and transnational levels. The submissions of the researchers above are a testament to the fact that physics plays a significant role in human existence. Physics have been identified as the key driver for growth and sustainable social development and transformation of nations, which could lead to industrialization.

The development of a nation also depends on the kind of education the nation puts in place for its citizens. The needs and values of a nation determine its educational policy; hence, the Federal Republic of Nigeria, FRN (2014) pointed out that there is the need to train Nigerian citizens to be able to manipulate their environment towards the development of the nation. There is no gain saying that quality education increases the productivity and potentials of individuals and by extension, the society. It is one thing to design and develop a curriculum for a programme and it is another to ensure effective monitoring and evaluation of the implementation of it by stakeholders in order to identify areas that need adjustment for effective achievement of the purpose of its development. Curriculum is a means of bringing the objectives of education into reality. In addition, mastery of any subject is determined by the method used in implementing the curriculum. The evaluation procedure put in place after the implementation and the students' response is expected to yield effective learning outcomes in the students. When the curriculum is faulty or not well-implemented, it may affect the purpose of the national policy on education. The objectives of any level of education cannot be achieved if the planned curriculum for such level of education is not well- implemented. Adebule and Akomolafe (2014) concurred that no matter how well the curriculum of any subject is planned, designed and documented, if not properly implemented the curriculum may not achieve its goal and objectives.

The implementation of curriculum is facing some challenges in Nigerian secondary schools. Ayandele (2021) opines that one of which is the lack of teachers' participation in decision making and curriculum planning. Danbatta (2015) earlier mentioned that teachers are not involved in curriculum planning which could make or mar curriculum implementation, since the responsibility of interpreting and putting the curriculum into use solely rests on the teacher. Moreover, the issue of policy changes in the educational system over the years, which started with the 6-5-4 system, 6-3-3-4 system and now the 9-3-4 system has confused learners as to which subjects are to be offered in certificate examinations; with the changes in subjects offered at certificate examination as a result of the changes in educational system policy. In this study, implementation means the teaching of physics curriculum content to secondary school students from senior secondary one to three. Gender could be a moderator variable in effective implementation of physics curriculum by secondary school physics teachers.

Gender is defined by Adolphus and Mumuni (2016) as those characteristics of male and female, which are socially determined in contrast to those which are biologically determined. What this means is that gender roles for men and women vary from culture to culture; and even within the same culture, from one social group to another. Gender is used to discuss social and psychological respects that are regarded appropriate to men and women. Gender could

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influence curriculum implementation if there are topics that are gender-bias. According to a study conducted by Taofeeq et.al. (2022), there was a significant difference observed in the syllabus coverage and organization of physics curriculum implementation by physics teachers based on gender in favour of the males. The study also showed that there are some topics in the senior secondary school physics curriculum which are gender bias. On the contrary, a study conducted by Adebule, Ayodele and Akomolafe (2023) showed that there is no significant difference observed in the syllabus coverage and organization of physics curriculum implementation by physics teachers based on gender. Another moderator variable that could influence the adequate implementation of senior secondary physics curriculum is teacher's years of teaching experience.

Teacher's years of experience have to do with the increased awareness of diversifying search for new ideas, new commitments and new challenges. It is important to note that experience gained over time, enhances the knowledge, skills, and productivity of teachers. Oluwadare and Gana (2020) were of the view that a teacher is considered to have sufficient teaching experience after engaging in the teaching and learning process for a period of 10 years. This is so because as the saying goes, 'practice makes perfect'. Another moderator variable which could have impact on the implementation of physics curriculum in senior secondary schools is school type.

Secondary schools in Nigeria are categorized into two types, namely public and private schools. Public schools are schools owned by government (either Federal or State) whereas private schools are schools owned by organisations and individuals that are non-governmental. These type of school also includes Missionary schools and Islamic schools. The academic activities of public schools are strictly monitored or supervised by government agencies such as quality assurance unit/department in the ministries of education while private schools' academic activities are monitored or supervised mostly by their proprietors and occasionally by government agencies. Students are the most important stakeholders in the teaching and learning process. Therefore, for effective evaluation of physics curriculum implementation, the perception of students offering physics on the relevance of the physics curriculum to real-world applications, is very important. Student-factor is very crucial in curriculum implementation process and therefore it is necessary to also use students in evaluating the extent of curriculum coverage by their teachers. Teaching methods (pedagogy) used by teachers in physics curriculum implementation is also key to achieving the objectives of the curriculum. Inquiry-Based/Guided-discovery Teaching method is used to describe teaching strategies that are driven by scientific inquiry. The approach is deeply rooted in constructivism teaching practices. It is student-centered and offers students opportunities to be actively involved in experimenting, questioning and investigating. 'Inquiry' refers to an intellectual process through which students develop understanding of science ideas and the ways in which scientists study the natural world through actively engaging with scientific questions and investigations (Zheng & Geelan, 2015). Instructional materials are also very important factor in the effective implementation of physics curriculum. In the absence of teaching and learning materials, the teaching-learning processes will be hampered and if standard officers do not go out to evaluate, it will be difficult to know whether the curriculum is being effectively implemented or not. Unavailability of school facilities and equipments like classrooms, libraries, resource centers, offices, desks, school halls and others. The fact that education is under-funded by the government means that the availability and quality of facilities in learning institutions is affected negatively.

Students' ability to acquire scientific knowledge which can be applied in real-world is vital to effective physics curriculum implementation. The most important focus of physics education is to prepare students to acquire scientific knowledge that they will apply in everyday life (UNESCO, 2015). This implies that physics teaching ought not just to convey

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collection of facts to the students but also a way to think about the world outside the classroom. Therefore, teaching physics has to be concerned with developing analytical, critical observation and problem solving abilities as well as the creativity of an individual. To promote deep understanding of scientific concepts and positive attitudes towards science, it is recommended that physics teaching and learning should be focused on the use of scientific activities to investigate real-life phenomena (Hofstein & Mamlok, 2016). Physics is an experimental subject, thus its teaching and learning becomes more effective when students are given opportunity to develop their own idea through science learning activities. When the physics curriculum is not properly implemented in senior secondary schools, the goal of formulating such curriculum will not be achieved. It is on the basis of the aforementioned issues, that the researcher evaluated the implementation of Senior Secondary School Physics Curriculum in Kafanchan Municipal, Kaduna State, Nigeria.

Statement of the Problem

Over the past ten years (2015-2024), the poor performance of students in Physics have been a general problem. Evidence have shown that students are not doing well in this subject at West African Examinations Council (WAEC,2015-2024) and National Examinations Council (NECO,2015-2024). There are possible factors which could be responsible for students' poor performance in physics some of which Ogunleye (2015) opined as overloaded curriculum, uneven distribution of curriculum content, difficult nature of physics concepts, lack of competent physics teachers and non-functional physics curriculum. Furthermore, studies by Wafula (2019) and Adolphus (2020) also identified low learners' motivation among students, inadequate teaching and learning materials, and limited learning activities in Physics classrooms as well as poor syllabus coverage (ineffective implementation of physics curriculum) as possible factors responsible for the poor performance of students. If this problem persists, students will not be able to get admission into higher institutions to study courses like Engineering, Medicine, Pharmacy and other critical disciplines which are needed for national development.

Therefore, there is need to evaluate the implementation of the senior secondary school physics curriculum in its entirety and to what extent has the implementation of the physics curriculum succeeded in achieving the set objectives of physics education, with regards to achieving aims and objectives, content coverage, teachers' utilization of the available input factors, level of compliance of teachers with the recommended instructional methods and evaluation techniques used by physics teachers among others in assessing their students. There appears to be inadequate evaluation procedure put in place to ascertain whether the senior secondary school physics curriculum is being implemented the way it should be or not. Hence, this study addressed the fundamental question: To what extent do physics teachers comply to the objectives of physics curriculum in its implementation?

Aim and Objectives of the Study

The aim of the study was to evaluate the implementation of senior secondary school physics curriculum in Kafanchan Municipal, Kaduna State, Nigeria.

Specifically, the study sought to achieve the following objectives:

1. Examine the teachers' implementation of performance objectives of senior secondary school physics curriculum based on teachers' qualification.
2. Determine teachers' implementation of performance objectives of senior secondary school physics curriculum based on years of teaching experience.
3. Find out teachers' compliance on teaching methods in the implementation of senior secondary school physics curriculum based on school type.
4. Ascertain the extent of content coverage of physics curriculum by physics teachers and students offering physics in senior secondary school.

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Research Questions

The following research questions were raised to guide the study:

1. To what extent does the implementation of performance objectives of senior secondary school physics curriculum by physics teachers vary based on teachers' qualification?
2. To what extent does the implementation of performance objectives of senior secondary school physics curriculum by physics teachers vary based on their years of teaching experience?
3. What is the compliance on teaching methods by physics teachers in the implementation of physics curriculum in senior secondary schools based on school type?
4. What is the extent of content coverage of physics curriculum by physics teachers and students offering physics in the teaching and learning of physics in senior secondary school?

Hypotheses

The following hypotheses were formulated and tested at 0.05 level of significance:

1. There is no significant difference in the implementation of performance objectives in the senior secondary school physics curriculum based on teachers' qualification.
2. There is no significant difference in the implementation of performance objectives in senior secondary school physics curriculum based on years of teaching experience.
3. There is no significant difference in the implementation of performance objectives in senior secondary school physics curriculum based on school type.

METHOD AND PROCEDURE

The study adopted Evaluation and Descriptive Survey Research Designs. The sample of this study consisted of 70 respondents comprising of 20 physics teachers and 50 SS3 students offering physics in Kafanchan Municipal, Kaduna State, Nigeria. Multistage sampling techniques was used. Three instruments were used for data collection: "Teachers' Evaluation of Physics Curriculum Implementation Questionnaire" (TEPCIQ), "Students' Evaluation of Physics Curriculum Implementation Questionnaire" (SEPCIQ) and a checklist (PROCL). The TEPCIQ and SEPCIQ were structured based on a five-points Likert Scale of Strongly Agree (SA), Agree (A), Undecided (U), Disagree (D) and Strongly Disagree (SD). The scoring of the instruments was based on value points assigned to each of the five-points Likert Scale of Strongly Agree(SA)-5points, Agree (A)-4points, Undecided(U)-3points, Disagree(D)-2points and Strongly Disagree(SD)-1point. Content validity of TEPCIQ and SEPCIQ was carried out by five experts while the construct validity of the instruments (TEPCIQ and SEPCIQ) was established through factor analysis method. Split-half reliability method was used to determine reliability of TEPCIQ and SEPCIQ, reliability coefficients of 0.85 and 0.89 were obtained. The reliability of the checklist (PROCL) was ascertained using interrater method and a reliability index of 0.93 was obtained. Data were analyzed using percentages, frequency, descriptive statistics (mean and standard deviation) and inferential statistics (independent samples t-test and ANOVA). A grand mean score of 3.0 was used to determine the decision mean of each section of the questionnaires.

RESULTS

Research Question One: To what extent does the implementation of performance objectives of senior secondary school physics curriculum by physics teachers vary based on their qualifications?

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Table 1: Extent to which the Implementation of Performance Objectives of Physics Curriculum by Teachers Vary based on their Qualifications

S/N	Qualifications	Low	Moderate	High	Total
1	NCE	-	-	-	-
2	BSc Ed	-	-	-	-
3	BSc	-	4	-	4
4	BSc/PGDE	-	-	-	-
5	HND	-	-	4	4
6	MSc Ed	-	-	-	-
7	MSc	-	4	8	12
8	PhD	-	-	-	-
	Total		8	12	20

Table 1 shows the result on the extent to which the implementation of performance objectives of senior secondary school physics curriculum by physics teachers vary based on their qualifications. From the result 4 of the physics teachers are BSc certificate holders with moderate extent of implementation of performance objectives of Physics curriculum, 4 of them have HND with high extent of implementation. Twelve of the teachers are MSc certificate holders in Physics with 4 and 8 teachers having moderate and high extent of implementation of performance objectives of physics curriculum respectively.

Research Question Two: To what extent does the implementation of performance objectives of senior secondary school physics curriculum by physics teachers vary based on their years of teaching experience?

Table 2: Extent to which the Implementation of Performance Objectives of Physics Curriculum by Teachers Vary based on their Years of Teaching Experience

S/N	Teaching Experience	Low	Moderate	High	Total
1	0-5 years	-	1	1	2
2	6-10 years	-	3	4	7
3	11-19 years	-	4	7	11
4	20 and above	-	-	-	-
	Total	-	8	12	20

Table 2 shows the result on the extent to which the implementation of performance objectives of senior secondary school physics curriculum by physics teachers vary based on their years of teaching experience. From the result 2 of the physics teachers with 0-5years of teaching experience have moderate and high extent of implementation of performance objectives of Physics curriculum, 7 teachers have teaching experience between 6 to 10 years with 3 and 4 of them having moderate and high extent of implementation of the objectives. Eleven of the teachers are having teaching experience of between 11 to 19 years, with 4 and 7 teachers having moderate and high extent of implementation of performance objectives of physics curriculum respectively.

Research Question Three: What is the compliance on teaching methods by physics teachers in the implementation of physics curriculum in senior secondary schools based on school type?

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Table 3: Compliance on Teaching Methods by Physics Teachers in the Implementation of Physics Curriculum based on school type

S/N		School Type					
		Public		Private			
		N_{Public} = 12		Nprivate. =8			
		Mean	Std	Mean	Std	$\bar{X}_G$	Decision
1	Inquiry-based Method	1.33	.492	2.00	.000	1.60	Not comply
2	Demonstration Method	3.33	.492	4.00	.000	3.60	Comply
3	Individualized Method	2.00	.000	1.50	.535	1.80	Not comply
4	Cooperative Method	2.00	.853	1.50	.535	1.80	Not comply
5	Discussion Method	4.00	.853	3.50	.535	3.80	Comply
6	Simulation and Game Method	2.00	.853	1.50	.535	1.80	Not comply
7	Laboratory Practical Method	4.33	.492	3.50	.535	4.00	Comply
8	Scaffolding Method	1.67	.492	1.50	.535	1.60	Not comply
9	Project Method	4.33	.492	3.50	.535	4.00	Comply
10	Lecture Method	4.33	.492	4.50	.535	4.40	Comply
11	Discovery Method	4.33	.492	4.00	.000	4.20	Comply
12	Analogy	3.67	.492	4.50	.535	4.00	Comply
13	Team Teaching	2.00	.853	2.00	.000	2.00	Not comply
14	Role Playing	2.00	.000	1.50	.535	1.80	Not comply
15	Excursion/Field Trip	2.33	1.30	3.50	.535	2.80	Not comply
16	Programmed Instruction	1.67	.492	1.50	.535	1.60	Not comply
17	Teacher led whole class discussion	4.67	.492	4.00	.000	4.40	Comply
18	Free flowing whole class discussion	2.00	.853	1.50	.535	1.80	Not comply
19	Guided-Discovery Method	1.33	.492	4.50	.535	2.60	Not comply
20	Kinesthetic-learning Method	2.67	.985	1.50	.535	2.20	Not comply
21	Technology-based Method	1.33	.492	2.00	.000	1.60	Not comply
22	Group learning Method	3.00	1.71	3.00	1.07	3.00	Comply
23	Game-based learning Method	1.67	.492	1.50	.535	1.60	Not comply
24	Expeditionary learning Method	2.00	.853	1.50	.535	1.80	Not comply
25	Differentiated instruction Method	3.00	.853	2.00	.000	2.60	Not comply

Table 3 present the result on the compliance on teaching methods by physics teachers in the implementation of physics curriculum in senior secondary schools based on school type. The result revealed that items 2, 5, 7, 9, 10, 11, 12, 17 and 22 have grand mean scores range between, 3.00 to 4.40. It implies that teachers in both public and private schools comply to these teaching methods; Demonstration Method, Discussion Method, Laboratory Practical Method, Project Method, Lecture Method, Discovery Method, Analogy, Teacher led whole class discussion and Group Learning Method. Also, items 1, 3, 4, 6, 8, 13, 14, 15, 16, 18, 19, 20, 21, 23, 24 and 25 were rated not comply with grand means ranging between 1.60 and 2.80, indicating that teachers do not comply with the following teaching methods in the implementation of physics curriculum in senior secondary schools: Inquiry-based Method, Individualized Method, Cooperative Method, Cooperative Method, Simulation and Game Method, Scaffolding Method, Team Teaching, Role Playing, Excursion/Field Trip, Programmed Instruction, Free flowing whole class discussion, Guided-Discovery Method, Kinesthetic-learning Method,

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Technology-based Method, Game-based learning Method, Expeditionary learning Method and Differentiated instruction Method.

Research Question Four: What is the extent of content coverage of physics curriculum by physics teachers and students offering physics in the teaching and learning of physics in senior secondary schools?

Table 4: Extent of Content Coverage of Physics Curriculum by Physics Teachers and Students Offering Physics

S/N		Respondents					
		Teachers $N_T = 20$		Students $N_S = 50$			
		Mean	Std	Mean	Std	$\bar{X}_G$	Decision
	Space, Time and Motion	4.00	.000	4.00	.000	4.00	Covered
1	Motion						
2	Position, distance and displacement	4.00	.000	4.00	.000	4.00	Covered
3	Time	3.80	.616	3.88	.480	3.86	Covered
4	Speed, velocity and acceleration	3.80	.616	3.84	.510	3.83	Covered
5	Rectilinear acceleration	3.85	.366	3.76	.517	3.79	Covered
6	Fundamental and derived units	3.70	.657	3.68	.653	3.69	Covered
7	Scalars and vectors	3.70	.657	3.66	.688	3.67	Covered
8	Equations of uniform accelerated motion	3.75	.444	3.82	.388	3.80	Covered
9	Projectiles	3.90	.308	3.90	.303	3.90	Covered
10	Equilibrium of forces	3.70	.923	3.62	.830	3.64	Covered
11	Simple harmonic motion	3.95	.224	3.84	.468	3.87	Covered
	Conservation Principles						
12	Work, energy and power	3.90	.308	3.94	.240	3.93	Covered
13	Heat energy	3.70	.923	3.68	.768	3.69	Covered
14	Electric charges	3.85	.366	3.64	.693	3.70	Covered
15	Linear momentum	3.80	.410	3.68	.551	3.71	Covered
16	Mechanical energy	3.90	.308	3.88	.328	3.89	Covered
	Waves						
17	Production and propagation of waves	3.85	.366	3.84	.370	3.84	Covered
18	Types of waves	3.90	.308	3.88	.328	3.89	Covered
19	Properties of waves	3.80	.616	3.78	.507	3.79	Covered
20	Light waves	3.40	1.046	3.52	.909	3.49	Covered
21	Sound waves	3.40	1.046	3.62	.830	3.56	Covered
22	Application of light and sound waves	3.40	1.046	3.54	.838	3.50	Covered
	Field						
23	Electromagnetic waves	3.60	.821	3.46	.762	3.50	Covered
24	Description and property of fields	3.20	.951	3.06	.890	3.10	Covered
25	Gravitational field	3.70	.470	3.40	.857	3.49	Covered
26	Electric field	3.65	.489	3.56	.577	3.59	Covered
27	Magnetic field	3.15	1.137	3.10	1.147	3.11	Covered

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28	Electromagnetic field	2.95	1.050	2.66	1.136	2.74	Not covered
29	Simple A.C. circuits	2.30	1.261	1.84	1.113	1.97	Not covered
	Quanta						
30	Particle nature of matter	2.45	1.276	1.96	1.212	2.10	Not covered
31	Elastic properties of solids	2.45	1.432	1.92	1.275	2.07	Not covered
32	Crystal structure	2.25	1.333	1.76	1.117	1.90	Not covered
33	Fluids at rest and in motion	2.25	1.293	1.98	1.152	2.06	Not covered
34	Molecular theory of matter	2.50	1.235	2.12	1.081	2.23	Not covered
35	Models of the atom	2.95	1.276	2.30	1.298	2.49	Not covered
36	Nucleus	3.15	1.226	2.32	1.316	2.56	Covered
37	Energy quantization	2.70	1.455	2.08	1.307	2.26	Not covered
38	Wave-particle paradox	1.85	1.226	1.44	.907	1.56	Not covered
		3.37		3.20		3.26	Covered

Table 4 shows the result on extent of content coverage of physics curriculum by physics teachers and students offering physics in the teaching and learning of physics in senior secondary schools. From the table, the content areas covered by teachers as responded by teachers and students are Motion, Position, distance and displacement, time, Speed, velocity and acceleration, Rectilinear acceleration, Fundamental and derived units, Scalars and vectors, Equations of uniform accelerated motion, projectiles, Equilibrium of forces, Simple harmonic motion, Work, energy and power, heat energy, Electric charges, Linear momentum and Mechanical energy. Other areas were production and propagation of waves, types of waves, properties of waves, light waves, sound waves, application of light and sound waves, electromagnetic waves, description and property of fields, gravitational field, electric field, magnetic field and nucleus, Also, areas not covered by teachers in Physics are electromagnetic field, simple A.C. circuits, particle nature of matter, elastic properties of solids, crystal structure, fluids at rest and in motion,, molecular theory of matter, models of the atom, energy quantization and Wave-particle paradox. Since the grand mean of 3.26 is above the criterion mean, it implies that the extent of content coverage of physics curriculum by physics teachers while teaching physics in senior secondary schools is to a high extent.

Hypothesis One: There is no significant difference in the implementation of performance objectives in the senior secondary school physics curriculum based on teachers' qualification.

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Table 5: ANOVA Result on Implementation of Performance Objectives in Physics Curriculum Based on Teachers' Qualification

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	210.133	2	105.067	51.523	.000
Within Groups	34.667	17	2.039		
Total	244.800	19			

Table 6 shows the ANOVA result on the difference in the implementation of performance objectives in senior secondary school physics curriculum based on teachers' qualification. From the result F (2, 17) = 51.52, p< 0.05, since the p-value of .000 is less than 0.05 level of significance, the null hypothesis was rejected. It was concluded that there is a significant difference in the implementation of performance objectives in the senior secondary school physics curriculum based on teachers' qualification. The post-hoc result in Table 11 reveals that, there is a difference between teacher with BSc and HND, HND and MSc but no difference between teachers with BSc and MSc in the implementation of performance objectives in Physics curriculum.

Hypothesis Two: There is no significant difference in the implementation of performance objectives in the senior secondary school physics curriculum based on years of teaching experience.

Table 7: ANOVA Result on Implementation of Performance Objectives in Physics Curriculum based on Years of Teaching Experience

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	19.735	2	9.868	.745	.489
Within Groups	225.065	17	13.239		
Total	244.800	19			

Table 7 shows the ANOVA result on the difference in the implementation of performance objectives in senior secondary school physics curriculum based on years of teaching experience. From the result F (2, 17) =0.745, p> 0.05, since the p-value of 0.489 is greater than 0.05 level of significance, the null hypothesis was retained. It was concluded that there is no significant difference in the implementation of performance objectives in the senior secondary school physics curriculum based on teachers' teaching experience.

Hypothesis Three: There is no significant difference in the implementation of performance objectives in the senior secondary school physics curriculum based on school type.

Table 8: Summary of t-test Result on Implementation of Performance Objectives by Teachers in Physics Curriculum based on School Type

Groups	N	Mean	SD	Df	t	P-value	Decision
Public	12	36.33	4.376	18	1.13	.275	Insignificant
Private	8	34.50	1.604				

Source: Fieldwork, 2024

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Table 8 presents the t-test result on the difference between the mean responses of teachers on the implementation of performance objectives in the senior secondary school physics curriculum based on school type. Public school teachers have a mean score of 36.33 with a standard deviation of 4.38 and the private school teachers had a mean score of 34.50 and a standard deviation of 1.6. The result further shows that t (18) =-1.13, P > 0.05. Since the P-value of 0.275 is greater than the 0.05 level of significance, the null hypothesis was retained. It was concluded that there is no significant difference between the mean responses of public and private school teachers on the implementation of performance objectives in the senior secondary school physics curriculum.

SUMMARY OF FINDINDS

The findings of the study include amongst others: there is no significant difference in the implementation of performance objectives in the senior secondary school physics curriculum based on teachers' teaching experience; there is no significant difference between the mean responses of public and private school teachers on the implementation of performance objectives in the senior secondary school physics curriculum.

REFERENCES

Adolphus, I. A. (2020). Gender differentiation in chemical thermodynamics achievement in selected schools in Akwa-Ibom State. *Journals of Humanities, Arts, Medicine and Sciences*, *2*(1), 11-20.

Adolphus, I. A. & Mumuni, A. A. O. (2016). *Exploration of gaps between intended and enacted physics curriculum: teachers' professional development perspective*.

Adebule, S. O., Ayodele C. S., & Akomolafe, O. D. (2023). Evaluation of the implementation of the senior secondary school physics curriculum in Nigeria. *International Journal of Education, Learning and Development*, *11*(6), 34-43.

Ayandele, A. A. (2021). A survey of implementation of basic technology curriculum in junior secondary schools in Oyo south senatorial district. *Al-Hikmah Journal of Educational Management and Counselling, 3*(1), 74-80.

Busari, T. (2014). *Effects of computer cooperative and individualized instruction on achievement and retention of senior secondary school students in physics in Minna Metropolis Niger State.* An Unpublished MTech Thesis, Science Education Department, School of Science and Technology Education, Federal University of Technology Minna, Niger State.

Dambatta, U. (2015). *An evaluation of the Nigeria certificate in education mathematics programme in the North-West, Nigeria.* Ph.D. Research Proposal Seminar. Mathematics Education Department, Faculty of Education, University of Ilorin. Nigeria.

Federal Republic of Nigeria, (2014). *National policy on education*. Lagos: NERDC. Federal Government Printers.

Gamze, Y. K., Tugba, Y. Y., Kürşat, K.& Esra, C. (2017). Teachers' perception: competent or not in curriculum development. *Malaysian Online Journal of Educational Sciences*, *5*(4), 56-73.

Hofstein, N. D., & Mamlok, F. J. (2016). Effect of discovery method on secondary school student's achievement in physics in Kenya. *International Journal of Education and Evaluation, 2*(7), 42-53.

Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement*.

National Examination Council (2024). *NECO chief examiners report*. *Physics (2015-2024).* https://necoonline.org.ng/e-learning/Physics/physmain.html.

Nigerian Educational Research and Development Council (NERDC) (2008). The *new senior secondary school curriculum structure at a glance*. Abuja. FME.

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Ogundele, M. O. (2015). Implementation of basic science curriculum in Nigeria private secondary schools: Problems and prospects. *Integrity Journal of Education and Training*, *4*(1),1-7.

Oluwadare, O. O., & Gana, C. S. (2020). Challenges in the implementation of the transformed secondary school physics curriculum in FCT, Abuja, Nigeria. *Journal of Information, Education, Science and Technology (JIEST)*, *6*(1), 20-25.

Omwirhiren, E. M. (2015). Enhancing academic achievement and retention in senior secondary school chemistry through discussion and lecture methods: A case study of some selected secondary schools in Gboko, Benue State, Nigeria. *Journal of Education and Practice*, *6*(21), 159-160.

Taofeeq, B., Gana, C. S., Gimba, R. W., & Salako, K. A. (2022). Evaluate the implementation of physics curriculum in senior secondary school using Tyler`s objective model in North- Central States, Nigeria. *Journal of Economic, Social and Educational* Issues, *2*(2), 179-181.

Tyler, R. W. (1949). *Basic principles of curriculum and instruction*. Chicago: University of Chicago Press.

UNESCO (2015). Current challenges in basic science education. *Week Report*.

Wafula, E. N. (2019). *Instructional influences on the implementation of physics curriculum in secondary schools, a case study of Bungoma County, Kenya.* Unpublished PhD thesis department of curriculum instruction and educational media MOI University, Eldoret-Kenya.

West Africa Examination Council (2024). *WAEC chief examiners report*. *Physics (2015-2024).* https://waeconline.org.ng/e-learning/Physics/physmain.html.

West Africa Examination Council WAEC (2015-2024). *Regulations and syllabuses for the West African Senior School Certificate Examinations*. Lagos: WAEC.

Zheng, R.T. & Geelan, D.H. (2015). Content analysis of 9thgrade physics curriculum, textbook, lessons with respect to science process skills. *International Journal of Educational Research and Technology*, *2*(5), 112-124.

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