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Teachers' Assessment of the Implementation of the Senior School Physics Curriculum in Osun State, Nigeria

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Abstract
This study investigated Physics teachers' assessment of the implementation of senior school physics curriculum in Osun State, Nigeria. It examined the influence of their qualifications and experience on their assessment. The teachers were sampled from the 30 local governments in the state; 125 physics teachers were sampled with at least four physics teachers from each local government in Osun state. The instrument for the study was researcher-designed **Teachers' Assessment Questionnaire (TAQ)** which consisted of 40 items to assess Nature, Objectives and Content of the Senior School Physics Curriculum. The items also assessed the instructional materials and instructional personnel available for the implementation of the Curriculum. The items were on 4point likert-type scale. Strongly agree (SA) +2, Agree (A) +1, Disagree (D) -1 and Strongly disagree (SD) -2. Two major research hypotheses were formulated and tested using t-test statistical analysis. Findings from the study showed that; there was no significant difference in teachers' assessment of nature of physics based on teachers' qualifications and experience; there was no significant difference in the assessment of content of physics curriculum based on teachers' experience and qualifications but there was a significant difference in their assessment of the Objectives based on experience and qualifications. Also, no significant difference existed in the assessment of instructional materials available for the implementation of the Curriculum based on their experience and qualifications. There was a significant difference in their assessment of instructional personnel based on their qualification, but no significant difference existed based on their experience. It was therefore recommended that difficult and abstract contents of the physics curriculum be reviewed and every physics teacher should have access to physics curriculum for effective implementation of the stated objectives.
Keywords: Assessment, Implementation, Curriculum, qualification, experience.

1.0 Introduction

Physics is one of the basic science subjects. It is defined as the study of the relationship between matter and energy in its entire ramification. Omosewo, (2003) defines physics as the bedrock of science and technology. Physics provides the basic knowledge and understanding of principles whose application contributes immensely to the quality of life in the society.

The importance of Physics as a requirement for technological development has been recognized in the recent years by many developing countries. It is the recognition of the important role that physics plays in national development that prompted Fafunwa (1972) and Awokoya (1976) to advocate for a functional curriculum in the sciences, especially in relation to physics in Nigeria. It was stated that: "the technological potential of a country is more accurately gauge by the quality of its Physics education than by any other single index such as the size of its population. For without physics, technological culture cannot really take root, no matter the amount of imported technical expertise" (Ette, 1977).

The word curriculum emanated from a Latin word meaning "a running course or race course" (Onwuka, 1984). Curriculum can be defined as an organization of subject matter to be presented as pieces of information. The term curriculum has been defined in many different ways by many researchers. Daramola (2004) defined Curriculum as the part of the school academic programme specifically designed to provide planned and guided teaching experiences. From the definition 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
How are the result of teaching assessed – evaluation

The functionality of the above stated components of the curriculum depends on how each of the components implemented is interrelated. Teachers have been found to be the key factor in 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 planner. In National Policy on Education, it was stated, "No educational system can rise above the quality of its teachers" (FRN, 2004). Omosewo, (1994) investigated the relevance of physics education programme in Nigerian higher institution to the teaching of senior secondary physics. She found out that some concepts in senior secondary physics are not relevant to the training received by practicing physics teachers. It was suggested that Physics education programme in higher institution should be improved such that it will meet the demands at senior secondary school. Another 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 Physics Curriculum is a function of 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. Teachers' qualifications mean teachers' level of education and professional attainment. The higher the teacher's exposure to learning the more experienced he or she is expected to be able to manipulate the teaching activities. Teachers' qualification and teaching experience are interrelated. The more qualified a teacher, the more experienced he becomes in ensuring proper implementation of the curriculum. A curriculum well implemented could conversely bring about a desired change (intended learning outcome) among students.

The Physics curriculum content is structured with the conceptual approach (Salami, 2003). It could be observed that the two major concepts that spread into every part of the entire curriculum are concepts of motion and energy. Other concepts that are directly related to these two concepts have been grouped into six sections and a number of topics. The sections include;

1) Interaction of matter, space and time.
2) Conservation principle.
3) Wave: motion without material transfer.
4) Field at rest and in motion.
5) Energy, Quanta and Duality of matter.
6) Physics in Technology

The curriculum has been designed such that spiral approach to sequencing a science course was adopted. In the approach, the concepts to be taught are arranged in such a way that they run throughout the three years course (SS 1, SS 2, & SS 3); the concepts being discussed in greater depth as the course matures over the years.

The teaching syllabus is organized into five sections; topics, performance objectives, content, activities and notes. The organization is done so as to serve as a guide for classroom teachers during classroom instruction. For example the performance objectives are stated so that they will guide the teacher in self-evaluation of their own teaching and the achievement of their students. It is expected that teachers should not see the performance objectives as all the details involved instruction but they should see the objectives as a guide to achieve intended learning outcomes (ILO). Also, teachers should be able to identify the cognitive, psychomotor and effective domains of learning from the performance objectives. This will turn out to serve as a guide to selection of adequate and appropriate instructional strategies for effective teaching and learning.

1.1Statement of the Problem

Physics as a basic science takes vital role in technological development. In spite of the important position occupied by physics education in Nigeria it is being plagued by several problems. Research had shown that students' performance in senior school certificate examination; physics has been consistently poor over the years. (Daramola, 1987 and Onwioduokit, 2000). One of the factors responsible for poor performance could be poor implementation of the designed physics curriculum. If physics education is going to achieve its aims and objectives then there is need to ensure proper implementation of its aims, objectives and content of the designed senior school physics curriculum. One of the ways of ensuring appropriate implementation of the curriculum is to investigate teachers' assessment of the objectives of the curriculum, whether they are clearly stated or otherwise. Also, it is essential to investigate teachers' assessment of the content to determine its adequacy in terms of meeting the needs of the students and the emerging needs of the society.

1.2 Purpose of the Study

The main thrust of the study was to determine teachers' assessment of the implementation of the senior school physics curriculum using Osun State physics teachers as a case study. The study assessed the implementation of the nature, objectives and content of the senior school physics curriculum. The study also assessed the instructional material and instructional personnel available for the implementation of the curriculum. Furthermore, the purpose was to assess the influence of teachers' experience and qualification on their assessment of the implementation of the curriculum.

1.3 Research Questions

The study sought answers to the following research questions:

1. How do physics teachers' assess the nature of the Senior School Physics, the objectives of physics curriculum, content of physics curriculum, the instructional materials and instructional personnel available for the implementation of the Senior School Physics Curriculum?
2. What is the Influence of teachers' qualifications and experience on their assessment of;
   a. Nature of Senior School Physics
   b. Objectives of Senior School Physics Curriculum
   c. Content of Senior School Physics Curriculum

d. Instructional Personnel and Materials available for the implementation of the Senior School Physics Curriculum.

1.4 Research Hypotheses

Two major Hypotheses were formulated to provide answer to research questions; the hypotheses were further subdivided to address each of the nature, objectives, content, instructional material and instructional personnel.

1. There is no significant difference between qualified and unqualified physics teachers' assessment of the;
   a. Nature of Senior School Physics.
   b. Objectives of Senior School Physics Curriculum.
   c. Content of Senior school Physics Curriculum.
   d. Instructional Materials available for the implementation of Senior School Physics curriculum.
   e. Instructional Personnel available for the implementation of Senior School Physics curriculum.
2. There is no significant difference between experienced and less experienced physics teachers' assessment of the;
   a. Nature of Senior School Physics.
   b. Objectives of Senior School Physics Curriculum.
   c. Content of Senior school Physics Curriculum.
   d. Instructional Materials available for the implementation of Senior School Physics curriculum.
   e. Instructional Personnel available for the implementation of Senior School Physics curriculum.

2.0 Methodology

2.1Research Type

The research type was a descriptive survey using questionnaire technique. The descriptive survey approach was used to obtain data from the representatives of the population to assess the implementation of the existing Senior School Physics Curriculum based on teachers' qualification and experience.

2.2 Sample and Sampling Technique

The target population of this study consisted of the entire 180 physics teachers in the state public secondary schools. The sample population is made up of 125 physics teachers randomly selected from 30 local governments representing 69% of the total number of physics teachers in Osun state. At least four physics teachers were randomly selected from each local government in the state.

2.3 Research Instrument

The instrument used in this research was researcher-designed Teachers' Assessment Questionnaire **(TAQ).** The instrument was divided into two parts, sections A and B. Section A requires information about the respondents such as; sex, teaching experience, qualification, subject specialization and other relevant information. Section B was concerned with information that reveals the assessment of teachers on implementation of the senior school physics curriculum. The assessment took into consideration the nature, the objectives, the content, and adequacy of instructional materials and personnel available for the implementation of new senior school physics curriculum. The instrument contains 40 statements, which were made on 4 point likert-type scale. The scale ranges from Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD) with scores 2, 1, -1 & -2 respectively. Section B of the instrument was further divided into subsections to analyze each of the nature, objectives, content, instructional material and instructional personnel.

2.4 Data Analysis

Data collected were analyzed using frequency count, percentage and t-test statistical methods. Research hypotheses 1 & 2 were analyzed using t-test.

3.0 Results

This involves interpretation of the findings as related to the research hypotheses generated in the study. The data were analyzed using frequency counts, percentages and t-test. In order to determine the response of the subjects in terms of their qualification and experience, frequency counts and percentages were used. The table below shows the frequency of respondents by qualification and experience. The table below indicates the frequency and percentages of the respondents based on their qualification and experience.

Respondents by Qualification and Experience

Variable	**Qualified**	**Unqualified**	**Experienced**	**Less experienced**
Frequency	60	65	50	75
Percentages	48%	52%	40%	60%

3.1 Hypothesis 1

There is no significant deference between qualified and unqualified physics teachers, assessment of the;

a. Nature of Senior School Physics.
b. Objectives of Senior School Physics Curriculum.

c. Content of the Senior School Physics Curriculum.
d. Instructional material available for the implementation of Senior School Physics Curriculum.
e. Instructional personnel available for the implementation of Senior School Physics Curriculum.

Table 2: Result of t-test Analysis of Hypothesis 1(a-e)

Hypotheses	Variable (Qualification)	N	X	SD	df	t-cal	t-table	Decision
1a	Qualified	373	3.193	1.100	748	1.839*	1.960	Not
	Unqualified	383	3.049	1.058				Rejected
1b	Qualified	560	3.052	1.161	1218	2.580**	1.960	Rejected
	Unqualified	660	2.876	1.209				
1c	Qualified	669	2.634	1.296	1374	0.832*	1.960	Not
	Unqualified	707	2.578	1.203				Rejected
1d	Qualified	425	2.600	2.553	863	4.258**	1.960	Rejected
	Unqualified	440	2.005	1.419				
1e	Qualified	372	2.073	1.271	748	0.882*	1.960	Not
	Unqualified	378	1.989	1.311				Rejected

Note: * Not Significant at 0.05 level & ** Significant at 0.05 level.

From the table the t-test analysis revealed that in hypothesis 1a qualified teachers had mean score of 3.193 and standard deviation of 1.100 while unqualified teachers had a mean score of 3.049 and a standard deviation of 1.058. The table also revealed that t-table value (1.960) is greater than t-calculated value (1.839) at 0.05 alpha level of significance. This implies that there was no significant difference between qualified and unqualified teachers' assessment of the nature of senior school physics. Hypothesis 1b was rejected because the t-table value (1.960) was less than t-calculated value (2.580) at 0.05 alpha level of significance. Hence, there was a significant difference between qualified and unqualified teachers' assessment of the objectives of the new senior school physics curriculum. The table also showed that there was no significant difference between qualified and unqualified teachers' assessment of the content of the senior school physics curriculum. Hence hypothesis 1c was not rejected (t-table value 1.960 was greater than t-calculated value 0.832). Hypothesis 1d shows that t-table value is less than t-calculated value (1.960<4.258) hence there was a significant difference. The table revealed that qualified teachers had mean score of 2.073, standard deviation of 1.271 while unqualified teachers had mean score of 1.9894, standard deviation of 1.311. The t-test revealed that t-calculated value (0.882) is less than t-table value (1.960). This implies that there was no significant difference between qualified and unqualified teachers' assessment of instructional personnel available for the implementation of the senior school physics curriculum.

3.2 Hypothesis 2

There is no significant deference between experienced and less experienced physics teachers, assessment of the;

a. Nature of Senior School Physics.
b. Objective of Senior School Physics Curriculum.
c. Content of the Senior School Physics Curriculum.
d. Instructional material available for the implementation of Senior School Physics Curriculum.
e. Instructional personnel available for the implementation of Senior School Physics Curriculum.

Table 3: Result of t-test Analysis of Hypothesis 2(a-e)

Hypotheses	Variable (Experience)	N	X	SD	df	t-cal	t-table	Decision
2a	Experienced	295	3.268	0.990	763	0.063*	1.960	Not
	Less Experienced	470	3.023	1.124				Rejected
2b	Experienced	533	3.146	1.034	1218	4.953**	1.960	Rejected
	Less Experienced	687	2.809	1.280				
2c	Experienced	950	2.523	1.244	137	3.712**	1.960	Rejected
	Less Experienced	426	2.791	1.248				
2d	Experienced	416	2.212	1.372	863	1.167*	1.960	Not
	Less Experienced	449	2.376	2.561				Rejected
2e	Experienced	465	2.058	1.256	748	0.743*	1.960	Not
	Less Experienced	285	1.936	1.346				Rejected

Note: * Not Significant at 0.05 level & ** Significant at 0.05 level.

The table above revealed that hypothesis 2a was not rejected, the t-table value is greater than the t-calculated value at 0.05 alpha level of significance. Hence, there was no significant difference between experienced and less experienced teachers' assessment of the nature of the senior school physics curriculum. Hypotheses 2b and 2c were both rejected; the t- table value is less than the t-calculated value in each case. There was a significant difference in experienced and less experienced physics teachers' assessment of both objectives and contents of the senior school physics curriculum. Also, hypotheses 2d and 2e were not rejected; the t-table value in each case was greater than the t-calculated value. Hence there was a no significant difference in experienced and less experienced physics teachers' assessment of both instructional material and personnel available for implementation of the senior school physics curriculum.

4.0 Discussion on findings

Findings from this study indicated there were no significant differences in teachers' assessment of the nature of the senior school physics curriculum based on their qualification and experience. It was observed that most teacher sampled have in depth understanding of the nature of the senior school physics curriculum. The study also revealed that there were significant differences in the assessment of objectives of the senior school physics curriculum based on their qualifications and experiences. It was observed that most of the unqualified teachers do not seem to have understanding of what objectives of the Senior School Physics curriculum is all about. This finding was in line with the findings of Omosewo (1998). She found out that teachers seem not to have adequate knowledge of objectives of Physics curriculum and that their knowledge of performance objectives is shallow.

The findings also revealed that there were no significant differences in the assessment of the curriculum content by the teachers in term of their qualification and experience. Most of the teachers sampled were of the opinion that some of the contents of the curriculum are not relevant to needs of the Nigerian students at O-Level and that some contents are too abstract. Hence, they are very difficult for students to understand. These findings are in consonant with Adewale (2002), who opined that some concepts of the curriculum are too abstract for students to comprehend. Further findings from the study showed that there are more unqualified teachers in the school than qualified ones, the qualified and less experienced ones are more than the qualified experienced ones. This is affecting the implementation of the curriculum objectives and contents through quality of teaching being done and conversely affecting the academic performance of students. It can be said that the existing physics teachers have little or no knowledge of contents and objectives senior school physics curriculum. This is in line with Omosewo (1994) which found out the relevance of physics education program received by prospective physics teachers to the teaching of physics in Nigerian secondary schools. It was also found out that most physics laboratories are poorly equipped, equipment available are obsolete and little or no efforts are being put in place for improvisation. Where the teachers are willing to improvise, they complained that there are no encouragements to ensure sustainability and durability of the improvised equipment.

5. Recommendations

The following recommendations were made from the findings of the study;

a. Provision should be made for all physics teachers to have a copy of the new senior school physics curriculum.
b. Teachers should endeavour to follow the stated objectives during each teaching
c. Difficult or abstract contents of the curriculum should be reviewed.
d. Efforts should be made to ensure that qualified and competent physics teachers are found in the field.
e. Improvisation should be encouraged among teachers. This will also help in developing psychomotor skills among student learning under such teacher.

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