



A Survey of Teachers' Knowledge of the Characteristics of New Senior Secondary School Biology Curriculum

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Abstract

This study investigated teachers' knowledge of characteristics of the new Biology curriculum. Four research questions were raised and two hypotheses were formulated. Descriptive survey design was adopted. Purposive sampling was used to select the sample of 108 teachers. "Test of knowledge of the characteristics of Biology curriculum" (TKCBC) was used to collect data. The instrument was validated by three specialists in Biology Education and pilot tested on fifteen teachers. Reliability coefficient of .795 was obtained using Kuder Richardson formula 20. Analysis of data using descriptive statistics for research questions one and two. t-test and analysis of variance were used to test the hypotheses at alpha level of 0.05 significance shows 64.8% teachers had access to the new curriculum. 32% teachers had adequate knowledge of characteristics of the curriculum. No significant difference in teachers' knowledge of characteristics of the curriculum based on gender and teaching experience. Therefore, some recommendations were made.

Keywords: Teachers' Knowledge, Characteristics, Biology Curriculum

Introduction

Biology is one of the crucial science subjects offered by students in senior secondary schools in Nigeria. According to Sarogini (2010), Aquarena Wetlands Projects (2018), Biology is the natural science that involves the study of life and living organisms including their physical structure, function, origin, chemical composition, growth and development, evolution, distribution and taxonomy.

As a curriculum, it is a sum total of all the activities that are desirable in the educational system as it dictates what should be taught, by whom, at what level (class), activities that will be required, with what teaching and learning materials, goals to be achieved and how to evaluate the content. Offorma and Chukwuma-Nosike(2017) see as a document that contains all planned and unplanned learning contents, experiences ,activities ,methods and evaluation guidelines ,that learners are exposed to under the auspices of the school, to bring a total change in behaviour.

Researches have shown that the teacher is a critical factor in the successful implementation of any education innovation (Wokocho, 2007) as cited in Odili, Ebisine, and Ajuar (2011). The teacher is central in the task of implementation of any curriculum. his/ her understanding of the curriculum objectives, contents, materials and methods is crucial in his/her ability to implement the curriculum. The curriculum schemata have placed a lot of burdens on the pedagogical demands of the teacher (Okoye, 2013). A teacher cannot give what he does not possess. As research has shown that teachers cannot effectively teach what they do not know or are not committed to.

Studies have revealed that there is a relationship between teachers' teaching experience and Curriculum implementation vise-a -vise students' achievement. Also, gender has become an important issue in science and technology for some time now. Gender disparity permeates any human endeavour including Curriculum implementation and achievement to mention but a few.

Available statistics from the West African Examination Council (WAEC) on Senior Secondary School Students' Performance in Biology has shown that although Biology has the highest enrolment relative to other science subjects, however it records a very poor performance at Senior School Certificate Examinations. This report followed by researches resulted in innovations in Biology curriculum.



The renewal of science curriculum started in the 1920s, with the aim of correcting the inadequacies and inconsistencies in science and improving on the performance of students in science of which Biology is one. The study of Science started as Nature Study in schools, later it became General study and much later learnt as Separate science subjects: Physics, Chemistry and Biology (Igwe, 2003) and (Omiko, 2011) as reported in Omiko (2013).

The first Biology curriculum innovation can be traced to late 60s when Science Teachers Association of Nigeria (STAN) and Comparative Education Study and Adaptation centre constituted a science curriculum development committee in conjunction with West African Examination Council to draw up syllabi in Integrated Science, Biology, Chemistry and Physics (Ivowi, 2011) as cited in Omiko (2013). Thereafter two other curriculum innovations were carried out in Biology in the year 1985 and 2009. The new Senior Secondary School Biology Curriculum Structure 1-3 was designed precisely in 2009 with partial implementation starting in September, 2011 with the intent of providing a logical and a psychological follow-up for the 9 –year Basic Science core curriculum. The curriculum was adapted and revised from the 1985 edition.

The objectives of the curriculum were derived from the National Policy on Education 2004 edition. They are to prepare students to acquire:

1. adequate laboratory and field skills in Biology;
2. meaningful and relevant knowledge in Biology;
3. ability to apply scientific knowledge to everyday life in matters of personal and community, health and Agriculture;
4. reasonable and functional scientific attitude. (FME, 2009)

The content of the new Biology curriculum is broad-based. The total curriculum contents are organized around four major Biological themes thus giving it a thematic approach to content organization and structure. The whole curriculum is structured around four themes of:

1. Organization of life
2. Organism at work
3. The organisms and its environment
4. Continuity of life

The curriculum is spiral in the sense that a careful analysis of the topics in the curriculum are repeated from one class to another, with increasing level of difficulty thereby making provision for coverage to be handled at greater depth, as the students move from lower to higher classes.

The curriculum format is organized into six sections as follows.

1. Topic
2. Performance objectives
3. Content
4. Activities – teacher and students
5. Teaching and learning materials
6. Evaluation guide.

The above organization provides maximum guide to the teacher. Hence the teacher needs to be hooked unto these components of the curriculum and become familiar with their application. Furthermore the curriculum format provides the teacher with the activities to be carried out either by the teacher or students on each topic. The teachers are at liberty to add more performance objectives to the already stated ones on each topic for proper implementation of the Curriculum.

Statement of the Problem

Despite the series of innovations in science curriculum of which Biology is one, the performance of Biology students in senior school certificate examinations is still below expectation, WASSCE Chief Examiners' report in May/June 2014-2017.

Stakeholders in Education have been complaining of students' poor performance in senior school certificate examination. The teachers are being blamed. These teachers who are implementing the curriculum may be qualified graduate teachers. What then is responsible for this persistent failure in school



certificate examination? This study, therefore attempts to access the teachers' knowledge of characteristics of the curriculum they are implementing. The findings of research conducted by Ibe, Nworgu and Anyaegbunam(2016) on teachers knowledge of subject matter and students achievement showed that there is a significant relationship between teachers knowledge of subject matter and students achievement in Biology. The study found that, when combined with time on task ,teachers' knowledge leads to substantial gains in student learning.

- i. Determine the accessibility of the New Biology Curriculum to teachers in school.
- ii. Access teachers' knowledge of the characteristics of the new Biology curriculum.

The following research questions and hypotheses will guide the study.

Research Questions

The problem of this study was addressed through the following research questions:

1. What percentages of Biology teachers have access to the new Senior Secondary School Biology curriculum?
2. What percentages of teachers have adequate knowledge of the characteristics of the new Senior Secondary School Biology curriculum?
3. Are male teachers more knowledgeable in the characteristics of the new Senior Secondary School Biology curriculum than their female counterparts?
4. Is there difference in knowledge of the characteristics of the new Senior Secondary School Biology curriculum among teachers with different teaching experience?

Hypotheses

The following hypotheses will be tested at 0.05 level of significance to guide the study.

1. There is no significant difference in knowledge of the characteristics of the new Senior Secondary School Biology Curriculum between male and female Biology teachers.
2. There is no significant difference in knowledge of the characteristics of the new Senior Secondary School Biology curriculum among teachers of different teaching experience.

Method

The descriptive survey was adopted for this study. According to Nwoargu (2015) as quoted in Unachukwu and Okeke-James (2017) in a descriptive survey, data collected from a few people considered to be a representative of a population is analyzed and generalizations made from it about the population. The survey research is often used to access thoughts, opinions and feelings. Furthermore, one can compare the attitudes of different population as well as look for changes in attitudes overtime.

The population of the study comprised of all Biology teachers in both Private and Public Senior Secondary Schools in Nigerian who attended the Biology panel workshop that was held in Abuja in the year 2017. The sample for this study comprised of the one hundred and eight Biology Teachers representing six states and FCT. The sample was derived by purposive sampling technique from among Biology teachers who attended the 2017 Biology panel workshop in Abuja.

The instrument used for data collection is known as "Test of knowledge of the Characteristics of Biology Curriculum (TKCBC). The instrument was developed by the researcher. TKCBC was made up of two sections. Section A: elicited information from the Biology teachers on their Bio-data and accessibility to the curriculum. Section B is made up twenty items or (objective questions) with options a – c and gaps to be completed to access the knowledge characteristics of the new Biology curriculum in the area of objectives, approach to content organization and structure, curriculum format for organization and selection of subject matter/topics.

The instrument developed was face-validated by three Biology specialists in the senior secondary school and a lecturer in the department of Curriculum and Instructional Technology university of Benin Test blue-print or table of specification was used in preparing the test to ascertain the validity of the instrument. The reliability of the instrument was established by administering fifteen copies of the



instruments to Biology teachers who were not part of the study. The reliability coefficient of .795 was obtained using Kuder-Richardson 20 (KR – 20) formula.

On permission by the organizers of the workshop, the instruments were distributed to the Biology teachers by the researcher. The data collected were analyzed. The questions were scored dichotomously, where a score of one was given to the correct answer and zero to the wrong answer or no answer.

Research questions one and two were answered using the percentages, while t-test and one-way analysis of variance (ANOVA) were used to analyze the hypotheses. The hypotheses were tested at an alpha significant level of 0.05.

Results

The findings of the study were presented sequentially, according to the research questions.

Research Question 1

What percentages of Biology teachers have access to the new senior secondary school Biology curriculum?

Table 1: Access to New Senior Secondary School Biology Curriculum

Response of teachers	Frequency	Percentage
Yes	70	64.8
No	38	35.2
Total	108	100%

Table 1 above answer research question 1, it shows that seventy Biology teachers representing 64.8% had access to the new senior secondary school Biology curriculum, while thirty-eight Biology teachers representing 35.2% do not have access to the curriculum.

Research Question 2

What percentages of Biology teachers have adequate knowledge of the characteristics of the new senior secondary school Biology curriculum?

Table 2: Category of Biology Teachers’ Knowledge of Characteristics of New Curriculum

Category	Frequency	Percentage
Adequate knowledge	32	29.6
Inadequate knowledge	76	70.4
Total	108	100

Table 2 above answered research question two. It reveals that thirty-two teachers representing 29.6% have adequate knowledge of the characteristics of the new senior secondary school Biology curriculum, while seventy-six Biology teachers representing 70.4% have inadequate knowledge of the characteristics of the new senior secondary school Biology curriculum.

Hypothesis 1

There is no significant difference in knowledge of the characteristics of the new senior secondary school Biology curriculum of male teachers over their female counterparts.

Table 3: Knowledge of Characteristics of New Biology Curriculum by Gender

Variable	Sex	N	Mean	Standard Deviation	df	Mean Difference	T	Sig. (2 tailed)	Decision
Knowledge	Male	46	1.72	.455	106	.024	.267	.790	NS
	Female	62	1.69	.465					



Table 3 shows that the values for male and female Biology teachers are 1.72 and 1.69 respectively. t-value of .267 and p-value .790 since p-value of .790 is greater than 0.05, it is not significant. This implies that the null hypothesis of no significant difference is retained. Consequently, gender does not affect teachers' knowledge of characteristics of curriculum.

Hypothesis 2

There is no significant difference in the knowledge of the characteristics of the new senior secondary school Biology curriculum among teachers with different teaching experience.

Table 4: Summary of One-way ANOVA of Between-Groups for Teachers' Knowledge

Variable		Sum of squares	df	Mean square	F	Sig.	Decision
Knowledge	Between groups	1.534	4	.383	1.882	.119	NS
	With groups	20.985	103	.204			
Total		22.519	107				

The Table 4 above, the f-value for between groups is 1.882. The degree of freedom is 4 and p-value of .119 since the p-value of .119 is greater than 0.05, it is not significant. This means that the null hypothesis of no significant difference is retained. Consequently, there is no significant relationship in teachers' knowledge of the characteristics of the curriculum based on teaching experience.

Discussion of Findings

The finding of this study shows that the percentages of Biology teachers who have access to the new senior secondary school Biology curriculum were 64.8%. That means the new senior secondary school Biology curriculum was available in most of the schools from where the Biology teachers came from. This result is contrary to that of Nwosu and Ibe(2012) and Ukah (2013) in which it was discovered that the Basic Science and Technology curriculum of the nine-year Basic Education were not available in most primary schools. In this study it is concluded that the new senior secondary school Biology curriculum is available in most of the senior secondary schools may be implementation have commenced.

Also, it was discovered in this research that the percentages of Biology teachers who have adequate knowledge of characteristics of the new senior secondary school Biology curriculum was only 29.6%. The result of this study is in line with that of Okoye(2013) and Ukah(2013) which revealed that teachers were not adequately knowledgeable about the topic in the new Basic Science Curriculum.. This study concluded that most Biology teachers who were sampled in this study do not have adequate knowledge of the new Biology curriculum. Hence, it can be said that most Biology teachers still implement the old Biology curriculum.

Furthermore, this research also found that there was no significant difference in the knowledge of the characteristics of the new senior secondary school Biology curriculum based on gender. This is in line with the work of Ibe(2016) which found that there was no significant difference in the performance of pupils taught by male or female teachers. Additionally, it was found that there was no relationship between Biology teachers' years of teaching experience and their knowledge of the characteristics of the new Biology curriculum. This is in line with the work of Abimbola and Abidoye (2013), in which they found that both experience and less experience teachers had the same view about the curriculum they were implementing. This is contrary to the work of Linet,(2014) and Ibe,Nworgu and Ayaegbunam(2016) which showed that there was relationship between teachers' teaching experience and Curriculum implementation. These studies revealed that teachers' experience helps the teacher to understand the special needs of the students in relation to different learning environment and that having taught the same content for a long time the teacher have mastered skills and knowledge required in setting and preparing students for national examination. In this study the reason for the inadequate knowledge by teachers is over over-dependence of teachers on scheme of work without the use of curriculum as a guide for preparation of lesson note as they believe that there was no difference between the contents of scheme of work and the curriculum which was revealed through oral interview with the teachers.



Conclusion

This study revealed that copies of the new senior secondary school Biology curriculum were available in most of the senior secondary schools where the sampled teachers came from. Also that most of the sampled teachers do not have adequate knowledge of the characteristics of the new senior secondary school Biology curriculum. Gender and teaching experience did not affect teachers' knowledge of the characteristics of the new Biology curriculum.

Recommendations

1. Ministries of Education should make copies of curriculum to be available in all schools in Nigeria.
2. The Ministries of Education at all levels should organize workshops and seminars regularly for teachers and also, strictly supervise teachers' use of the curriculum as a guide for lesson preparation.
3. The universities of Education and faculties of Education should recommend the senior secondary school Biology curriculum as one of the textual materials for their students in order to help them possess good knowledge of the curriculum before and after graduation.
4. Science Teachers Association of Nigeria should continue to train and re-train their members in workshops and seminars on the new Biology curriculum.

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