

Extend of Implementation of Biology Curriculum in Public Senior Secondary Schools in Maiduguri Metropolis, Borno State, Nigeria

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ABSTRACT

The study evaluated the extent of Implementation of Biology Curriculum in Public Senior Secondary School in Maiduguri Metropolis, Borno State, Nigeria. The objectives of the study were to determine the extent to which the objectives of Biology curriculum for public Senior Secondary School have been achieved, the extent to which the contents of the public Senior Secondary School Biology curriculum are relevant in achieving the objectives of the curriculum, the extent of types of teaching methods used in implementing Public Senior Secondary School biology curriculum and the extent of types of assessment methods used in implementing Public Senior Secondary School Biology curriculum. The study used survey research design. The population of the study was fifty nine (59) biology teachers and four thousand five hundred and five (4505) SS3 students of Biology in Public Senior Secondary Schools, the researcher selected a sample of four hundred and fifty one (451) SS3 students of biology and fifty nine (59) biology teaches in Maiduguri Metropolist of Borno State. Questionnaire was used as instruments for data collection. Mean and standard deviation was used to analyze the data. The finding of the study revealed that the objectives of biology curriculum have been achieved to a moderate extent. Contents of the biology curriculum are very relevant in achieving the objectives of the biology curriculum. Demonstration, discussion, lecture and team teaching method were often while laboratory method, project method, excursion/field trip and discovery method are seldom. Essay writing, multiple choice alternative, true or false, completion of blanks and assignment assessment methods are very often used while Oral questioning and Laboratory work are seldom used in the implementation of biology curriculum. it was recommended that the fact that the objectives of the curriculum for Public Senior Secondary School biology have only been achieved to a moderate extent suggests that better results could be achieved if the teachers' welfare practices are looked into, since teachers are the final implementers of the curriculum. Curriculum could be reviewed regularly to meet the needs of the society. School management should encourage biology teachers to utilize the appropriate recommended teaching methods and assessment methods in the implementation of biology curriculum. The study conclude that Pubic senior secondary school biology teachers are not comply with the recommended teaching methods and assessment methods which contribute to the poor teaching and learning of biology and subsequently lead to the achievement of biology objectives at a moderate extent.

Keywords: implementation, curriculum, public senior secondary school, achieving & objectives etc.

INTRODUCTION:

Biology is one of the Public Senior Secondary School subjects taught in Nigeria. It is an integral science subject which provides contents in the training of students who want to study Biological science, Anatomy, Agricultural science, Microbiology, Medicine, Nursing, Pharmacy, Forestry and Fisheries. Requirement for

a credit pass and above in biology is needed for science related and vocational disciplines. Many of the Public Senior Secondary School students choose biology in the West African Senior School Certificate Examinations (WASSCE) or National Examination Council's Senior School Certificate Examinations (NECOSSCE), in 2018 1.5 million and 1,041,536 candidates that enrolled for WASSCE and NECOSSCE Biology examination respectively (FME, 2004). Also, for some Public Senior Secondary School students, biology is a subject of first choice because they find it an interesting subject that is related more to nature. Biology is one of the subjects in the national curriculum for Senior Secondary Schools, first published by the Federal Ministry of Education in 1985 (FME, 2005). The objectives of secondary school biology curriculum are to prepare students to acquire: Adequate laboratory and field skills in biology, meaningful and relevant knowledge in biology, ability to apply scientific knowledge to every day's life in matters of personal and community health and agriculture and a reasonable and functional scientific attitude (FRN, 2004).

The contents of biology curriculum are: Concept of living, basic ecological concepts, plant and animal nutrition, variations and variability and evolution and genetics. Based on this spiral arrangement, the concepts to be taught are arranged in such a way that topics are repeated yearly, throughout the three years of the course, so as to cover the 62 units in the biology curriculum (FME, 2004). Any repeated concept is discussed in greater complexity and depth as the course matures over the three year period. The curriculum for teaching biology in Private Senior Secondary Schools emphasized the relationship between living and non-living things, relevance of biology to agriculture, the structure and physiology of organisms, some basic ecological concepts, the use of natural resources, lands, plants and animals-their variations, populations and implications, adaptation, theories of evolution and application of the principle of heredity in agriculture and medicine. The contents of the Private Senior Secondary School biology curriculum places emphasis on field studies, guided discovery, laboratory techniques and skills (Ifeobu, 2014).

The conventional teaching method is classroom-based and consists of lectures and direct instructions conducted by the teacher. This teacher-centered method emphasizes learning through the teacher's guidance at all times. Students are expected to listen to lectures and learn from them. The teacher often talks to the students instead of encouraging them to interact, ask questions, or make them understand the lesson thoroughly. Most classes involve rote learning, where students depend on memorization without having a complete understanding of the subject. Just passing the tests, consisting of descriptions, matching, and other forms of indicators, is all that matters to complete the curriculum (Adegoke, 2011). For teachers to be able to ensure and enhance classroom learning, they have to possess necessary pedagogical skills which have to be systematic and methodical (Uya, 2008).

(Dumbraveanu 2005) outlines some of the methods used in assessment of Senior Secondary School biology students in Nigeria which include: Observation, Questioning (objective and essay), Projects, Corrections and marking, Teachers comment and awards of marks, Continuous assessment system which allows 40 percent mark allocation for essay-type questions, multiple choice tests, practical and other class test such as assignment or projects and 60 percent for the final examination is encouraging students to work continuously during the year and to reward them for efforts they put in before the final exam. The rationale is that allocating more than 40 percent for continuous assessment may hamper the learners' enthusiasm to work for the final examination. In order to evaluate the knowledge of Science in general and biology in particular, examination bodies use both the conventional (theory) and practical types.

While the implementation of the curriculum is the aspect that concerns the nature and scope of classroom teacher and evaluation of learning achieved by students who were taught, the process of curriculum implementation entails interaction between the curriculum planner, the teacher, the learners and the learning environment. The teacher is the major implementer of the curriculum since what the teacher does with it in the classroom determines whether the set goals would be achieved or not. How well the teacher implements the curriculum is determined by the teachers' knowledge, professional training, competence, initiative, interest and motivation. Though such factors as students' interest and readiness and more importantly, the physical environment (e.g. availability and adequacy of learning materials and equipment) may be constraining, a knowledgeable and competent teacher would always be able to make the best out of any situation. It is the process of evaluation that exposes in a comprehensive way, the worth and the true picture of what happens to the curriculum at its implementation.

(Okebukola and Akinbola 2008) state that when one examines the Private Senior Secondary School biology results, in WASSCE and NECOSSCE in Nigeria, in the last nine years (2004-2012), one finds that the results are generally poor. Students that scored credit and above are regarded as those that achieved well. According to (Yabugbe 2009) there is evidence to show that even though many students find biology interesting thereby registering for it in the Senior Secondary Schools many of them obtain poor results,

year in year out. The poor performance of students in biology has been attributed to the following reasons. Most of the schools are poorly funded by government and do not have enough classrooms, and many classrooms do not have enough seats for all the students, they lack well-equipped laboratories with chemicals and reagents and the libraries are without modern quality textbooks, the class sizes are large and most schools do not have laboratory assistants thereby making science teaching difficult and tedious for teachers and so students are less involved in hands-on practical activities. Thus resources limitations impact on the implemented curriculum in ways that limit opportunities for learning (Waziri, 2014).

OBJECTIVES OF THE STUDY:

The objectives of the study are to determine:

- i) The extent to which the objective of biology curriculum for public Senior Secondary School have been achieved in Maiduguri Metropolis, Borno State
- ii) The extent to which the contents of the public Senior Secondary School biology curriculum are relevant in achieving the objectives of the curriculum in Maiduguri Metropolis, Borno state
- iii) The extent of types of teaching methods used in implementing Public Senior Secondary School biology curriculum in Maiduguri Metropolis, Borno State
- v) The extent of types of assessment methods used in implementing Public Senior Secondary School biology curriculum in Maiduguri Metropolis, Borno State

Research Questions:

The following research questions were answered:

- i) To what extent has the objectives of biology curriculum for public Senior Secondary Schools been achieved in Maiduguri Metropolis, Borno State?
- ii) To what extent the contents of biology curriculum for public Senior Secondary Schools relevant for achieving the objectives of the curriculum in Maiduguri Metropolis, Borno State?
- iii) To what extent the types of teaching methods used in implementing public Senior Secondary School biology curriculum in Maiduguri Metropolis, Borno State
- v) To what extent the types of assessment methods used in implementing public Senior Secondary School biology curriculum in Maiduguri Metropolis, Borno State

METHODOLOGY:

The research design for this study was survey research design. Survey is a method of collecting information by interviewing or administering questionnaires to a sample of individuals and allow researcher to gather information, summarize, present and interpret for the purpose of clarification (Orodho, 2009). According to (James 2009) survey research is used to obtain information concerning the current status of phenomena to describe what exists with respect to variables or conditions in a situation.

The population of this study consists of fifty nine (59) biology teachers and four thousand five hundred and five (4505) senior students form 3 of Biology in sixteen (16) public Senior Secondary Schools in Maiduguri Metropolis, Borno State. However, the researcher selected all fifty nine (59) biology teaches and simple random sampling method was used to select a sample of four hundred and fifty one (451) senior students form three of biology in Maiduguri Metropolis of Borno State. (White 2011) Simple random sample is that each member of the population has an equal chance of being chosen. This means that it guarantees that the sample chosen is representative of the population. In turn, the statistical conclusions drawn from analysis of the sample will be valid.

Research Instrument:

The instrument that used for data collection was a questionnaire and checklist. Two sets of adapted questionnaires from (Ifeobu 2014) was used these are the Secondary School biology Implementation Evaluation Questionnaire for Teachers (SSBIEQT) and Secondary School biology Implementation Evaluation Questionnaire for Students (SSBIEQS). Data generated for the study was analyzed using mean and standard deviation. Mean and standard deviation was used to analyze data collected from research questions.

RESULTS:

Research Question one:

To what extent has the objectives of biology curriculum for public Senior Secondary Schools been achieved in Maiduguri Metropolis, Borno State?

Table 1: Extent of Achievement of the Objectives of Biology Curriculum for Public Senior Secondary School

Biology students have	Students (451)			Teachers (59)		
	Mean	SD	Remark	Mean	SD	Remark
1. Acquired adequate laboratory skills in Biology	2.05	0.96	ME	2.40	0.68	ME
2. Acquired adequate field skills in biology	1.92	1.05	LE	2.45	1.05	ME
3. Acquired functional scientific Attitudes	3.16	1.09	HE	3.05	0.94	HE
4. Acquired ability to apply scientific knowledge to every day life	3.51	0.90	ME	2.95	0.88	ME
5. Acquired meaningful knowledge in Biology	1.26	1.01	LE	2.15	0.81	ME
6. Acquired relevant knowledge in biology	3.11	0.92	HE	3.25	0.55	HE
Composite Mean	2.60	0.31				

Key: High Extent (HE) = 4.00-3.01; Moderate Extent (ME) = 3.00-2.01 Low Extent (LE) = 2.00-1.01; No Extent (NE) = 1.00-0.01.

Results shown in Table 1 revealed that students were of the opinion that most biology students have acquired adequate laboratory skills in biology to a moderate extent with a mean of 2.05 while the teachers also were of the opinion that this objective was achieved to a moderate extent with a mean of 2.40. The composite mean of 2.60 indicates that both students and teachers accepted that the objectives of the Public Senior Secondary School biology curriculum have been achieved to a moderate extent.

Research Question Two:

To what extent the contents of biology curriculum for Public Senior Secondary Schools adequately relevant for achieving the objectives of the curriculum in Maiduguri Metropolis, Borno State?

Table 2: Extent in which the Contents of the Biology Curriculum for Public Senior Secondary Schools are Relevant for Achieving the Objectives of the Curriculum

The Contents of the Biology Curriculum	Mean	SD	Remark
1. Concept of living	3.19	0.40	VR
2. Basic ecological concepts	3.19	0.68	VR
3. Plant and animal nutrition	3.48	0.60	VR
4. Conservation of matter	3.19	0.60	VR
5. Variation and variability	3.14	0.72	VR
6. Evolution	2.95	0.66	R
7. Genetics	3.14	0.65	VR
Composite	3.02	0.33	

Key: Very Relevant (VR) = 4.00-3.01; Relevant (R) = 3.00-2.01; Less Relevant (LR) = 2.00-1.01; Not Relevant (NR) = 1.00-0.01.

Results shown in Table 2 revealed that concept of living, basic ecological concepts and plant and animal nutrition were rated as being very relevant for the achievement of biology curriculum objective with a mean of 3.19, 3.19, 3.48 respectively. The composite mean score of 3.02 shows that the teachers agreed that the Contents of the biology curriculum are very relevant in achieving the objectives of the biology curriculum for Public Senior Secondary Schools.

Research Question three:

To what extent the types of teaching methods used in implementing Public Senior Secondary School

biology curriculum in Maiduguri Metropolis, Borno State

Table 3: Extent of Types of Teaching Methods Used in the Implementation of Public Senior Secondary School Biology Curriculum

Teaching Methods	Mean	SD	Remark
1. Lecture method	2.05	1.07	OU
2. Project method	1.57	0.74	SU
3. Demonstration method	3.19	0.75	VOU
4. Discovery method	1.95	0.86	SU
5. Individualized method	2.00	1.14	SU
6. Discussion method	3.33	0.57	VOU
7. Concept mapping	1.86	0.91	SU
8. Inquiry method	2.52	0.98	OU
9. Laboratory	1.14	0.72	SU
10. Simulation and games	1.71	0.78	SU
11. Excursion/field trip	1.48	0.68	SU
12. Team teaching	2.81	0.98	OU
13. Role playing	1.71	0.95	SU

Key: Very Often Used (VOU) = 4.00-3.01; Often Used (OU) = 3.00-2.01; Seldom used (SU) = 2.00-1.01; Not used (NU) =1.00-0.01

Results shown in Table 3 revealed that on the opinion of the teachers that demonstration, discussion, lecture and team teaching method were often used with a mean of 3.19, 3.33, 2.05 and 2.81 respectively while laboratory method, project method, excursion/field trip and discovery method are seldom used with a mean of 1.14, 1.57, 1.48 and 1.98 respectively as indicated in table 3.

Research Question four:

To what extent the types of assessment methods used in implementing Public Senior Secondary School biology curriculum in Maiduguri Metropolis, Borno State?

Table 4: Extent of Assessment Methods Used by Biology Teachers in Assessing their Students in Public Senior Secondary School

Assessment Methods	Mean	SD	Remark
1. Quizzes	2.80	1.00	OU
2. Oral questioning	1.90	1.07	SU
3. Essay writing	3.15	0.81	VOU
4. Multiple choice alternative	3.30	0.65	VOU
5. True or false	3.35	0.58	VOU
6. Matching of items	2.70	0.65	OU
7. Completion of blanks	3.05	1.05	VOU
8. Assignment	3.35	0.74	VOU
9. Laboratory work	1.90	0.71	SU

Key: Very Often Used (VOU) = 4-3.01; Often Used (OU) = 3.00-2.01; Seldom used (SU) = 2.00-1.01; Not used (NU) =1.00-0.01

Results shown in Table 4 revealed that the teachers indicate that essay writing, multiple choice alternative, true or false, completion of blanks and assignment assessment methods are very often used with a mean of 3.15, 3.30, 3.35, 3.05, and 3.35 respectively while Oral questioning and Laboratory work are seldom used with a mean of 1.90, 1.90 respectively as indicated in table 4.

DISCUSSION:

The findings of this study in respect to the research question one indicates that both students and teachers accepted that the objectives of the Public Senior Secondary School biology curriculum have been achieved to a moderate extent. This result was also related with the findings of (Mimi and James 2014) found that

all the six item statement on the achievement of biology programme objectives had their mean above the criterion mean of 2.50 implying that the biology programme objectives were achieved and recommended that workshops/seminars and conference should be organized by Government for serving Biology teachers, in order to keep them abreast with the recommended/innovative teaching strategies.

The findings in respect to the research question two indicated that concept of living, basic ecological concepts and plant and animal nutrition were rated as being very relevant for the achievement of biology curriculum objective by the teachers. The composite mean score of 3.02 shows that the teachers agreed that the Contents of the biology curriculum are very relevant in achieving the objectives of biology curriculum for Public Senior Secondary Schools. The findings also similar to the work of (Ofoha 2009) found that Nigerian secondary school curriculum was considered appropriate in term of content in meeting the philosophy of Nigerian secondary educational system but found weak in its method of implementation. The findings in respect to the research question three indicates that demonstration, discussion, lecture and team teaching method were often used while laboratory method, project method, excursion/field trip and discovery method are seldom used in the implementation of biology curriculum in Public Senior Secondary School. This finding agree with the study of (Akani 2016) found that the methods frequently used by these teachers are the lecture method and the Demonstration method. The physics and bio-chemistry teachers used more of lecture method while the biology teachers used more of demonstration method.

The findings in respect to the research question four indicates that essay writing, multiple choice alternative, true or false, completion of blanks and assignment assessment methods are very often used and oral questioning and Laboratory work are seldom used. This finding agree with the study of (Kilic, Kaya and Kurt 2012) conducted a study on assessment and evaluation techniques being used in classrooms by Biology teachers working at secondary schools in Konya city, survey design was used and the sample of study consist of 49 Biology teachers at secondary schools in Konya city. The data were obtained by a questionnaire of nine open ended questions. The data that was obtained from the survey were solved by the descriptive analysis method. According to the findings, it was determined that teachers use the multiple-choice question type with a ratio of % 35 and use classic question type with a ratio of %2. It can be said that teachers rarely prefer alternative measurement tools. Most of the Biology teachers (%51) said that the question types they use are adequate in assessment and evaluation and some (%26) said that the question types they use are partially adequate.

RECOMMENDATIONS:

Based on the result of the study the following recommendations were made:

1. The fact that the objectives of the curriculum for Senior Secondary School biology have only been achieved to a moderate extent suggests that better results could be achieved if the teachers' welfare practices are looked into, since teachers are the final implementers of the curriculum.
2. The topical contents of the biology curriculum are capable of achieving objectives of the curriculum for Senior Secondary School biology, suggests that the curriculum could be reviewed regularly to meet the needs of the society. A review of the curriculum may also demand a look at the teaching equipment, materials and other teaching support facilities for teaching the content of the curriculum.
3. School management should encourage biology teachers to utilize the appropriate recommended teaching methods in the implementation of biology curriculum.
4. Biology teachers should comply with the appropriate assessment methods in the implementation of biology curriculum in Senior Secondary School.

CONCLUSION:

The study conclude that Pubic senior secondary school biology teachers are not comply with the recommended teaching methods and assessment methods which contribute to the poor teaching and learning of biology and subsequently lead to the achievement of Biology objectives at a moderate extent.

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