Survey of Teachers' Implementation of Biology Curriculum in Senior Secondary Schools in South West Nigeria

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Abstract
This study surveyed Biology teachers' implementation of Biology curriculum in senior secondary schools in South West Nigeria. The study adopted descriptive survey design with the population focus of all Biology teachers in senior secondary schools in South West Nigeria. The sample for the study consisted of 30 senior secondary school Biology teachers randomly selected from three states out of six in South West Nigeria through multistage sampling technique. Teachers' Implementation of Biology Curriculum Questionnaire (TIBCQ) was used to collect data for the study. Two research questions were raised and answered using descriptive statistics. Results of the study showed that most teachers did not have the instructional materials as recommended by the Federal Ministry of Education for the implementation of Biology curriculum and that the learning condition in senior secondary schools fall below the recommended standard by the Federal Ministry of Education.

Keywords: Biology, Curriculum, implementation, Survey, Teachers

Introduction

Education has variously been defined as permanent change in behaviour as a result of learning. Education therefore remains one of the most powerful instruments for both development of man and transformation of human society (Tsafe, 2013). It is to be the best legacy any nation can give to her citizenry. In the National Policy on Education (FRN, 2013) education is seen as an instrument par excellence for effective national development. Education is a powerful instrument of change in any nation. It is an instrument for long-life learning, charged with the responsibility of shaping and refining all other challenges of life. It can also be regarded as a vehicle for transmitting social, economic, political and technological changes and development in a nation. Education in any nation of the world has the responsibility to produce an intellectually, morally, mentally, spiritually and emotionally sound human person (Okon, Esu & Ekere, 2016). The development of scientific skills largely depends on methods

of teaching used. Every teacher is expected to have a clear understanding of the basis for his/her profession. Education is a tool for national development and it is a process of bringing about desirable change in behaviour in human beings and seen as an effective tool that can be used to respond rapidly to changing needs and aspirations of the nation (Ada, 2012).

Biology is a very important subject in the field of science and also one of the science subjects at the senior secondary school level (Federal Republic of Nigeria, 2013). Biology is the science of life that studies living matter, structure, function and behaviour of organism and helps us to understand ourselves. Biology is the study of living things in different forms, their evolution, structures, functions, growth, distribution and taxonomy; and it occupies a unique position in the secondary school science curriculum. It serves as a pre-requisite to the study of other lucrative and challenging professions like medicine, nursing, pharmacology, biochemistry, agriculture among others (Olayinka, Ayanda & Adeoye, 2020).

Instructional materials are tools readily or locally made that help to facilitate the teaching/learning process. Onasanya and Omosewo (2011), defined instructional materials as a system component that may be used as part of instructional process which are used to disseminate information, message and idea in the teaching/learning process. Teaching aids are important catalyst of social re-engineering and change in learners. Effective teaching for desired social and behavioral changes cannot be fully accomplished without the use of instructional materials. According to Olawale (2013), instructional materials include materials to facilitate learning for better results. In the same vein, Uzuegbe, Mbadiwe and Anulobi (2013) refer to instructional materials as devices used to assist the instructor to facilitate students' learning of the subject matter.

Curriculum is viewed as the vehicle through which the purpose of education and its values are transmitted to the learners in the society from one generation to another. It can also be seen as the bedrock of education. Curriculum is all of the experiences that individual learners have in a programme of education whose purpose is to achieve broad goals and related specific objectives. Curriculum is the totality of activities carried out in the school for the potential development of the learners who are guided and evaluated by the teacher. According to Olayinka (2016) curriculum is the entire programme of the school work which could be considered to include the syllabus of a subject; though in a wider sense, it is considered to be bigger than the syllabus of a subject as it embodies other strategies of teaching and learning. Hanna (2015) asserted that curriculum is the totality of all planned and unplanned, guided and unguided learning experiences learners are exposed to in a school setting for the purpose of attaining its educational goals. This implies that curriculum entails gaining experiences for the purpose of becoming useful individuals through education. Curriculum is a planned programme of learning opportunities to achieve broad educational goals and related objectives. Curriculum according to Ivowi (2010) is a tool designed for educating a person in order to change the orientation, behaviour, actions and values of that person whose concern is not only

to develop self but also the world around him. It is an instructional guide which is documented to be utilized for teaching and learning for the realization of desirable changes in the learners under the guidance and supervision of the school. Ajayi (2007) revealed that the aim of the teacher to make the learner an autonomous and self–propelled thinker and producer cannot be accomplished without enough working facilities provided for the learner and also stressed that this is the essence of practical and laboratory apparatus to facilitate learning and enhance curriculum coverage in Biology.

Okebukola (2002) in Olayinka (2019) described curriculum implementation as translation of the objectives of the curriculum from paper to practice. Ivowi (2004) defined curriculum implementation as the translation of theory into practice or proposal into action. Duru (2011) posited that curriculum implementation is the actual execution of document in the classroom through effective interactions of the teacher, learners and other elements in the instructional system. Garba (2004) in Olayinka (2019) also viewed curriculum implementation as putting the curriculum into work for the achievement of the goals for which the curriculum is designed. Onyeachu (2008) viewed curriculum implementation as the process of putting all that have been planned as a curriculum document into practice as well as interaction with physical facilities, instructional materials, psychological and social environment.

Importantly, it is known that one of the factors that determine the successful implementation of Biology curriculum is the learning materials. Biology is a biological science which requires manipulations of materials for proper understanding of concepts and teaching of Biology without adequate learning materials makes it abstract. Absence of teaching materials, without any doubt, should affect the implementation of Biology curriculum. Only the theoretical aspect should be covered, hence altering the purpose of biology in schools (Federal Ministry of Education, 2009). It is then certain that no effective science education programme can exist without learning materials or equipment. The absence of learning materials therefore could be a great problem facing the teaching and learning of Biology in secondary schools.

Olayinka (2016) opined that implementation plays a vital role for it is the most rigorous, delicate, time consuming and more practical and also stressed that what surrounds the learner, what the learner sees, hears and uses during teaching and learning determines to an extent the level of assimilation, understanding of the concepts taught and achievement in general. Olayinka also explained that curriculum implementation could not be properly and successfully carried out without the use of appropriate instructional materials and adequate learning environment.

The classroom learning environment of students according to Onwuakpa and Akpan (2000) is an embodiment of the physical, psychological and sociological conditions of the classrooms. Onwuakpa and Akpan (2000) noted that the psychological environment is an umbrella of the level of speed of teaching, cohesiveness, distractions, interests, motivations, anxieties, confusion and difficulty of classroom learning activities. Jegede and Ogunojemite, (2010) shared the view that the social environment in its own includes: the level of classroom interactions between the students and their teacher and his teaching aids it is this environment

that shows how friendly the teacher and students are in the classroom. Jegede and Ogunojemite (2010) also concluded that it is very easy to plan but the beauty of good planning is successful implementation. Thus, instructional materials and learning environments are prime determinants of successful implementation of Biology curriculum. This work therefore is a survey of teachers' implementation of Biology curriculum in senior secondary schools in South West Nigeria, so as to reveal the prevailing situation in the teaching–learning process of Biology in Nigeria secondary schools.

Research Questions

(1) What are the functional instructional materials for implementation of Biology curriculum?

(2) How conducive is the environment for learning of Biology?

Methodology

The study adopted descriptive research design of the survey type. The population of the study comprised all Senior Secondary School Biology teachers in South West Nigeria. The sample for this study comprised 30 Senior Secondary School Biology teachers randomly selected from three of the States in South West Zone of Nigeria (through multistage sampling technique). Three States were randomly selected using simple random sampling technique. Purposive sampling technique was used in order to pick five Local Government Areas from each of the selected states and two schools were purposively selected from each of the selected Local Government Areas. Thirty (30) senior secondary Biology teachers were used across the 30 schools.

Biology Teachers Questionnaire (BTQ) was used to collect data for the study. The BTQ had two sections (A and B). Section A was a three-option Likert type instrument seeking information from the respondents on the state of instructional materials required for implementing the Biology curriculum. It consisted of 41 items. The teachers were asked to respond to the state of adequacy under the heading: none, partially adequate and fully adequate. Section B sought information on Biology Learning Condition and Environment (BLCE) in schools. It consisted of 18 items and respondents were to indicate their level of agreement to each item on the basis of agree and disagree.

The instrument was validated and the reliability coefficient was (r = 0.68). The data obtained were analyzed using descriptive statistics of frequency counts and percentages.

Results

Research Question 1: What are the functional instructional materials available for implementation of Biology curriculum?

In answering the research question, frequency and percentage were used as set out in Table 1.

Table 1: Frequency and percentage analysis on availability of functioning instructional materials in schools**.**

S/N	Functional instructional materials available for teaching Biology contents are as follows:	None		Partially Adequate		Fully Adequate	
		F	%	F	%	F	%
1	Print materials for recognizing living things;	5	16.7	5	16.7	20	66.7
2	Charts for classification of living things;	9	30	14	46.7	7	23.4
3	Television for teaching Kingdom: Monera, Protista and fungi, plant and animalia	5	16.7	14	46.7	11	36.7
4	Pictures for teaching cells;	9	30	4	13.3	17	56.7
5	Textbooks for teaching cell and its environment;	4	13.3	15	50	11	36.6
6	Filmstrips for teaching some properties & functions of the cell;	4	13.3	13	43.3	13	43.3
7	Projector for teaching tissues and Supporting system;	3	10	6	20	21	70.0
8	Projector for teaching Nutrition in Animals;	4	13.3	10	33.3	16	53.4
9	Textbook for teaching Basic Ecological concepts;	8	26.7	8	26.7	14	46.7
10	Television for teaching Functioning Ecosystem;	6	20	7	23.3	17	56.7
11	Projected material for teaching Energy transformation in nature;	7	23.3	14	46.7	9	30
12	Pictures for teaching Relevance of Biology to Agriculture;	7	23.3	16	53.3	7	23.4
13	Microscope for teaching Micro-Organisms around us;	7	23.3	15	50	8	26.6
14	Microscope for teaching Micro-organisms in action;	12	40.0	7	23.3	11	36.7
15	Textbook for teaching Towards better Health;	9	30	1o	33.3	11	36.7
16	Filmstrip for teaching Aquatic habitat (marine Habitat);	13	43.3	10	33.3	7	23.4
17	Filmstrip for teaching Terrestrial habitat;	10	33.3	13	43.3	7	23.4
18	Filmstrips for teaching Reproduction of unicellular organisms and invertebrate;	9	30	12	40	9	30

19	Interactive media for teaching Classification of plants;	5	16.7	12	40	13	43.3
20	Wall chart for teaching Digestive system;	8	26.7	10	33.3	12	40
21	Wall chart for teaching Transport system;	8	26.7	12	40	10	33.3
22	Projected material for teaching Respiratory System;	10	33.3	8	26.7	12	40
23	Wall chart for teaching Excretory system;	7	23.3	16	53.3	7	23.3
24	Textbook for teaching Nutrient Cycling in nature;	17	56.7	5	16.7	8	26.6
25	Projected material for teaching Ecological management; Association, Tolerance, Adaptation, Pollution.	16	53.3	10	33.3	4	13.4
26	Mounted pictures for teaching Conservation of natural resources;	16	53.3	10	33.3	4	13.4
27	Realia for teaching Pests and diseases of crops;	14	46.7	10	33.3	6	2.0
28	Filmstrips for teaching Reproductive Systems in vertebrates;	15	50	2	6.7	13	43.3
29	Charts used for teaching Reproductive system in plant;	6	20	15	50	9	30
30	Pictures used for teaching Pollination in plants;	10	33.3	7	23.3	13	43.3
31	Textbooks used for teaching Regulation of internal environment;	7	23.3	13	43.3	10	33.3
32	Projected materials used for teaching Nervous Co-ordination;	6	20	15	50	9	30
33	Charts are for teaching Sense Organs;	6	20	15	50	9	30
34	Textbooks used for teaching Ecology of Population;	10	33.3	8	26.7	12	40
35	Projected materials used for teaching Balance in Nature;	13	43.3	4	13.3	13	43.3
36	Podcasts used for teaching Reproductive system and reproduction in humans;	16	53.3	11	36.7	3	10

37	Real objects used for teaching Development of new seeds;	10	33.3	13	43.3	7	23.3
38	Real objects used for teaching Fruits;	11	36.7	8	26.7	11	36.7
39	Interactive Board used for teaching Reproductive behaviours;	7	23.3	11	36.7	12	40
40	Textbooks used for teaching Biology of heredity (Genetics);	13	43.3	5	16.7	12	40
41	Filmstrips used for teaching Variation and evolution.	10	33.3	10	33.3	10	33.3

The responses of teachers on functioning instructional materials in schools for the implementation of Biology curriculum were assessed using 41 items. Frequency and percentages were used and tabulated on Table 1. Result in Table 1 showed that 16.7% of the sampled schools did not have functioning instructional materials on Recognizing living things, kingdom: monera, Protista and fungi, plantae and animalia, classification of plants. Thirty percent (30%) of the sampled schools did not have functioning instructional materials on classification of living things, Basic Ecological Concept, towards better Health, Reproduction of unicellular organisms and invertebrate; 13.3% of the sampled schools did not have functioning instructional materials on cell and its environment, some properties and functions of the cell, Nutrition in Animals; 26.7% of the sampled schools did not have functioning instructional materials on Basic Ecological concept, Digestive system and transport system. Twenty percent (20%) did not have the instructional materials on functioning Ecosystem, Reproductive system in plants, Nervous co-ordination and sense organ; 23.3% of the sampled schools did not utilize the instructional materials on Energy transformation in nature, Relevance of Biology to Agriculture, Micro-organisms in action, excretory system, Regulation of internal environment and Reproductive behaviours. Forty percent (40%) of the sampled schools did not have the instructional materials on Microorganism in action; 33.3% of the sampled schools did not utilize the instructional materials on respiratory system, Pollination in plants, Ecology of population, Development of new seeds and Variation and Evolution; 56.7% did not have instructional materials on Nutrient Cycling in nature; 53.3% of the sampled schools did not make use of instructional materials on Ecological management, Conservation of natural resources, Reproductive system and reproduction in humans; 46.7% of the sampled schools did not have instructional materials on Pest and diseases of crops. Fifty percent (50%) did not utilize the instructional materials on Reproductive systems in vertebrates; 43.3% of the sampled schools did not make use of instructional materials on Aquatic habitat (marine habitat), Balance in nature and Biology of heredity (Genetics); 36.7% of the sampled schools did not utilize instructional materials on Fruits.

It was discovered that no section of the Biology concept was found to be fully adequately implemented by the Biology teachers. There was no item with 100% coverage. The Biology item with the highest percentage level was recognizing living things having 66.7%

The analysis on Table 1 revealed further that most teachers did not have the instructional materials as recommended by the Federal Ministry of Education (2002) for the implementation of the Biology Curriculum.

Research Question 2: How conducive is the environment for learning of Biology?

In answering the research question, frequency count and percentage were used to deduce the answer to the question.

Table 2: Percentage analysis on the condition of learning environment

S/N	ITEMS	AGREE		DISAGREE	
		F	%	F	%
1	There are adequate facilities for learning Biology in the schools.	7	23.3	23	76.7
2	There are adequate instructional materials for learning Biology in the school.	6	20	24	80
3	There are competent Biology laboratory attendants and assistance in the school.	23	76.7	7	23
4	There is adequate supply of electricity for practical work in Biology laboratory.	17	56.7	13	43.3
5	There is minimum of water supply for practical work in Biology laboratory.	23	76.7	7	23.3
6	There is generating set for practical work in Biology laboratory.	13	43.3	17	56.7
7	There is a well-equipped laboratory for Biology.	20	66.7	10	33.3
8	The classrooms are well ceiled and ventilated.	18	60	12	40
9	The libraries are well ventilated and equipped with necessary Biology text books.	23	76.7	7	23.3
10	Students' practical note books are checked at the end of every practical lesson.	23	76.7	7	23.3
11	Students are assisted by the laboratory assistance when the Biology teacher is not available.	16	53.3	14	46.7
12	Biology students do visit laboratory at will.	14	46.7	16	53.3
13	Biology teachers are allowed to carry out practical activities at their own choice.	22	73.3	8	26.7
14	Students are introduced to practical work in SS1.	18	60	12	40
15	Students are introduced to practical work in SS2.	21	70	9	30
16	Students are introduced to practical work in SS3.	21	70	9	30
17	There is enough time allocated for Biology practical activities in schools.	17	56.7	13	43.3

18	Biology text books are available in the library.	25	83.3	5	16.7

Table 2 shows that 23.3% of the respondents agreed that there are adequate facilities for learning Biology in the school, while 76.7% disagreed that there are adequate facilities for learning Biology in the school, 20% of those sampled agreed that there are adequate instructional materials for learning Biology in the school, while 80% disagreed that there are adequate instructional materials for learning Biology in the school, 76.7% agreed that there are competent Biology laboratory attendants and assistants in the school while 23.3% disagreed that there are competent Biology laboratory attendants and assistants in the school, 56.7 % agreed that there are electricity supply for practical work in Biology laboratory while 43.3% disagreed that there are electricity supply for practical work in Biology laboratory, 76.7% agreed that there is minimum of water supply for practical work in Biology laboratory, while 23.3% disagreed that there are minimum of water supply for practical skills in Biology laboratory, 43.3% agreed that there are generating set for practical work in Biology while 56.7% disagreed that there are generating set for practical work in Biology, 66.7 % agreed that there are well equipped laboratory for Biology while 33.3% disagreed that there are well equipped laboratory for Biology. Sixty percent (60%) agreed that the classrooms are well ceiled and ventilated while 40% disagreed that the classrooms are well ceiled and ventilated, 76.7% agreed that the libraries are well ventilated and equipped with necessary Biology text books while 23.3% disagreed that libraries are well ventilated and equipped with necessary Biology text books, 76.7% agreed that students' practical note books are checked at the end of every practical lesson while 23.3% disagreed that students' practical note books are checked at the end of every practical lesson, 53.3% agreed that students are assisted by the laboratory assistants when the Biology teacher is not available while 46.7% disagreed that students are assisted by the laboratory assistants when the Biology teacher is not available, 46.7% agreed that Biology students do visit laboratory at will, while 53.3% disagreed that Biology students do visit laboratory at will ,73.3% agreed that Biology teachers are allowed to carry out practical activities of their own choice while 26.7% disagreed that Biology teachers are allowed to carry out practical activities of their own choice. Sixty percent (60%) agreed that students are introduced to practical work in SS1 while 40% disagreed that students are introduced to practical work in SS1, 70% agreed that students are introduced to practical work in SS2 while 30% disagreed that students are introduced to practical work in SS2, 70% agreed that students are introduced to practical wok in SS3 while 30% disagreed that students are introduced to practical work in SS3, 56.7% agreed that there is enough time allocated for Biology practical activities in schools while 43.3% disagreed that there is enough time allocated for Biology practical activities in school, 83.3% agreed that Biology textbooks are available in the library. All these confirmed that the learning condition in schools fall below the recommended standard by the Federal Ministry of Education which means that none of the sampled schools had 100% coverage.

Discussion of Findings

Results in Table 1 used to answer research question one indicated that some senior secondary schools did not have adequate functioning instructional materials. This study showed that instructional materials for the implementation of the Biology curriculum contents was not fully adequate. This amount to lack of resource materials and absence of instructional materials in schools. It was discovered that no section of the Biology concept was found to be adequately implemented by Biology teachers. There was no item with 100% coverage. This implies that most Biology teachers have been teaching Biology without the necessary materials. This proved that instructional materials were not adequate and that most of the schools lack instructional materials which could lead to low academic performance in Biology. Seweje (2004) supported that instructional materials are the chief responsibility of the teachers to contribute grossly to the students' low performance in Biology. Teaching Biology without the necessary materials makes it abstract. Inadequate instructional materials in schools are a confirmation of lack of instructional materials for Biology teaching in schools. According to Seweje, usage of instructional materials is one of the major factors that could determine the successful implementation of Biology curriculum. The analysis in Table 1 revealed further that most teachers did not have the instructional materials as recommended by the Federal Ministry of Education (2002) for the implementation of the Biology Curriculum. Therefore, the instructional materials used in teaching Biology in schools are not adequate.

The result of this study also showed that the condition of learning environment was very poor. Jegede and Ogunojemite (2010) stressed emphatically that the students' classroom learning environment could influence learners' achievement at school. The findings of this study also support the report of Ajayi (2007) who stressed that the physical environment contributes to the course of knowledge and this include class- size, very neat and conducive environment, position of the chalkboard and notice board in strategic position. Ajayi also stressed that this will affect learning positively. All these confirmed that the learning condition in schools fall below the recommended standard by the Federal Ministry of Education which means that none of the sampled schools had 100% coverage.

Conclusion

The conclusion drawn from the findings of this study is that instructional materials for the implementation of Biology curriculum contents were not adequate. The study revealed further that the condition of learning environment of most of secondary schools was very poor and this was not in agreement with the recommended standards by the Federal Ministry of Education.

Recommendations

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

1. Biology teachers should always use instructional materials while teaching to make Biology teaching activity based. All Biology teachers should always use instructional materials while teaching.

2. There should be separate well-equipped Biology laboratories provided in senior secondary schools and Biology laboratory assistants should be available for the implementation of Biology curriculum.
3. Government should provide conducive learning environment for the learning of Biology in conjunction with the school administrators. In addition, all Biology classrooms must have electricity and running water.

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