Effect of Qualification and Experience of Biology Teachers on the Status of Ecology Teaching in Kwara State

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Abstract

This study examined the effect of qualification and experience of Biology teachers on the status of ecology teaching in Kwara State. This study sample included one hundred and forty two (142) Secondary Schools selected by random sampling technique. The researcher designed teachers' questionnaire which were administered to four hundred and fifty (450) teachers selected from eight (8) Local Government Areas of Kwara State. Researcher-designed validated questionnaire was used to elicit information from the respondents on the status of ecology teaching. Three research questions and two hypotheses were formulated. Frequency counts and chi- square statistics were used to analysis the data collected. Finding of this study revealed that 68% of Biology teachers agreed with the contents while 32% disagreed. However both qualified and unqualified teachers had viewed ecology teaching the same way that is ecology teaching was not properly done due to the fact that some Biology teachers skip certain areas of the syllabus that they find difficult to teach. Similarly, experienced and less experienced teachers had the same views about ecology teaching in Kwara State. Based on the findings, the following recommendations were made: fieldwork and practicals on Ecology should be carried out satisfactory in the schools, teachers should be sponsored to seminars and workshops specifically on Ecology teaching.

Introduction

Biology deals with the study of all the varied aspects of living organisms. It is one of the science subjects, offered by candidates sitting for the senior school certificate (SSC) ordinary level examinations. Biology is the most popular subject among the pure science subjects (Idodo, 1996). Biology at the senior secondary school level can be grouped under such headings as: Cell and Unicellular Organisms, simple multicellular animals, insects, the arthropods, higher animals, reptiles and birds, mammals, flowerless plants, flowering plants, physical processes found in living organisms, respiration, food substances, nutrition of green plants, transport systems, excretion, ecology, etc. Ecology is the study of interactions of organisms with their physical environment and with each other. No plant or animal is independent of its environment.

If organisms must survive, then the environment must provide suitable conditions for their existence because they are likely to be affected by conditions around them (Stone, 1990). Ecological studies deal with any of the three levels of the organization of the organism, the individual, the population and communities. It deals also with the way in which the organisms at each of these levels of organization function in harmony with the non living physical environment. Ecology has many useful applications aimed at maintaining a healthier and more productive biosphere for the life of humans and other living organisms. It provides for the judicious use of natural resources often referred to as conservation. (Ndu, 1990). The sub topics under ecology at the senior secondary school level are basic ecological concepts, Aquatic habitants, Fresh water, Swamps, Marsh, Estuary, Grass land, Major biomes of the world, ecology of Population study and Problem of survival etc.

The following are the objectives for teaching senior secondary school Biology:
1.   To provide basic literacy in Biology for functional living in the society.
2.   To acquire essential scientific skills and attitudes as a preparation for the technological application of Biology.
3.   To acquire basic concepts and principles of Biology as a preparation for further studies.
4.   To stimulate and enhance creativity (National Biology Curriculum, 1993 page 20-22.

The focus of the secondary schools is to produce students that will proceed to tertiary institutions for further education. Some researchers reports shows that teachers found some concepts in ecology difficult (Ndukwe, 1988). Okeke and Ochuba (1986) worked on the level of understanding of ecological concepts. The study revealed low understanding of the three selected concepts by secondary school certificate students on some selected ecology concepts such as population, habitant and ecosystem. Apart from the three selected concepts, the findings call for further investigations of the other ecology concepts so as to improve the understanding of these concepts among secondary school students and to know the best method to be employed in teaching them. Jegede and Lagoke (1986) worked on the status of ecological field works in Nigerian secondary schools and found out the teachers did not have a positive attitude towards the teaching of ecological work. Adeniyi (1985) worked on misconceptions held by junior secondary school students in selected ecological concepts and found out that the absence of Yoruba equivalent of the ecological concepts was a factor for such misconception held by students. Ugwuandu (1984) worked on problems of teaching ecology and genetics at the secondary school level

and found that teachers found some concepts difficult to teach. Abidoye (2010) found the results of students in Biology Examination conducted by WAEC discouraging. It is shown below in table 1.

Table 1:

The Nation-Wide statistics of performance in Science and related subjects in May/June, 2008-2010 Senior School Certificate Examinations.

Year	Subject	Total Enrolment	Total Sat	A1– C6 (% Pass)	D7- E8 (% Pass)	TOTAL NO A1-E8	F9 % Failure
2008	Biology	1285048	1259965 (98.1)	427844 (33.9)	329961 (26.2)	757605 (60.1)	484071 (38.4)
	Chemistry	428513	418423 (98.0)	185949 (44.4)	114697 (27.4)	300646 (71.9)	110417 (26,4)
	Physics	424893	415113 (97.7)	200345 (44.3)	91116 (22.0)	291461 (70.2)	116776 (28.1)
2009	Biology	1364655	1340206 (98.2)	383112 (28.6)	413014 (30.8)	796126 (59.4)	471312 (35.2)
	Chemistry	478235	468546 (98.0)	204726 (43.7)	114020 (24.3)	318746 (68.0)	119260 (25.5)
	Physic	474887	465636 (98.1)	222722 (47.8)	141595 (30.4)	364317 (78.2)	79919 (17.2)
2010	Biology	1325408	1300418 (98.1)	427644 (33.9)	329961 (26.2)	757605 (60.1)	484071 (38.4)
	Chemistry	477573	465643 (97.5)	236043 (50.7)	109944 (23.6)	346003 (74.3)	988165 (21.1)
	Physic	475414	463755 (97.6)	237756 (51.3)	122417 (26.4)	360173 (77.7)	84716 (18.3)

Source: Statistics Section West African Examination Council (WAEC) Office Yaba, Lagos (2011).

The results in table 1 show a decline in students' performance in years sampled, 2008-2010. The percentage of students that had credits was very low compared to the total entry. In 2008-33.9%, in 2009-28.6% and in 2010-33.9% throughout the examination results, the performance of biology students was always below 60% of the total number students who offered biology in the external examination. In the years 2008, 2009 and 2010 . The percentage failures were 38.4%, 35.2% and 38.4%. It could therefore be seen from the table that percentage failure of students' performance increased yearly. The result above showed are the same for all the senior secondary schools in Nigeria. Many reasons have been advanced for the poor performance such as

i.   Negative attitude of both teachers and students (Akintoye & Shofuyi, 2002)

ii.   Lack of adequate laboratory equipment (Jimoh, 1992)

iii.   Some teaching methods adopted by Biology teachers (Harbor – Peters & Ogomeka, 1991)

iv.   Teachers' difficulty in understanding and teaching of certain Biology concepts (Abimola, 1998)

v.   Inadequate coverage of the Biology syllabus (WAEC, 1985).

Ecology is one of the difficult concepts to both teachers and students of Biology (Abimbola 1998: NERDC, 1993: Oyeyemi 1991 and Ugwuandu, 1984, Soyinka 1983 and WAEC, 1998 – 2000). Researchers reported that most teachers in Nigeria secondary schools grossly neglect the teaching of ecology like that of genetics. The Chief Examiner's report on Ecology revealed low achievement in ecology by students (WAEC 2004). In all the studies examined, ecology was difficult due to the following reasons:

i.   Neglect of ecology by most secondary school teachers

ii.   Academic ability and area of specialization of teachers

None of the studies above examined knowledge of teachers and experience of biology teachers. Hence, the need for this study.

Purpose of the Study

The purpose of this study was to determine the influence of qualification and experience of Biology teachers on their views about the status of ecology teaching in Kwara State.

Research Questions

There were three research questions and two hypotheses. They are

1. What is the status of ecology teaching in senior secondary schools in Kwara State as viewed by Biology teachers?
2. Do the views of Biology teachers' on ecology teaching vary with their qualification?
3. Do the views of Biology teachers' on ecology teaching vary with their teaching experience?

The hypotheses are

1. There is no significant difference between qualified and unqualified biology teacher on the status of ecology teaching
2. There is no significant difference in the view of experienced and less experienced biology teachers on the status of ecology teaching

A total of one hundred and forty two (142) public schools were sampled for the study. Five hundred questionnaire copies were given to Biology teachers across the sampled public schools for study, but four hundred and fifty copies were filled and returned.

Data Analysis and Results

Table 2

Table 2: Number and Percentages of Teachers' Responses

Variable	Number of teachers	Total	Percentage distributed
Qualified	209	450	46.4
Unqualified	241		53.6
Less-experience	182	450	40.4
Experienced	268		59.6

Table 2 shows the distribution of four hundred and fifty (450) respondents involved in the study. Four hundred and fifty respondents were distributed into four variables i.e. qualification and teaching experience. There were two hundred and nine (209) Qualified and 241 unqualified respondents. And also there were 268 experienced and 182 less-experienced Biology teachers.

Research Question One

What is the status of Ecology teaching in senior secondary schools in Kwara State as viewed by Biology teachers?

Table 3:

The number and percentages of Teachers' responses on Ecology Teaching

CONTENTS	Agreed %	Disagreed %	Total %
General responses of the teachers	68	32	100

The general response to the contents was that 68% of the Biology teachers agreed that teaching of Ecology was not done properly and 32% said it was alright. This shows that there should be improvement on the status of Ecology teaching by the Biology teachers. The total respondents percentages was hundred percent.

Research Question Two: Do the views of Biology teachers' in Ecology teaching vary with their qualification?

Research Question Three: Do the views of Biology teachers' in Ecology teaching vary with their teaching experience?

Table 4:

Chi- square Analysis of Average overall of the Responses on the basis of Qualification (qualified and less-qualified) and Teaching Experience (Less experienced and experienced) Biology Teachers on the Status of Ecology Teaching.

QUALIFICATION	χ^2	TEACHING EXPERIENCE	χ^2
Qualified		Less-experienced	
	0.41		0.56
Unqualified		Experienced	

The average results of the analysis related to the research questions as are shown in table 4. From Table 4, the Chi-square calculated (X^2 Cal) was 0.41, while the table value was 3.84 at 0.05 alpha levels, with degree of freedom of 1 this shows that the views of Biology teachers on the teaching of Ecology did not vary significantly with qualifications. With this, the null hypothesis (H_{02}) was not rejected.

Similarly, the calculated X^2 for experience of teachers was 0.56 while the table value was 3.84. Therefore H_{03} was not rejected. This table 4 shows that both the Qualified and Unqualified have similar opinion

to that of the experienced and less experienced Biology teachers about the teaching of Ecology in Kwara State.

Summary of Major Findings

In this study, the major findings are

1) Ecology teaching was accorded low status in Kwara State with 68% agreement of Biology teachers that said that there should be improvement in the Biology curriculum of some Ecology concept that are lacking.

2) Both qualified and unqualified biology teachers agreed that Ecology teaching was not due to the fact that some Biology teachers skip certain areas of the syllabus that they find difficult to teach.

3) Experienced and less experienced teachers agreed that ecology teaching was not properly done.

Discussion of Results of Status Ecology Teaching

In this study, it was found out that ecology teaching had low status in Kwara State, and has effect on students' performance. The finding agreed with Adeshina (2007), Ogundele (1995) and Ojaleye (1997).

The results of the study indicated that many Biology teachers had the views that the status of teaching is very important in the teaching of Ecology. With respect to the qualification, the qualified agreed with unqualified Biology teachers that some teachers skip certain areas of the syllabus that they find difficult to teach. The findings agreed with Mgbako-Ezemia (1992), Ogundele (1995) and Ojaleye (1997).

The experienced and less experienced teachers agreed that ecology teaching was not properly done as a result of not exposing the Science teachers to seminar and workshop. The finding agrees with those of Ndukwe (1988), Abdullahi (1983), Fafunwa (1974), Balogun 1982 and Saha (1983).

Recommendations

Field work and practicals on Ecology should be carried out satisfactorily in the schools.

Teachers should be sponsored to seminars and workshops specifically on Ecology teaching.

Suggestions for further Studies

The following suggestions are made for further studies: this research work can be replicated in other part of Kwara State of the country since this study is limited to eight Local Government Areas of Kwara State. Also the Science education students could start from where this work end by creating many instructional aids that could be used to teach Ecology and other concept that are perceived difficult by many Biology teachers.

Moreover, other researchers can equally examine other variables such as area of specialization, type of schools and others that have not been addressed in this study.

Appendix

Chi- square Analysis of the Responses on the basis of Qualification (qualified and less-qualified) and Teaching Experience (Less experienced and experienced) Biology Teachers on the Status of Ecology Teaching.

S/NO	CONTENTS	QUALIFICATION	χ^2	TEACHING EXPERIENCE	χ^2
1	Ecology in the curriculum is arranged in a conceptual manner	Qualified Unqualified	1.001	Experienced Less experienced	0.02
2	Learning about ecosystems should involve field work	Qualified Unqualified	0.12	Experienced Less experienced	0.26
3	Specific samples illustrative of adaptive features of organisms should be brought into the class room	Qualified Unqualified	1.55	Experienced Less experienced	0.004
4	Emphasis should be placed on identifying adaptive features of organisms.	Qualified Unqualified	2.37	Experienced Less experienced	0.004
5	Food scarcity as an ecological problem should be emphasized.	Qualified Unqualified	0.13	Experienced Less experienced	1.98
6	Some important ecology concepts are lacking in the Biology curriculum.	Qualified Unqualified	0.40	Experienced Less experienced	1.00
7	In studying an ecosystem, sizes of ecosystem and population of many organisms should be determined.	Qualified Unqualified	0.85	Experienced Less experienced	1.04
8	The biology curriculum is loaded	Qualified	0.09	Experienced	0.70

No.	Statement	Qualification		Experience	
	with too many ecology concepts.	Unqualified		Less experienced	
9	The arrangement of ecological concepts in such a way that they run throughout the three year course is convenient for teaching.	Qualified Unqualified	0.05	Experienced Less experienced	0.63
10	Non availability of Biology textbooks affects the teaching of ecology in senior secondary schools.	Qualified Unqualified	0.35	Experienced Less experienced	0.011
11	Actual measurements of ecological factors should be taken.	Qualified Unqualified	0	Experienced Less experienced	0
12	The students should be guided to study an ecosystem.	Qualified Unqualified	0	Experienced Less experienced	0
13	A field trip should be made to a biotic community.	Qualified Unqualified	0	Experienced Less experienced	0
14	Students should collect organisms from the ecosystems and classify them as producers, consumers or decomposers.	Qualified Unqualified	0	Experienced Less experienced	0
15	Students should be able to measure or estimate sizes of some ecosystems.	Qualified Unqualified	0.27	Experienced Less experienced	0.34
16	Students should be able to give names of organisms typical of each community	Qualified Unqualified	0.08	Experienced Less experienced	0.55
17	Students should be able to describe each of the factors and point out their relative importance.	Qualified Unqualified	0.08	Less experienced Experienced	0.16
18	The factors which affect water retentivity of soil-types and determine the amount of water each soil type can hold should be known by the students.	Qualified Unqualified	0.61	Experienced Less experienced	0.11
19	Students should be guided to study land ecosystem.	Qualified Unqualified	0.90	Experienced Less experienced	0.01
20	Interpretation of graphs showing ecological factors of an area should be determined.	Qualified Unqualified	0.15	Experienced Less experienced	0.86
21	Students should be able to name soil types and discuss their effects on vegetation.	Qualified Unqualified	0.00	Experienced Less experienced	0.28
22	Students should be able to demonstrate how climatic factors are measured.	Qualified Unqualified	0.67	Experienced Less experienced	0.55
23	Students should be able to state the sources of energy in an ecosystem.	Qualified Unqualified	0.15	Experienced Less experienced	1.13
24	Students should be able to recognize that food relationship exists among living things.	Qualified Unqualified	1.85	Experienced Less experienced	0.55
25	Students should be able to use the knowledge of energy losses in the ecosystem to explain the pyramidal shape of feeding relationships.	Qualified Unqualified	0.15	Experienced Less experienced	1.13
26	Students should be able to identify some associations which are beneficial, harmful and neutral to each of the organisms of the association.	Qualified Unqualified	1.29	Experienced Less experienced	0.51

27	Students should be able to recognize that living things possess a range of tolerance to environmental factors.	Qualified Unqualified	0.00	Experienced Less experienced	2.43
28	Students should be able to recognize that the availability of water is the principal factor for the distribution of plants and animals.	Qualified Unqualified	0.00	Experienced Less experienced	0
29	Students should be able to observe characteristics of the mode of life of a given organism	Qualified Unqualified	0.15	Experienced Less experienced	0.86
30	Students are to copy and memorize notes for examination.	Qualified Unqualified	0.74	Experienced Less experienced	0.02
31	Students are to find out definitions of terms from textbooks.	Qualified Unqualified	0.49	Experienced Less experienced	0.01
32	Ecological pyramids should be drawn for the students.	Qualified Unqualified	0.74	Experienced Less experienced	0.86
33	Tests, quizzes and examinations should require students to know definitions.	Qualified Unqualified	0.12	Experienced Less experienced	0.00
34	Skills in using equipment like quadrat, barometer and rain gauge are tested and used as students' evaluation.	Qualified Unqualified	0.43	Experienced Less experienced	0.44
35	Sometimes, I use demonstration method to teach the students ecology.	Qualified Unqualified	0.30	Experienced Less experienced	1.32
36	I always accept class discussion when teaching the students ecology.	Qualified Unqualified	0.11	Experienced Less experienced	2.37
37	I never used lecture method to teach the students	Qualified Unqualified	0.07	Experienced Less experienced	0.003
38	I give assignments to the students.	Qualified Unqualified	0.62	Experienced Less experienced	1.27
39	I rarely accept individual projects from the students	Qualified Unqualified	0.12	Experienced Less experienced	0.02
40	The graphic method is used to interpret the graph.	Qualified Unqualified	1.48	Experienced Less experienced	0.59
41	The field work of teaching method is used for field studies	Qualified Unqualified	0.78	Experienced Less experienced	0.01
42	Laboratory method is used to teach the practical lesson.	Qualified Unqualified	0.003	Experienced Less experienced	0.38
43	Some of the ecological habitats recommended for study are available in the school environment.	Qualified Unqualified	0.14	Experienced Less experienced	0.02
44	Biology laboratory is always available for practical lessons.	Qualified Unqualified	2.07	Experienced Less experienced	0.30
45	There is ample space to construct an ecological garden on the school compound.	Qualified Unqualified	0.09	Experienced Less experienced	0.05
46	There is space for field studies within the school environment.	Qualified Unqualified	0.20	Experienced Less experienced	0.12
47	Students are not more than fifty in Biology lessons	Qualified Unqualified	0.02	Experienced Less experienced	0.04
48	The minimum number of basic ecological materials possessed in my school is sufficient.	Qualified Unqualified	0.29	Experienced Less experienced	1.79

49	Instructional materials in the school are sufficient for the Biology teacher.	Qualified Unqualified	0.03	Experienced Less experienced	0.23	
50	The principal's support for biology teaching in my school is encouraging.	Qualified Unqualified	0.08	Experienced Less experienced	0.12	
51	Biology textbooks in my school are enough.	Qualified Unqualified	0.07	Experienced Less experienced	0.06	
52	The number of Biology teacher(s) in my school is sufficient.	Qualified Unqualified	0.03	Experienced Less experienced	0.18	
53	Many of the ecological instruments (rain gauges, wind-vane) are available in the school.	Qualified Unqualified	0.29	Experienced Less experienced	1.08	
54	There is a biology laboratory in my school	Qualified Unqualified	0.27	Experienced Less experienced	2.32	
55	The biology laboratory is used for practical lessons.	Qualified Unqualified	0.28	Experienced Less experienced	0.94	
56	Practical on ecology is carried out in the laboratory.	Qualified Unqualified	0.07	Experienced Less experienced	0.25	
57	There is enough equipment in the laboratory.	Qualified Unqualified	0.01	Experienced Less experienced	0.13	
58	There are laboratory enough attendants in my school.	Qualified Unqualified	0.71	Experienced Less experienced	0.07	
59	There are puddles and a pond in my school.	Qualified Unqualified	1.33	Experienced Less experienced	0.001	
60	Stream and river which can be used to study ecosystems are available in my school.	Qualified Unqualified	0.02	Experienced Less experienced	1.63	
61	Bushes are present in the school premises to study ecosystems.	Qualified Unqualified	0.40	Experienced Less experienced	1.01	
62	Measuring instruments for sizes of the ecosystem are present.	Qualified Unqualified	0.85	Experienced Less experienced	1.04	
63	There are various charts, photographs, films of different biotic communities in Nigeria in the school.	Qualified Unqualified 0.09		Experienced Less experienced	0.70	

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