

Senior Secondary School Teachers' Perception of difficult Topics in Biology Curriculum in Mubi North Local Government Area of Adamawa State, Nigeria

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ABSTRACT

This study investigated teachers' perception of difficult topics in secondary schools Biology in Mubi North Local Government Area of Adamawa State. The study adopted the descriptive survey research design. The main objective of this study was to determine the perception of biology teachers on difficult topics in biology; and the factors responsible for such perceptions. A total of 40 biology teachers were randomly obtained from six secondary schools in the study area. Three research questions were raised and three hypotheses formulated to guide the study. The instrument used was a questionnaire developed by the researchers and was validated by some experts from Science Education Department, Adamawa State University, Mubi. The reliability of the instrument was established with a coefficient of 0.79 from its analysis. Mean scores and standard deviations were used to answer the research questions while ANOVA statistic was used in testing the hypotheses. From the findings of the study, it was revealed that there are some biology teachers who do perceive some topics as difficult even to teach. Also, it was found that there was significant relationship between male and female teachers of biology in their perception of biology topics as been difficult. Furthermore, there was significant difference between experienced and less experienced teachers of biology in their perception of biology topics as been difficult. It was therefore recommended that government should employ qualified biology teachers for effective teaching and learning; teachers should be encouraged to read relevant textbooks on the topics at hand, find and use videos on biological science.

KEYWORDS: Perception, Biology, Difficult topics, Teachers

Introduction

Biology, as a scientific field provides numerous vital innovations in human lives through various studies in its basic sub-fields like genetics, biotechnology. Therefore, learning biology for daily life like any other science subject becomes a necessity in today's world. Biology learning includes understanding biological organization from molecules to ecosystems and all the varied aspects of living organisms. Furthermore, it is the science of living things among which human being has the strongest place. Biological science stimulates human interest to find the truth with an intellectual rigour. The purpose of science is to discover the laws that govern the natural world and so increase our understanding of it (Liras, 1994). The knowledge of biology has played a very important role in the society and is used to solve problems of disease and poor yield in agriculture. Research has shown that science is the bedrock of all technological breakthroughs. It is through science

(biology inclusive) that man is able to expand knowledge and exercise control over the environment. Wasagu (1998) opined that science does not only affect us at any given time of our daily existence, it digs into life to provide more insights. This implies that science lives with us and affects our living both as individual and as a society. Hence, the teaching of science in school helps the youth to acquire the knowledge the science and technology and to adjust to its product and his environment. It is in this regard that biology is made a compulsory science subject for all students in the senior secondary school level.

Teaching is an art by which the teacher must put into the minds of students certain concepts using specific techniques (Aitken, 2012). A teacher must engage his students to facilitate absorbing, understanding, applying and then retaining new knowledge. Keeves (2009) stated that teachers should not assume that all students have come with the same experience. This implies that teachers should teach keeping in mind the capacities and experiences of all the students. Aubusson and Watson (2003) observed that teachers have a critical influence on the quality of teaching and learning that occurs in the classrooms. If teachers have positive attitude towards the topics, effective teaching and learning would take place which in turn increases the level of students' understanding. Teachers' perceptions need to be considered as much as content of other component of a curriculum. Research has shown that the quality of education that teachers provide to students in any subject highly depends upon the perception of the teachers about the topics they teach. If a teacher perceived a topic as simple, then teaching and learning may be effective but if otherwise, the students may find it difficult to understand (Adeyemo, 2011). Thus, the teachers' perception is one of the most important educational inputs predicting students' academic achievement.

In Nigeria, teachers' attitude and students' lack of experience have been reported to be major factor responsible for students' perceived difficulty in sciences (biology inclusive) (Ajayi, 2000; Unoroh, 2004; Oni, 2006). Teachers' attitude towards biology can either motivate students or discourage them. Just as Fakunde (1981) and Okpala (1991) as cited in Umeh (2002) noted, many biology teachers have fobia towards teaching genetics and other similar concepts in WAEC syllabus and they remarked that it may be worse with the new and wider coverage of concepts in the contents in the National Curriculum for Senior Secondary School in the country. It has been reported that some topics perceived as difficult are responsible for students' poor performance in the subject. For example, topics as respiration and photosynthesis, genetics, and reproduction were perceived as being difficult as mentioned by Anderson, Sheldon & Dubay (1990), Pashley (1994) and Yip (1998) respectively. Nigerian Educational Research and Development Council (NERDC) in a workshop organized in that regard in 1993 had classified the reasons for the perceived difficult biology topics to be students' related reason, teachers in the field, learning environment and resource materials. Furthermore, studies indicate that teachers' qualification, teaching experience and gender may be responsible for teachers' perception of difficult topics in biology. While Uche and Umoren (1998) were of the view that teachers' academic qualification is a factor for perceiving biology topics as difficult, Bankole (1999) and Kane (2007) made distinction between the teachers' qualification by stating that professionally

qualified teachers who had long years of experience are more effective in teaching than their counterparts who either are not professionally qualified or have very few years of teaching experience even though they may be professionally qualified. On the contrary, David (2004) was of the opinion that experience alone does not make a teacher an expert since according to him, experts often develop automaticity for repetitive operations that are needed to accomplish their goals. According to Wafula (2005), lack of adequate resource materials and facilities were some of the factors that lead to poor implementation of Biology curriculum which means that lack of instructional materials leads to teachers' perception of Biology topics as difficult.

There is general belief among science and mathematics educators that males perform higher than their female counterparts (Reigner, 1993; Enokoha, 1995, Ajiboye and Tella, 2006; Kojigili, 2008). On the contrary, evidence abounds that gender disparity in biology may not be attributed to ability but variables such as motivation, culture or other environmental and personal factors (Lingred, 1976; Akpan, 1987; Slaven, 1996). Empirical studies within and outside Nigeria revealed that some biology topics are abstract and therefore difficult to understand even by some experienced and qualified teachers. Once teachers have difficulty in understanding certain biology topics, they will not be able to teach such topics to the understanding of students. Most of the biology teachers, when encountered such problems of difficulties in biology topics tend to skip the topics, leave them untreated or some may give them as an assignment to students, which may cause failure for the learners due to lack of understanding such topics. It was as a result of the consistent poor performance of students in sciences and the teachers' fear of teaching certain topics that led to the organization of Nigeria Educational Research and Development Council (NERDC) workshop in 1993 on "difficult topics" in science and mathematics and also the establishment of the National Mathematical Centre Abuja by the federal government. It is on this basis that this research seeks to investigate the biology topics perceived as difficult by biology teachers.

Purpose of the Study

The main purpose of this study is to determine the perception of teachers of biology on the topics seen as difficult in secondary school curriculum and to determine factors responsible for such perceptions in Mubi North Local Government Area of Adamawa State.

Research Questions

The following research questions were raised to guide the study:

1. To what extent do biology teachers perceive some topics as difficult in secondary schools?
2. What biology topics do biology teachers perceive difficult to teach?
3. What are the factors responsible for their perceived difficulty of biology topics?

Research Hypotheses

The following hypotheses were formulated to guide the study:

- Ho₁: There is no significant difference between male and female biology teachers in their perception of difficult topics in biology.
- Ho₂: There is no significant difference between experienced and less experienced biology teachers in their perception of biology topics as been difficult.

Methodology

This study adopted survey research design. The population of the study comprised all biology teachers in all the senior secondary schools in Mubi North Local Government Area of Adamawa State. A total of 40 biology teachers were selected using simple random technique from six secondary schools from the population. The instrument used for data collection was a questionnaire designed by the researchers with three sections; A, B and C. Section A was designed to elicit information from respondents such as name of school, teachers' gender, academic qualification and years of teaching experience. Section B was a four-point Likert scale type items consisting of biology topics to which the respondents were to identify as difficult or not. For section C, respondents were to identify the factors responsible for their perception of some biology topics as difficult. The instrument was administered on the biology teachers in each of the sampled schools and the responses were collected back by the researchers immediately. The instrument was validated by some experts from the Science Education Department of Adamawa State University, Mubi, the instrument was pilot tested on a group of biology teachers from senior secondary schools that were not part of the targeted sample of the study and a reliability coefficient of 0.79 was obtained using Cronbach Alpha.

The research questions were answered using mean response scores and standard deviations while Analysis of variance (ANOVA) was used to test the research hypotheses at 0.05 level of significance.

Results

Table 1 shows the mean response scores of teachers on their opinions of difficult topics in Biology. It shows that the teachers perceived those topics with the mean scores of 2.5 and above as not difficult to teach while those with the mean scores less than the cut-off point of 2.5 were perceived as difficult.

Table 1: Mean Response Scores of Teachers' opinions of Biology Topics considered Difficult

S/No.	Items	SA	A	D	SD	Mean	Remark
1	I find it difficult to teach chromosome	4	3	20	13	2.00	Rejected
2	Gene is difficult to teach	4	12	10	4	2.50	Accepted
3	I find homeostasis difficult to teach	4	16	24	0	2.50	Accepted
4	Fertilization is difficult to teach	0	18	22	0	1.70	Rejected
5	I find cell division difficult to teach	0	12	20	8	1.90	Rejected
6	Mitosis is easy to teach	16	16	4	4	3.10	Accepted
7	I find it difficult to teach meiosis	14	14	8	4	2.95	Accepted

8	I find transport not easy to teach	16	16	8	0	3.20	Accepted
9	I find it difficult to teach genetics	12	9	18	2	2.30	Rejected
10	Respiration is difficult to teach	8	14	14	4	2.65	Accepted
11	I find evolution difficult to teach	4	16	16	4	2.50	Accepted
12	Amino acid is not easy to teach	8	20	8	4	2.80	Accepted
13	Photosynthesis is not easy to teach	4	8	16	12	2.20	Rejected
14	I find it not easy to teach pollution	5	3	14	18	1.85	Rejected
15	I find it difficult to teach digestion	8	0	24	8	2.20	Rejected
16	It is difficult to teach excretion	4	14	12	10	2.30	Rejected
17	I find it difficult to teach reproduction	0	6	18	16	1.75	Rejected
18	Conservation is difficult to teach	4	8	18	10	2.10	Rejected
19	I find growth difficult to teach	6	4	18	12	2.10	Rejected
20	Pollination is difficult to teach	8	8	14	10	2.30	Rejected

Table 2: Mean Response Scores of Teachers' opinion on Factors Responsible for their Perception of some Biology Topics as Difficult

S/No.	Factors	SA	A	D	SD	Total	Mean	Remark
21	Gender is a factor responsible for teachers' perception of some biology topics as difficult.	4	12	18	6	40	2.3	Rejected
22	Teachers' Academic qualification is a factor responsible for teachers' perception of some biology topics as difficult.	8	10	10	12	40	2.35	Rejected
23	Teachers' teaching experience a factor for teachers' perception of some biology topics as difficult.	8	16	8	8	40	2.6	Accepted
24	Teacher's attitude towards the topic is a factor responsible for their perception of some biology topics as difficult.	4	24	12	0	40	2.8	Accepted
25	Lack of instructional materials is a factor responsible for teachers' perception of some biology topics as difficult.	16	18	6	0	40	3.1	Accepted

Table 2 shows the mean response scores of teachers' opinion on factors responsible for their perception of some biology topics as difficult. The table shows that those factors with the mean scores of 2.5 and above have been accepted as responsible for teachers' perception of some biology topics as difficult, while those with the mean scores less than the cut-off point of 2.5 were not accepted

Table 3: Mean Scores of Male and Female Teachers' Perception of the Difficult Topics in Biology

	N	Mean	Std. Deviation
Male	23	59.900	11.035
Female	17	32.900	8.045
Total	40	46.400	16.667

Table 3 shows the mean scores of male and female teachers' perception of difficult topics in biology which indicates that the mean scores of the male respondents is 59.90 while that of the female respondents is 32.90.

Table 4: Mean Responses of Experienced and Less Experienced Teachers on their Perception of Difficult Biology Topics

	N	Mean	Std. Deviation
Experienced	20	1.00	.000
Less experienced	20	1.80	.410
Total	40	1.40	.496

Table 4 shows the mean responses of the experienced and less experienced teachers. The mean response scores of the experienced teachers is 1.00 while that of the less experienced teachers is 1.80. The result indicates that the mean of experienced teachers is less than that of the less experienced teachers. This indicates difference between the levels of perception of difficult topics in biology by the category of teachers.

Hypothesis One: There is no significant difference in Biology topics perceived as difficult by male and female Biology teachers

Table 5: Summary of ANOVA of the Male and Female Teachers' Perception of Difficult Topics in Biology

	Sum of Squares	df	Mean Square	F	Sig
Between Groups	7290.000	2	7290.000	78.175	.000
Within Groups	3543.600	38	93.253		
Total	10833.600	39			

The result of the ANOVA statistics in Table 5 reveals that the F-statistics is 78.175 with $P < 0.05$. This indicates that the null hypothesis is rejected. This means that there is significant difference in biology topics perceived as difficult by male and female biology teachers.

Hypothesis Two: There is no significant difference in Biology topics perceived as difficult by experienced and less experienced Biology teachers.

Table 6: Summary of ANOVA of Experienced and Less Experienced Teachers' Perception of Difficult Topics in Biology

	Sum of Squares	df	Mean Square	F	Sig
Between Groups	6.400	2	6.400	76.000	.000
Within Groups	3.200	38	.084		
Total	9.600	39			

The result of the ANOVA statistics in Table 6 reveals that the F-calculated value is 76.00 with $P < 0.05$ which indicates that the null hypothesis was rejected. This means that there is significant difference in biology topics perceived as difficult by experienced and less experienced biology teachers.

Discussion

The result of the findings of the study revealed the mean response scores of biology teachers on their opinion of some biology topics which were perceived as difficult to teach by the biology teachers in secondary schools and those topics include: Gene with the mean score of 2.50, Homeostasis, 2.50; Mitosis with 3.10; Meiosis with 2.95; Transport with 3.20; Respiration with 2.65; Evolution with 2.50; and Amino acid having the mean of 2.80. This finding is in line with the findings of Anderson, Sheldon and Dubay (1990) that identified respiration as perceived difficult topic. The study also found that some biology topics were perceived as not difficult to teach by biology teachers in secondary schools which include: Chromosome, Fertilization, Cell division, Genetics, Photosynthesis, Pollution, Digestion, Excretion, Reproduction, Conservation, Growth and Pollination because their mean were less than the cut-off point of 2.5. This finding is contradictory with the findings of Pashley (1994) who identified Genetics as difficult and Yip (1998) who identified Reproduction as difficult.

Furthermore, the findings revealed the factors responsible for the teachers' perception of some biology topics as difficult as: teachers' teaching experience with a mean of 2.60, teachers' attitude towards the topics with a mean of 2.8, and lack of instructional materials with 3.1. This is in line with the findings of Soyibo (1992) Bankole (1999) and David (2004) where they identified teachers' teaching experience and teachers' attitude towards the topics as among the factors responsible for teachers' perception of biology topics as difficult.

The result of the findings as shown in Table 4 indicates that there is significant difference between male and female biology teachers on their perception of biology topics as difficult, which means that gender has a significant role in teachers' perception of difficult topics in secondary school biology. This is in line with the findings of Ajiboye and Tella (2006) and Tamirie, (2009) who reported that female's academic achievement is significantly lower than that of males in science. From Table 6, the finding reveals that there is significant difference between experienced and less experienced biology teachers on their perception of biology topics as difficult. This means that the experienced teachers are more effective in teaching than less experienced teachers. This is in line with the study of

Harris and Sass (2007) who state that brand new teachers are less effective than those with some years of experience.

In conclusion, it has been revealed that many of the biology teachers in secondary schools perceive some biology topics as been difficult to teach while others perceived many of the topics as not difficult to teach. Teachers' teaching experience, teachers' attitude towards some topics and lack of instructional materials are the major factors responsible for teachers' perception of biology topics as difficult in Mubi North Local Government Area of Adamawa state.

Recommendations

From the findings of the study, the following recommendations were made:

- 1 Government should employ competent and qualified biology teachers for effective teaching of Biology.
- 2 Teachers of biology should learn to use different strategies for the teaching of the subject and insist on teaching even the so called difficult topics.
- 3 Retraining programmes should be reinforced for teachers of science by government where the methodology of teaching perceived difficult concepts in sciences should feature prominently in the course content for such programmes.
- 4 Teachers should also be encouraged to read relevant textbooks on the topics at hand, find and use videos on biological science for example to support the topic the teacher is teaching.

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