BIOLOGY TEACHERS' AWARENESS AND UTILIZATION OF SELECTED TEACHING METHODS IN CHANCHAGA LOCAL GOVERNMENT AREA MINNA, NIGER STATE

Ibrahim, Ismail Kuta, Tukura, C. S., Rufai, Kazeem Olayiwola
James, Stephen, Mohammed, Nana Amina, Nmadu, John, Ali, Fati
Federal University of Technology, Minna
Department of Educational Technology
Federal University Ndufu-Alike Ikwo Ebonyi State

Abstract
The study examinedBiology Teachers' awareness and utilization of selected teaching methods in Chanchaga Local Government Area Minna, Niger State.Survey research design was used for the study.Six Senior Secondary Schools were purposefully selected based on the availability of laboratory equipment to carry out the research study. Five (5) Biology Teachers wereselected from each of the six Schools. The instrument used for data collection was questionnaire. The instrument was validated by two experts in the field of science education for criterion related validity. Reliability of the instrument was determined using test-retest method. Data obtained was analyzed using KR 20 formula and a co-efficient of 0.80 was obtained. The results from the analyses showed that many Biology tutors were not aware of the various science teaching strategies and how to utilize them. It was recommended that an urgent step be taken by organizing seminars and workshops for tutors to enhance their teaching methodology.

Keywords: *Biology Teachers, Awareness, Utilization, Teaching Methods, Qualified and Unqualified BiologyTutors.*

Introduction

The word “science” and it contribution to humanity cannot be over emphasized. Science comes from the Latin word “scientia” meaning “knowledge”. According to the Webster' New Collegiate Dictionary, Science is “knowledge covering general truths of the operation of general laws, especially as obtained and tested through scientific method concerned with the physical world”. The word “Biology” is derived from the Greek word 'bios' and 'logos' meaning 'life' and 'study' respectively and is defined as the science of life and living organism (Norwegian University of Science and Technology, Biology Department). We can now deduce from the above definition that science is a system of acquiring knowledge which uses observation and experimentation to describe and explain natural phenomena.

The roles of tutors are often formal and ongoing, carried out at a school or other place of formal education. In many countries, a person who wishes to become a teacher must first obtain specified professional qualifications or credentials from a university or college (Ukoha & Ukoha, 2009). These professional qualifications may include the study of pedagogy, the science of teaching. Teachers, like other professionals, may have to continue their education after they qualify, a process known as continuing professional development (Department of Education and Skills, Ireland, 23 July, 2012). In the process of acquiring knowledge, it is expected that a good and well trained science tutors should be able to know that in imparting knowledge to students (which comprises of both fast and slow learners) different methods of teaching ought to be looked into carefully so as to enhance fast and easy comprehension of what is been taught. But today reverse is the case in many of our secondary schools in Nigeria (Omorogiuwa&Ogumogu, 2013).

STAN (Science Teachers Association of Nigeria), ASTE (Association of Science Teachers Education) and so many others strive to be the leading voice (STAN for Nigeria and ASTE world-wide) most especially in the areas of research and policy development related to the enhancement of science teaching, but how many of this research and policies that are made have so far being implementedΩIf at all any have being implemented, what is the attitude of the science teachers toward utilizing them in their various schoolsΩWhile it is true that there are teachers whose attitudes are positive towards the promotion of good science teaching-learning situations, for most students, in many parts of Nigeria, the reality of the school classroom consists of lessons where science is transmitted by their teachers, at best, as a set of facts, laws and data.

As a result of all this, science teaching, has not being able to make reasonable progress in the Nigeria educational system and it has also deprived science students from going beyond the lowest hierarchy of learning outcomes in science which is knowledge or factual recall level (Alant, 2004), He went further to say that the lecture method does not provide the students opportunities to go to the higher levels of cognitive learning which are applications, analysis, synthesis and evaluation.

According to Augustine (2013), higher institutions in Nigeria charged with the responsibility of training science teachers at all level are increasingly turning out teachers without the basics in actual methodology of science teaching. The numbers of institutions charged with these responsibilities are increasing day by day and thousands of science teachers are coming out of these institutions without the basic requirement in terms of passing appropriate knowledge using various science teaching methods to do that. Hence, they always resort to the traditional way of teaching science which is lecture method. Furthermore, apart from a science teacher knowing the bases, he/she should also be groomed in he/her own field of science (whether Physics, Chemistry or Biology) and also in the various methodologies of science teaching (Boyo, 2006).

Therefore, there is need for science teachers to make their classroom interactive (being a method of teaching science for example experimentation, simulation, constructivism, vee mapping e.t.c which will go a long way to improve science teaching in Nigeria. Achor (2003), Cognitive correlates of physics achievement of some Nigeria Senior Secondary Science Teachers. Admit in His study shows that the extent of awareness of science teachers on the 19 innovative teaching strategies is high as indicated by 61.6% for Biology, it implication is that teachers know about these strategies. However, the question that remains is what efforts have these teachers made to adequately utilize some or all of these teaching strategies in their day-to-day teachingΩFrom another perspective however, awareness as used in this study could be very shallow; one may be superficially aware of a method without knowing in depth how to use it. There may be a need to revisit the nation's available training programmes with a view to laying emphasis on such methods.

The findings by Regina et al (2010) revealed that though most science teachers (Biology tutors inclusive) are aware of the various teaching strategies, the extent of its utilization is very low. Some of the teaching strategies used by Biology tutors could also have effect on either male or female students, some teaching strategies are best used by some male tutors while some are best used by female tutors which will go a long way to tell on the achievement of learners.

Gender is one of the most important factors interacting with the achievement of student; a lot of researchers have been conducted but unresolved as to the cause of the low achievement (Nusbaum, 2000). Danmole, (2004) noticed in the course of their studies that male has higher achievement. Non significance difference was notice between the two sexes by various researchers such as; Gambari, (2004); Ezenwa, (2005).

West African Examination Council (WAEC) Chief Examiners Report over the years shows a continuous student poor performance (especially in Biology) and reduction in their enrolment into sciences courses. One of the factors responsible for the poor performance is the in-appropriate teaching strategies often employed by Biology tutors in most secondary schools.

The persistent poor performance of students both in internal and external Biology examinations has given rise to an assumption that most tutors in Nigerian secondary schools do not probably make use of the various teaching strategies in order to cope with some specific topics in Biology that cannot be taught using lecture method alone. There are various teaching strategies recommended for use by researchers that will enhance proper understanding of certain difficult concept in Biology. Teaching strategies such as experimentation, discussion, demonstration, fieldtrip, vee - mapping, simulation, constructivism, have been used amongst others but the poor performance have persisted in the subject biology, therefore, the study intends to investigate the Biology tutors awareness of the use of various science teaching methods in Chanchaga Local Government Area.

Research Questions

This study seeks to address the following research question;

1. Are Biology teachers aware of the selected teaching methodsΩ
2. What selected teaching methods are effectively utilized in secondary schools by Biology tutorsΩ
3. Is there any difference between qualified and unqualified Biology tutors in the utilization of selectedteaching methodsΩ
4. Will there be any difference between experienced and less experienced Biology tutors in the utilization of selected teaching methodsΩ

Research Hypotheses

The following null hypotheses were formulated and tested at 0.05 level of significance

(i). There is no significant difference between qualified and unqualified Biology tutors in the utilization of selected teaching methods.

(ii). There is no significant difference between experienced and less experienced Biology teachers in the utilization of selected teaching methods.

Methodology

Survey research design was adopted for the study. It was adopted to investigate the Awareness and Utilization of selected teaching methods utilized by Biology tutors. The target population for this study was the entire Biology Tutors of secondary schools in Chanchaga Local Government Area in Minna, Niger State. The total population of Biology Tutors was 65 in 2016/2017 session. The sample size used for the research study was 30 Biology Tutors. Five Biology Tutors each were randomly selected fromsixschools; Government Secondary Schools under Chanchaga Local Government Area in Minna based on the availability of laboratory equipment in the schools. The names of the schools are; AhmaduBahago Secondary School Minna, Government Day Secondary School Minna, Government Girls Day Secondary School Minna, Zarumai Model Secondary School Minna, Day Secondary School Limawa Minna, and Government Secondary School Minna Niger State respectively.

The instrument used in this study was a structured Questionnaire which was a slight modification of the one developed by Regina et al (2010). The instrument (questionnaire) was divided into three sections A, B and C. Section A requires personal information of each respondent such as teaching qualification, years of experience and so on. While section B was based on 21 identified instructional strategies of science teaching, a three-options rating scale of Aware, Utilized, and

Not Aware were used to assess if the teachers were aware of the selected Biology teaching methods. Section C deals with the level of utilization of the various Biology teaching strategies among the Biology tutors. It has three (3) option rating scale of frequently, sometimes, and never. The questionnaire was validated by experts in the field of science education and educational measurement and evaluation in the Federal University of Technology Minna and Niger State Ministry of Education. Useful and constructive suggestions were made which led to restructuring or complete elimination of some item from the questionnaires.

To determine the reliability of the instrument, a pilot study was conducted in a school that was not among the ones sampled for the study but within the population. Test- retest method was used with an interval of one week. The instrument was administered to a group of ten Biology tutors and collated. The data was analyzed using Cronbach alpha formular and r= 0.80 was obtained.

The researcher administered the questionnaires to the Biology tutors in the various selected Secondary Schools in Chanchaga Local Government Area Minna, Niger State. The researcher waited to collect immediately, but for Biology tutors that were not chanced due to one reason or the other, he went back the following day for collection.The percentage, mean, standard deviation and the t-test statistical analysis were used. The result was computed and used in testing the hypotheses. The level of significance that was adopted for the data analysis was p= 0.05. This level of significance formed the basis for rejecting or accepting each of the hypotheses, from which findings, discussion and summary were arrived at.

Results

The data of the study were analyzed and presented according to the research questions and hypotheses. Therefore, the measures used were Frequency, Percentage, Mean, t-test and Standard deviation.

Research Question One: Are Biology tutors aware of the selected teaching methodsΩ

Table 1: Biology Tutors Awareness of the Selected Teaching Methods

Awareness	A (3)	NS (2)	NA (1)	Weight sum	Weight mean	Rank	Decision
Lecture	28(84)	1(2)	1(1)	87	2.90	2.5th	Aware
Discussion	29(87)	1(2)	0(0)	89	2.97	1st	Aware
Demonstration	28(84)	1(2)	1(1)	87	2.90	2.5th	Aware
Experimentation	26(78)	3(6)	1(1)	85	2.83	4th	Aware
Discovery	24(72)	4(8)	2(2)	82	2.73	7.5th	Aware
Project	18(54)	10(20)	2(2)	76	2.53	11.5th	Aware
Field Trip	24(72)	5(10)	1(1)	83	2.77	5.5th	Aware
Problem Solving	26(78)	1(2)	3(3)	83	2.77	5.5th	Aware
Vee Mapping	11(33)	19(38)	0(0)	71	2.37	13th	Aware
Concept Mapping	11(33)	11(22)	8(8)	63	2.10	18th	Aware
Analogy	12(36)	10(20)	8(8)	64	2.13	16th	Aware
Simulation	16(48)	7(14)	7(7)	69	2.30	14.5th	Aware
Constructivism	3(9)	16(32)	11(11)	52	1.73	20th	Not Aware
Cooperative Group	18(54)	10(20)	2(2)	76	2.53	11.5th	Aware
Resource Person	13(39)	11(22)	6(6)	47	1.56	21th	Not Aware
Programmed Instruction	7(21)	17(34)	6(6)	61	2.03	19th	Aware
Computer-aided instruction	23(69)	6(12)	1(1)	82	2.73	7.5th	Aware
Team Teaching	15(45)	11(22)	4(4)	71	2.37	14.5th	Aware
Mind Mapping	13(39)	8(16)	9(9)	64	2.13	16th	Aware
Brain Storming	24(72)	3(6)	3(3)	81	2.70	9th	Aware
Individualized Group	21(63)	8(16)	1(1)	80	2.67	10th	Aware

Table 1shows the weight mean of 2.0 was used and teaching methods with a weight mean of 2.0 and above are aware of those selected teaching methods but and teaching methods below that simply means that Biology tutors are not aware of such selected teaching methods.

Table 1 shows that the level of awareness among Biology tutors of the selected teaching methods was high. The tutors affirmed their knowledge of 19 out of 21 teaching methods listed in the study. The selected teaching methods that were categorized as not being aware of by Biology tutors were Constructivism and Resource person.

Research Question Two: Which selected teaching methods are being effectively utilized in secondary schools by Biology TutorsΩ

Table 2 Level of Utilization of Selected Teaching Methods by Biology Tutors in Minna Metropolis

UTILIZATION	N (3)	ST (2)	F (1)	WEIGHT SUM	WEIGHT MEAN	RANK	DECISION
Lecture	1 (3)	17 (34)	12(12)	49	1.63	20th	Not Utilized
Discussion	2(6)	17(34)	11(11)	51	1.70	19th	Not Utilized
Demonstration	4(12)	14(28)	12(12)	52	1.73	18th	Not Utilized
Experimentation	4(12)	20(40)	6(6)	58	1.93	11th	Not Utilized
Discovery	8(24)	19(38)	3(3)	65	2.17	6th	Utilized
Project	10(30)	4(8)	2(2)	40	1.90	13th	Not Utilized
Field Trip	12(36)	16(32)	2(2)	70	2.33	4th	Utilized
Problem Solving	13(39)	13(26)	4(4)	69	2.30	5th	Utilized
Vee Mapping	21(63)	7(14)	2(2)	79	2.63	1st	Utilized
Concept Mapping	16(48)	13(26)	1(1)	75	2.50	2nd	Utilized
Analogy	14(42)	13(26)	3(3)	71	2.37	3rd	Utilized
Simulation	6(18)	10(20)	1(1)	39	1.85	16th	Not Utilized
Constructivism	2(6)	21(42)	7(7)	55	1.83	17th	Not Utilized
Cooperative Group	11(33)	12(24)	7(7)	64	2.13	7th	Utilized
Resource Person	2(6)	14(28)	14(14)	48	1.60	21th	Not Utilized
Programmed Instruction	4(12)	12(24)	4(4)	40	1.90	13th	Not Utilized
Computer-aided instruction	8(24)	16(32)	6(6)	62	2.07	8th	Utilized
Team Teaching	5(15)	12(24)	2(2)	41	1.95	10th	Not Utilized
Mind Mapping	9(27)	5(10)	3(3)	40	1.90	13th	Not Utilized
Brain Storming	10(30)	8(16)	12(12)	58	1.93	11th	Not Utilized
Individualized Group	10(30)	9(18)	11(11)	59	1.97	9th	Not Utilized

From Table 2 the weight mean of 2.0 was used and teaching methods with a mean above the weight mean of 2.0 and above means that Biology tutors are aware of that teaching method but teaching methods below that simply means that the selected teaching method sare not being utilized by Biology tutors

Table 2 reveals that only 8 out of 21selected teaching methods are being effectively utilized by the majority of Biology tutors. The selected teaching methods being utilized by Biology tutors are Team Teaching, Computer Aided Instruction, Cooperative Group, Analogy, Concept Mapping, Vee Mapping, Field Trip, Discovery, and Problem Solving. The remaining 13 selected teaching methods were not being effectively utilized by Biology tutors.

Hypothesis One: There is no significant difference between qualified and unqualified Biology tutors in the utilization of selected teaching methods.

Table 3 Summary of t-test Analysis of Level of Utilization of the Selected Teaching Methodsbetween Qualified and Unqualified Biology Teachers

Group	N	Mean	SD	df	T	p-value
Qualified	25	72.65	5.99	28	1.15^{NS}	0.29
Less Qualified	7	71.29	8.24			

NS: Not Significant at P> 0.05
Note: Qualified Biology tutors are tutors that are specially trained to teach Biology either at the B.Sc. (Ed.), M.Sc. (Ed.) or PhD. levels or those who are trained in Biology or other related field but have professional or educational qualification that can enable them teach Biology.

Table 3 testing hypothesis one at significant level of 0.05 and df of 28, a t-value of 1.15 which is not significant at 0.29 was obtained. Since the P – value of 0.29 is higher than the fixed value of 0.05 then it can be said that the observed mean difference in the utilization level between qualified and unqualified Biology tutors is not significant. Thus, it can be concluded that there is no significant difference between qualified and unqualified Biology tutors in the utilization of selected teaching methods.

Hypothesis Two: There is no significant difference between experienced and un-experienced Biology tutors in the utilization of selected teaching methods.

Table 4: Summary of t-test Analysis of Level of Utilization of the Selected Teaching Methods between Experienced and Un-ExperiencedBiology Teachers

Group	N	Mean	SD	df	T	p-value
Experienced	1	84.00	0.00	28	0.00^{S}	0.00
Un-Experienced	29	71.93	6.17			

S: Significant at P< 0.05
Note: Experienced Biology tutors are tutors who have taught for 6 years and above while un-experienced Biology tutors are tutors who have taught for less than 6 years.

Table 4 testing hypothesis two at significant level of 0.05 and df of 28, a t-value 0.00 which is significant at 0.00 was obtained. Since the P – value of 0.00 is less than the fixed value of 0.05, then it can be said that the observed mean difference in the utilization level between experienced and un-experienced Biology tutors is significant. Thus, it can be concluded that there is a significant difference between experienced and un- experienced Biology tutors in the utilization of the selected teaching methods.

Discussion of Results

From the results, it was reveal that the awareness of Biology tutors on the various teaching strategies specifically those used in these work is high. This finding is in agreement with the findings of Njoku (2004), Regina et al. (2010) and Ukoha and Ukoha (2009) which have all reported that the level of Biology teachers 'awareness of selected teaching methods is relatively high. It was also discovered that only 8 out of 21 teaching methods have weight mean of 2.0 and above which is an indication of effective utilization of such teaching methods, the remaining 13 teaching methods are not effectively utilized. This finding is supported by Ukoha and Ukoha (2009) and Regina et al. (2010) who finding reveals that though most Biology teachers are aware of the various teaching, the extent of its utilization is low. This study also reveals that there was no significant difference in the level of utilization of selected teaching methods between qualified and less qualified Biology tutors. It is clear that the difference in the mean of qualified and less qualified is not much which implies that qualified Biology tutors do not utilize more effectively the teaching methods than the less qualifies.

This finding is in disagreement with Regina et al (2010) whose study reveals that qualified tutors utilize the selected teaching methods significantly better than less qualified tutors. Finally, this study reveals that there was a significant difference between experienced and less experienced Biology tutors in the level of utilization of the selected teaching methods. It could be observed that the mean utilization of experienced Biology tutors is greater than that of the less experienced Biology tutors. This implies that experienced Biology Tutors have greater utilization of the selected teaching methods than that of the less experienced Biology Tutors. This finding is in agreement with that of Regina et al (2010) but in disagreement with Njoku (2004) who argued that the experienced science teachers (Biology inclusive) create science classroom environments that are similar to what could be expected of science teacher trainees that are entering the classroom to teach for the first time.

Conclusion

Based on the research findings as related to the hypotheses formulated and tested, the following conclusions were made: it was established that there is no significant difference between qualified and unqualified Biology tutors in the utilization of selected teaching methods. Similarly, it was also noted that there was a significant difference between experienced and un-experienced Biology tutors in the utilization of the selected teaching methods.

Reference

Abimbola, J. O. (1994). A Critical Appraisal of the Role of Laboratory Practical Work in Science Teaching in Nigeria. *Journal of Curriculum and Instruction,* 4(1&2), 59-65.

Alant, C. E. (2004). The Effect of Three Teaching Methods on Students Academic Achievement in Chemistry. *Post-Script,* 5(1), 70-81.

Alli, A. (1975). Effect of Laboratory Classes on Motivation and Level of Achievement in Physics in Nigeria Secondary Schools.*http://www.unilorin-educing/journals.education*.

Augustine, O. (2013). An Analysis of the Perceived Challenges faced by Student – Teachers during Teaching Practice Exercise.

Association of Science Teachers of Education.(2004). Position Statement; Science Teacher Preparation and Career-long Development.

Boyo, A. (2006). Identifying Problems Associated with Studying of Physics in Lagos State, Nigeria. http://www.narusto-u.ac.jb/db/shuushi.

Chukwuemeka, A. A. (1985). Science Teachers' Shortage in East Central State: Responsible Factors. *Journal of Science Association of Nigeria,* 13, 9-11.

Cambridge Advanced Learners Dictionary, 2016. Definition of Science Explorable.com, (2009). "Definition of Science"

Federal Ministry of Education. The development of education 1994 – 1996. National report of Nigeria. International conference on education, 45th session, Geneva, 1996.

Guardian News, 3rd March, 2009. Definition of Science.

Gambari, I. A. (2004)&Ezenwa,(2005): No significance Gender difference

Abimbola, I. O. (1994) "A Critical Appraisal of the Role of Laboratory Practical Work in Science Teaching in Nigeria" 4, (1&2), 59-65.

Ogumogu, A. E (2011). An assessment of the current state of Physics Education in Edo State.Unpublished M. Ed project, Department of Educational Psychology and Curriculum Studies, Faculty of Education, University of Benin, city.

Oxford Dictionary, 2016. Definition of Science.

Pavlov, I. P. (1897/1902). *The work of the digestive glands.* London: Griffin.

Pavlov, I. P. (1928). *Lectures on conditioned reflexes*. (Translated by W.H. Gantt) London: Allen and Unwin.

Pavlov, I. P. (1955). *Selected works*. Moscow: Foreign Languages Publishing House.

Regina, M.O., Anchor, E. E. &Ogbeda, J. A. (2010). Teachers Awareness and Utilization of Innovation Teaching Strategies in Secondary School Science in Benue State, Nigeria. Educational Research, 1(2), 32-38.

Sheldon, G. 1997. "Religion & Science-the Best of Enemies, the Worst of Friends" Ukoha, U. A &Ukoha, E. (2009). Utilization of Instructional materials among Vocational Subjects. InPrimary Schools in Obudu Local Government Area. *Journal of Research and Curriculum Teaching, 4(1), 343-354.*