
BIOLOGY TEACHER'S ATTITUDES TO IMPROVISATION OF MATERIALS FOR TEACHING BIOLOGY IN THE SENIOR SECONDARY SCHOOLS ILORIN.

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***Abstract:** The purpose of the study was to identify and explain the attitudes of biology teachers to improvisation of instructional materials in the secondary schools located in Ilorin town. In specific terms, the objectives of the study were to: (i) ascertain the level of improvisation achieved by biology teachers; (ii) establish the nature of teachers attitudes to improvisation of learning materials; (iii) find out whether sex and experience of the teachers, as well as ownership and age of the school are important determinants of the attitudes of biology teachers to improvisation. After a broad background review of the related literature, a descriptive a research design with the survey method was adopted for the study. A researcher designed questionnaire was administered on the nineteen biology teachers were purposively selected from a random or ten senior secondary schools. Their responses were used to answer the five research questions and test the four null hypotheses raised in chapter one. Findings from the study included the following: (i) the level of improvisation of instructional materials among biology teachers in the senior secondary schools in Ilorin town was just average though the female teachers had a higher level of improvisation; (ii) Both the male and female biology teachers had a higher level of improvisation; (iii) Biology teachers in the private schools; those in the old schools and those with more experience had positive attitude to improvisation of instructional materials.*

Keywords;

The following key terms were operationally defined as follows:

Improvisation: Improvisation is the art of using instructional materials either collected from the local environment or those designed and constructed by the teacher. An improvised instructional materials is a substitute for factory-made instructional materials which is not available

Biology: Biology is one of the science subjects taught in the senior secondary schools. The biology curriculum provided by an agency of the Federal Government is broken into topics (called syllabus) to be taught in the schools.

Attitude: attitude is a person's predisposition to act in a certain way to an object or person. Teachers' attitude to improvisation of instructional materials is teacher's tendency to want or not want to engage to the task of improvising of instructional materials in biology.

INTRODUCTION

Background to the Study

Improvisation is the art of replacing some sophisticated and expensive materials with those made by the teachers and student to achieve the objectives of teaching (Malto and Binimote, 2010). Improvisation is the substitution or creation of cheap and simple alternatives by the teacher or his nominee. It is an act of using any production of similar or near similar forms to the actual instructional materials in order to facilitate teaching learning (National Teachers' Institute, NTI 2008), Olatona (2008) defined improvisation as a means of providing a very close substitute of an item when for reasons of availability in, size, cost, and handling risk, the real object cannot be made available in the classroom for instructional purpose. Balogun (1980) divided instructional materials into two: level one comprises those which are termed technology in education, characterized by the audio-visual aids. Teaching functions are enriched and supplemented by the array of teaching machines that under control of the teacher. Level two is termed technology of education. It is characterized by a systematic approach based on clearly stated learning objectives. Technology in education and technology of education are usually fused together to maximize the process of teaching and learning using available material. Improvisation is categorized in two, namely role substitution and role stimulation. The former involves little modification of the original item before it can be used to fulfill the new function. An example using glass tumbler as beaker, later involves a construction of an item or apparatus to meet a need which for reason of cost and/or availability cannot be met by commercially produced ones (Olatona, 2003, Olatona 2008). Examples are the digestive system and alimentary canal. According to Funtā (2003) a common problem science

teaching in the secondary school is lack of adequate instructional material. Practical work with ill-equipped laboratories is difficult, but not impossible if the teacher comprises. Improvisation in science teaching embrace alternatives, materials, equipment and apparatus to facilitate instruction whenever there is a lack or shortage of first hand materials equipment and apparatus.

Many investigations claimed that many factors are responsible for teachers attitudes toward improvisation for one thing, teachers have little or no knowledge of what to improvise (Sanwa, 1985) gender factor also important in improvisation. Female teachers succumb to the belief that improvisation is a tedious tasks, Odunsin (1984) believed that science teacher's attitudes towards improvisation play a major role in determining students' academic performance. When a science teacher shows a positive attitude to science teaching and improvisation of instructional materials, the students are rose and science learning ceases to be difficult, remote, irrelevant and meaningless. Bomide (1980) opined that in a period of economic recession, the teachers need to take improvisation seriously. Aganga (1981) pointed out that the poor performance of students in biology practical is attributable to teachers' negative attitude to improvisation. Also Ali (1983) found that teachers positive attitude to improvisation in laboratory classes goes a long way to helping students to attain higher levels of learning in science.

MATERIALS

Meaning and Nature of Improvisation

Adeyanju (2000) define improvisation in teaching as making judgment about what to do with a piece of material or equipment in the classroom to solve a scientific or technological problem. It means finding alternatives that will still function as the unavailable idea resources. Improvisation it potent in reducing abstraction of concept in science, Improvisation is the act of using material obtainable from the local environment or designed by a teacher or with the help of local personnel to enhance instruction (Kamoru & Umeano, 2006). Iheigbulem (2007) he defined improvisation as the act of substituting for the standard equipment or instructional material not available with locally made equipment. Landu (2000) in his own view defined improvisation as the act of using alternative teaching aids to enhance teaching and learning process. Likewise, Hodgson (1999) believe that it is a more difficult word to define than literature. Improvisation can be viewed as

substituting, replacing or altering creative arts material for a particular function.

There are three forms of improvisation:-

- i. Mere replication: Bomide (2008) refers to this role stimulation involving actual construction of apparatus as an imminent measure.
- ii. Visual aid representing reality.
- iii. Demonstration of unique and alternative arrangement of equipment and materials to reach concept principle or generalization.

Mkpanane (2005) opined that an improvised material must essentially serve the purpose for that which it is intended to serve. It is not just providing a piece of material as substituted of what is not available. Balogun (1982) said biology is peculiar among the science subject, in being a subject in extensive improvisation is possible and far most of which only little technical skill is involved. This means that biology as a subject is activity oriented and the teaching of biology without learning material will certainly result to poor performance in the course. In the nature of improvisation, Onasanya (2008) noted that improvisation demand adventure, creativity and perseverance

Concept of Instructional Materials

Resources material otherwise known as Learning Instructional Materials (LIMS). Occupy a central theme in the teaching/ learning process they could also be referred to as educational media, instructional technology, media technology or teachings aids as it is most commonly called by classroom teacher. According to Abimbade (1997), resources materials are "Whatever materials used in the process of instruction". They are a broad range of resources which can be used to facilitate effective instruction. They indicate a systematic way of designing, carry out and evaluating the total process of learning and communication and employing human and non human resources to bring out a none meaningful and effective instruction (NTI, 1990). In the other word, resource material are those human and non-human resource that are considered as indispensable requirement in the teaching/ learning process. They are indeed those educational resource, materials, item or equipment personal and infrastructure in the form audio-visuals, print, or no print, projected or non-projected and other forms of

telecommunication gadgetry- radio television video, Tape recorder (VTR) and the like (percival & Ellintion, (1984). The productions of these resource have been made easier in recent time due to the rapid development in modern technology. Despite this however, it is interesting to note that teacher are almost ignorant of the availability and the relevance of these resource (N.E.R.C 1971). It is indeed paramount for these involved in the leaning process to get acquainted with these resources so as to be meet the recent in their profession. The classification could also be made according to the dimension of the resource. It could also be classified on term of wares: hardware's and software's classification also exist according to requirement for application in the classroom, i.e. non-projected and projected materials. sometimes too, it take the from of non-print, print and electronic material as other classification. (Kurange, 2001).

Whatever the grouping or clarification, it is paramount to know which resource material appeal to which sense (s). This will further help it's to chose the resource that will appeal to as many of the sense as possible for the teaching. Basically, the two main senses through which we gain most of our knowledge are those of sight and hearing. That however is not to say that other senses- touch, smell and taste could not reinforce the others.

Science Status of Biology Materials in Schools

Okonkwo (2000) in his earnest research on some problems of science education in Nigeria, he stated that many secondary schools the laboratory was luxury as a "scared shrine". Abdullahi (1983) in his survey of existing faculties for teaching biology in various Nigerian school of senior secondary school biology syllabus involves a lot of practical works, this requires a more equipment and materials or effective learning and students achievement. Ayinde (1997) stressing the view of Ugonabo and Ogwo (1991) classified instructional materials into four groups namely: visual, Auditory and stimulation. Asenmga (1981) commented that if science is to be taught in schools, students should be taught practically. Thus, effective teaching of biology, laboratory cannot be left out. Since it provides the students, opportunity of being engaged in the process of investigation, hence the management of scientific discovery. Therefore, it is clear that without the biology laboratory, most school practical cannot be conducted meaningfully and hence learning of biology will not be completed. Animola (1989)

observed that lack of relevant textbook, the scarcity of relevant, readable, costly; under stable textbook in Nigeria is an open secret that affects students performance. Ige (2000) wrote that science teaching/learning could be meaningful and effective if backed by the necessary resources to enrich instruction.

Identify the needs of Improvisation of Simple Science Material

It is relatively easy to devise materials for primary and secondary local science materials, at the same time it is much harder to generate science teachers enthusiasm for and confidence in improvisation. In spite the aforementioned improvisation should not be seen as no go area for the showing advantage as given by Allsop (1991) thus:-

- i. It is cheaper so there is more apparatus available for individual or group experiments, in addition to teacher demonstrations.
- ii. Concern over loss, breakage and repairs, is reduced, therefore, equipment is more frequently used.
- iii. Students are made aware of the scientific principles applied to everyday things, not just special and sophisticated apparatus imported from abroad.
- iv. Attention is drawn to the need to estimate accuracy
- v. A classroom can often be used if a laboratory is not available
- vi. Simple equipment encourages students to make good use of local resource.
- vii. Simple equipment often demands an understanding of basic principles rather than follow a set of complex experimental instruction (Funtuwa, 2003)

The Condition of Improvisation

The need for improvisation cannot be over emphasized. Allsop (1991) identified conditions that hesitate for improvisation in school.

Finance: When a school budget is inadequate for the purchase of scientific equipment needed for instructional purpose, some other provision has to be made. In these days galloping inflation and rising enrolment of students, most schools cannot provide enough money to meet the demands of the science department

Shortage in the supply of equipment:- Even if money were to be available, it is possible to have a situation in which the apparatus/equipment are not of stock.

Emergency:- It may happen that an equipment or material got damage the course of its usage. A resourceful teacher will not abandon the experiment, but rather think of improvising some thing in place of it.

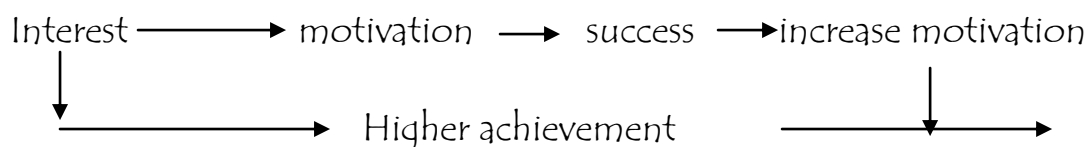
Teaching strategy:- Many science teachers realize that equipment for introductory work in science need to be factory made, nor do they have to be high precision in their utility (Funta, 2003)

Teachers' Attitudes to Improvisation

The standard of the teacher is the backbone of any educational system for developing scientifically literate citizen. The national policy on education (FRN, 1998), notes that no educational standard can above the quality of the teacher (p.38). The National Science Education Standards (National Research Council, 1996) also asserts "What students learn is greatly influenced by how they are taught" (p.38) Abimbola (1986) and Otuka (1987) found misconception in students which they traced to misconception held by the teachers. Therefore, students cannot achieve high level of performance in the absence of skilled, knowledgeable, talented and dedicated professional teachers. Teachers have been shown to have an important influence on students' academic achievement and they also play a crucial role in educational attainment because they are ultimately responsible for translating policy into action and principle based on practice during interaction with the students (Afe 2001). Many investigations claimed that many factors are responsible for teachers' attitude towards improvisation. Since scholars such as Sanwa (1985) argued that teachers at times have little or no knowledge of what to improvise. He said for secondary school students to obtain high performance, the teacher has to possess high qualities. He opined that gender also imitates on how the teacher will impact the knowledge to their students. Female teachers concur to the belief that improvisation is a tedious task, that only male teachers are the most responsible to take care of the task. Meanwhile, the scholar sees the job as a collective task, where both male and female teachers should take part. Odunsin (1984) states that science teachers' attitude towards improvisation plays a major role in performance of the

students. The opined that, teacher with positive attitude arouse students and science and learning become ease. When students interest is stimulated, he became motivated and this motivation lead him or her success, which could eventually lead to increase motivation and this lead to higher achievements in turn leads back to interest.

The research drew a chart flow and it is illustrated below.



Adediran (1985) in a study of self-concept investigated the relationship between how teachers perceive themselves and effect on the academic achievement. In this investigation a number of very important results emerged. The first result is that there was a negative and non-significant relationship between self concept and teaching achievement of female teacher. This means that the female teachers perceive themselves an in capable in handy some aspect that involve or need improvisation as it lead to poor performance of the students. Igbalajobi (1985) after conducting an investigation into teacher attitude toward improvisation stated that factor such as ability hard work, task and luck are the base to the successful an positive to science teaching while unsuccessful one can be tag with external factor such as incompetent, negative, low self system and environmental factor.

According to Tomori (1987) teacher having positive attitude to improvisation can be in tune with the available resource within the environment. This means that be it any number of teacher having right attitude to improvisation have the resources of hand, only a few teacher can go-a-mile to found resources to improvise. Meanwhile Bajah (1996) in his studies revealed that teacher attitude toward improvisation a times based on culture of the school is one of the many variable that affect the teachers taught or motivation towards improvisation, for instance schools that belong to missionaries impede creating or moulding an image, the sees it as creating an ideal environment. He also observed that money constrain also contribute and determine teachers' behavior to improvisation. He attributes

this to lack of funding from stake holder to support the teaching/learning and development of practical class.

Some of the teachers' attitude to improvisation of teaching biology in senior secondary school are listed below such as:-

1. Teachers have more confidence in themselves with teaching using improvisation (Positive)
2. Teachers avoid topic that require the use of improvise materials (Negative)
3. Teachers are able to teach every topic with ease using improvise material (Positive)
4. Teachers are no longer anxious to teach biology because of topics that require improvisation (Negative)
5. Teachers don't use improvised material at all (Negative)
6. Teachers are no longer conversant with standardized material (Negative)
7. The use of improvised materials make job interesting as a biology teacher (Positive)
8. Improvisation of material makes teacher to be more creative (Positive)
9. By using improvisation of materials, students are motivated to teaching/learning, therefore it is encourage by teacher to engage in using improvise material (Positive)
10. The availability of the resource material within the environment encourage the teachers to go for local material for improvisation (Positive)

METHODS

This page explains the procedure used in the course of the study under the following sub-headings; Research Type, Sample and Sampling Technique, Research Instrument, validation of research instrument, procedure for Data collection and procedure for data Analysis.

Research Type

This study is a descriptive research using survey method. The designed makes it possible to collect data for large population. This is it has capacity for under application and broad converge. There is economy in data collection due to focus provided by standardized question. Only questions that are of interest to the research are asked, recorded codified and analyzed.

Sampling and Sampling Techniques

The population for the study consisted of secondary school biology teachers in Ilorin of Kwara State Nigeria. Twenty (20) Biology teachers in senior secondary school were selected purposively, where two teachers, will be from each school. Twenty teachers (Male & Female) that were selected are listed in Appendix 1

Instrumentation

The instrument used for this study was a researcher-designed questionnaire. It consisted of three sections. The first section elicited information on teachers' biographical background: sex, experience, school type and school age. Section two asked teachers to mention the number of learning materials they produced or collected the previous term. The third section was an attitude scale with three alternative responses: agreed (3) Unsure (2) and Disagree (1).

Procedure for Data Collection

The questionnaire was personally administered to the biology teachers. Also, the total number of questionnaires taken to each school was collected. This is because the researcher collected the questionnaire from the biology teachers as soon as they finished filling them. During the administration of the questionnaires, teachers were instructed to fill the column independently without consulting with their colleagues. The impression that they were involved in a research was not created, thereby minimizing fear and biased response. At the end of the exercise nineteen (19) biology teachers returned usable questionnaires.

RESULT

The following findings emerged from the analysis of data:

- i. On the assumption that a biology teacher should construct or collect twelve instructional materials in a term, it was discovered that the level of improvisation among the female teachers was 67%. The corresponding percentage for the male teachers, was 50%. On the whole the level of improvisation was slightly above average.
- ii. The male teachers had positive attitudes to improvisation. Also the female teachers had positive attitudes to improvisation of instructional materials.

- iii. Biology teachers in the public secondary schools had neutral attitudes, while their counterparts in the private secondary schools had positive attitudes to improvisation.
- iv. Biology teachers in the old secondary school held positive, while those in the less experienced biology teachers held neutral attitude, while the more experienced ones had positive attitudes to improvisation.
- v. The attitudes of male and female teachers to improvisation were not significantly different.
- vi. The attitudes of (i) Teachers in the old and young schools; (ii) Teachers in the public and private schools and (iii) Those less and more experienced were significantly different.

DISCUSSION

It was discovered that the level of improvisation was just average. This result is not surprising given the low morals and poor job satisfaction that secondary school teachers work under in Kwara State (Mohammed, 2013; Unegbu, 2014). Also Danjuma (2004) in a study of the level of improvisation of learning materials in Biu and Havrul LGAS of Borno State reported low level. Both the male and female teachers held positive attitude to improvisation of instructional materials. This is not in line with the finding of Olutona (2008) that male and female teachers had negative attitudes to improvisation in physics, a science subject like biology. Ownership of school, age of school and experienced levels of biology teachers had significant determinants of the attitudes of biology teachers to improvisation. Again this is not in support of Olutona's study (2006) in the case of secondary school physics teachers in the state of Osua. The attitudes of public school teachers of biology, those of teachers in the young schools as well as attitudes of the less experienced teachers were found to be neutral. This reminds one of the findings of Sanwa (1985), Igbalajobi (1985) and Bajah (1996) that some teachers had negative or non-challant attitude to improvisation. This they said was due to the fact that some teachers regarded improvisation as a tedious task. Some were clearly incompetent and others had low self-esteem.

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TABLE 1: T-TEST ANALYSIS OF MALE AND FEMALE ATTITUDES OF BIOLOGY TEACHERS TO IMPROVISATION

Variables	N	Mean	Dtf Dev	Df	t-cal	t-tab	Decision
Male	6	2.5	0.5	17	1.80	2.093	Ho not rejected
Female	13	2.7	0.3				
Total	19	Significance level = 0.05					

The calculated t (1.80) is less than the tabulated t (2.1) at degree of freedom (df) = 17 and significance level of 0.05. Therefore the calculated t is not significant. He null hypothesis is not rejected. There is no significant difference in the attitudes of male and female teachers to improvisation of instructional materials. Their attitudes are positive in both cases.

Null hypothesis 2 (HO²): No significant difference exists in the attitudes of biology teachers in private and public secondary schools.

Table 8 was used to test the hypothesis.

TABLE 2: T-TEST ANALYSIS OF THE ATTITUDE OF BIOLOGY TEACHERS IN PRIVATE AND PUBLIC SCHOOLS TO IMPROVISATION.

Variables	N	Mean	Std Dev	Df	t-cal	t-tab	Decision
Public Teachers	7	2.0	0.5	17	2.20	2.093	Ho not rejected
Private teachers	12	2.5	0.3				
Total	19	Significance level = 0.05					

The calculated t (2.02) is greater than the tabulated t. (2.1). therefore the calculated t is significant. Thus the null hypothesis is rejected. There is a significant difference in the attitudes of biology teacher in public and private secondary schools. The teachers in the public schools held neutral attitudes; while those in the private schools held positive attitude.

Null hypothesis 3 (HO³): The Attitude of biology teachers to improvisation in the old and young secondary schools are not significantly different.

TABLE 3: T-TEST ANALYSIS OF ATTITUDES OF BIOLOGY TEACHERS IN OLD AND YOUNG SCHOOLS TO IMPROVISATION.

Variables	N	Mean	Std Dev	Df	t-cal	t-tab	Decision
Public Teachers	7	2.7	0.050	17	2.48	2.093	Ho not rejected
Private Teachers	12	1.3	0.31				
Total	19	Significance level = 0.05					

The calculated t (2.48) is greater than the tabulated t (2.1) is significant. Therefore the null hypothesis is rejected. There is a significant difference in the attitudes of teachers in the old and young schools. The attitude of biology teacher in the young school was negative, while that of teachers in the old schools was positive.

Null hypothesis 4 (HO₄): There is no significant difference in the attitude of more experienced and less experienced biology teachers to improvisation of instructional materials.

TABLE 4: T –TEST ANALYSIS OF ATTITUDES OF LESS AND MORE EXPERIENCED BIOLOGY TEACHERS TO IMPROVISATION

Variables	N	Mean	Std Dev	Df	t-cal	t-tab	Decision
Public Teachers	12	1.9	0.2	17	2.80	2.093	Ho not rejected
Private Teachers	7	2.8	0.8				
Total	19	Significance level = 0.05					

The calculated t (2.80) is greater than the tabulated t (2.1) that means that the calculated t is significant. Therefore the null hypothesis is rejected. There is a significant difference in the attitudes to improvisation between the less and more experience teachers.

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