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ABSTRACT

The study assessed teacher's use and construction of improvised instructional materials in Science Education in Lagos State of Nigeria. A Survey research method was adopted in carrying out the study. The population of the study included; both science teachers and students in Surulere Education district of Lagos. Three research questions were developed to guide the study. A questionnaire was designed and administered on 50 and 200 science teachers and students in Surulere educational district of Lagos State. Data obtained were analysed using descriptive statistics-frequency, percentages and mean. The result of the findings revealed that most science teachers do not improvise instructional materials nor use improvised instructional materials in the teaching of sciences in schools. Finally, the study identified some major constraints to effective construction and utilization of instructional materials by science teachers to include; poor funding, time constrain on the part of those teachers, lack of creativity among teachers, poor improvisation skills, etc. Based on the findings recommendations were made.

1. INTRODUCTION

In line with Science education reforms and in recognition of education on enhancing sustainable development the United Nations declare 2005 to 2014 the Decade of Education for sustainable development. Despite widespread acceptance of this declaration the struggle to achieve this in science classroom faces contradictions. Many Nigerian schools face the crises of Lack of adequate equipments/teaching materials for effective hands-on and mind-on activities. Akpan (2008) documented a number of factors from Okoye (2002) which militate against advancement of science education. Among the factors highlighted were lack of adequate textbooks and lack of funds to purchase equipment. Thus as Nigeria schools and teachers face the challenges of providing positive learning environment, the need to improvise material resources for innovative teaching practice cannot be overemphasised.

Improvised materials offer a substitute of the original which by their qualities are better adapted to the nature of human thinking than the original because students think better with the familiar improvisation in the making of substitutes from local materials found at home or school premises where the equipment is not available. The improvised materials usually convey special instructional messages just as the original materials (NTL, 2007). Instructional materials are especially important in science education because successful implementation of science curriculum depends to a large extent on available instructional materials (Offorma, 1994). According to Bekitu (2000), Instructional materials comprise theoretical, practical and skill oriented resources which facilitate the learning acquisition and evaluation of Vocational/technical skills. Instructional materials are useful in the classroom because they minimise the use of theory and verbalisation. Gilbert, Justice and Arsela (2003), observed that improvised

materials for example models in science education function as a bridge between scientific theory and the world as experienced “the reality”. The idea of improvisation may be likened to the use of analogical models which enhance investigation understanding and communication (Harrison and Treagust, 2000).

Improved materials in science are usually accompanied by specific activities that are relevant, meaningful and significant to the teaching at any given time. Hence, improvised instructional materials encourage active participation of students in the learning process. Kinschner, Sweller and Clark (2007), opined that students develop abilities in communication, leadership ethical decision-making and critical thinking if they are actively engaged in the learning process. Even when dealing with printed text and illustrations, learners are actively engaged in the process of selecting, organising and integrating relevant information on the appropriate instructional material (Mayer, 2003).

The importance of active learning in molecular biology instruction as opposed to passive use of illustration was emphasised by researchers such as Rode (1995), Rogerson and Cheney (1989). They pointed out that illustrations often failed to offer adequate explanation of concept in molecular genetics while creation of models by students succeeded in engaging them actively as well as enhanced their understanding on the topic.

Instructional materials may be placed under four main classifications:

- according to technological level
- according to the sense they stimulate
- as projected media
- as print and non print media.

Several authors have researched on the importance of using any/all forms of instructional material for students’ achievement in science and mathematics. Usman and Adewunmi (2006) studied on factors responsible for inability of teachers to improvise instructional materials for mathematics; Madumere (2004) wrote on creativity/improvisation of instructional materials in teaching environmental concepts. Wasagu (2000) carried out a study on improvisation as a good source of enriching science lessons. Njoku (2000) wrote on the training of science Technology and Mathematics Teachers for improvisation. According to Njoku teachers are not adequately equipped with the skills in improvisation of teaching materials. These researchers have no doubt placed emphasis on the need to improvise to supplement for inadequate supply of instructional materials in Nigeria schools. Therefore, the extent of implementation of improvisation of instructional teaching and learning materials remains an area of scrutiny if science educations in Nigeria will meet the challenges of the decade

2. PURPOSE OF THE STUDY

The main purpose of this study is to assess teachers’ use of improvised instructional materials in science education. Specifically the study will examine;

1. The extent to which science teachers improvise instructional materials
2. The extent to which improvised instructional materials are being utilized for science teaching
3. The challenges of effective utilization of instructional materials by science teachers in Nigerian Schools

3. RESEARCH QUESTIONS

1. To what extent do science teachers improvise instructional materials?
2. To what extent are improvised materials are being utilised for science teaching in schools
3. What are the major challenges for effective utilization of instructional materials by science teachers in Nigeria schools

4. METHODOLOGY

4.1 Research design

The survey research method was employed in this study. This will be geared towards the collection of data on Teachers use of improvised instructional materials in science Education. This method was deemed the most appropriate design for this study because it involve selecting chosen samples from a large population to discover the relative incidence distribution and interrelations of some important variables.

4.2 Population

The population of the study comprise all secondary school science students and science teachers in Lagos State.

4.3 Sample size and Sample Technique

The subjects of the study were 200 Science Students and 50 Science Teachers selected randomly from Surulere Education district. The schools used for the study were; Aguda Grammar School Surulere, Surulere Girls Secondary School, Itolo Girls Secondary School, Government College Ericmoore and Coker Secondary School all in Surulere Educational District. 40 Science Students and 10 science teachers were chosen from each of the school for study. In all, 250 respondents formed the sample size.

4.4 Research instrument

Questionnaire designed by the researchers was used for data collection. The questionnaire was divided into two sections: A and B. Section A contains the demographic information of the respondents while section B is a close ended questionnaire designed to elicit the kind of information that is relevant to the research questions. The responses was analyzed using, likert scale of preferences in descending order, rated strongly agree attracting a score of four; agree; a score of three, disagree; a score of two, and strongly disagree a score of one.

4.5 Validity and Reliability of Instruments

The content and face validity of the instrument used was carried out by expert drawn from the University of Ibadan. The experts made necessary corrections and constructive criticisms which were useful for the preparation of the final draft of the questionnaire. A pilot study was later conducted with 50 Science students and 10 Science teachers from Akoka High school. With respect to reliability of the instrument, Crombach test of reliability method was employed in ascertaining the internal consistency of the instrument and the internal consistency coefficient of reliability was established at .85.

4.6 Procedure

The researchers personally administered the questionnaires to the subjects and patiently waited for them to fill their responses. The filled copies of the questionnaire were promptly collected from the subjects as soon as they were through with their responses. The 250 copies of the questionnaires administered were completely retrieved.

5. Data analysis

In analyzing the data, descriptive statistical method was employed using SPSS packages. The methods that were used include: percentage, frequency counts and mean. In discussing the result the responses was merged in two parts strongly agreed and agreed as (agreed response) while strongly disagreed and disagreed was merged as disagreed response.

6. RESULTS AND DISCUSSION

Table 1: The extent of improvisation of instructional materials by the teachers in schools

S/N	Item	Strongly Agree Freq (%)	Agree Freq (%)	Disagree Freq (%)	Strongly Disagree Freq (%)	X
1	Our teachers improvise instructional material when the need arise	26 (13%)	50 (25%)	34 (17%)	90 (45%)	2.06
2	My teachers brings real objects and charts to teach us in the class	12 (6%)	70 (35%)	52 (26%)	66 (33%)	2.14
3	We sometimes use our equipments/materials during our theory class	27 (13.5%)	43 (21.5%)	72 (36%)	58 (29%)	2.19
4	Improvised instructional material during our practical classes	24 (12%)	60 (30%)	53 (26.5%)	63 (31.5%)	2.23
5	Sometimes my teachers acquire and construct some visual media such as photographs, diagrams, posters etc organised by him to clarify his point	39 (19.5%)	50 (25%)	68 (34%)	43 (21.5%)	2.43

Note: figures outside parentheses are frequency distributions, (ii), figures in parentheses are percentage distributions

From the table above 62% of the respondents disagree that science teachers improvised instructional materials for the purpose of teaching their students. Collaborating with this Nwosu (2003) had earlier in a study on the problems of teaching science education in Nigeria, found out that the major problem of learning science subjects in school is that of unavailability of important materials and equipments required to explain some basic concept in science. He further pointed out that inability of science teachers to improvise where these materials are not available remains a critical issue that needs an urgent attention. In this vein 59% of the respondents, disagreed that science teachers replicates real objects, charts and other instructional materials in class to substitute real objects and equipments which they cannot provide or bring to the class. This result is evident that most science teachers don't have alternative when instructional materials are in-adequate or unavailable, instead of them to improvise, they resort to teaching of such courses without any instructional material thereby inhibiting the students' ability to comprehend very clearly.

Furthermore, 65% of the respondents disagree that the teachers sometimes use equipments available in school to teacher theory class while 35% of this students agree to this. Looking at item 4, 58% of the respondents disagree that science teachers construct and bring instructional material to practical class. This finding is line with Chukwukere (2007) who earlier pointed out that many secondary school teachers are not drilled in the act of improvisation of instructional material both at theoretical class or at the practical class in Nigeria secondary schools for lack of motivation or time constrain on their sides.

Table 2: The extent of utilization of improvised instructional materials by science teacher in schools (Students)

S/N	Item	Strongly Agree Freq (%)	Agree Freq (%)	Disagree Freq (%)	Strongly Disagree Freq (%)	X
1	Our science teachers hardly use instructional material during class teachings	52 (26%)	95 (47.5%)	17 (8.5%)	36 (18%)	2.82
2	My teachers believe that using instructional material delays his/her class	21 (10.5%)	110 (55%)	21 (10.5%)	48 (24%)	2.52
3	There is need for use improvised instructional materials even though they are not real object	14 (7%)	123 (61.5%)	50 (25%)	13 (6.5%)	2.69
4	It is only during practical that we use instructional materials	43 (21.5%)	108 (54.0%)	40 (20%)	9 (4.5%)	2.92
5	Our teachers use instructional materials when there external supervisors	39 (19.5%)	85 (42.2%)	50 (25%)	26 (13%)	2.68

Note: figures outside parentheses are frequency distributions, (ii), figures in parentheses are percentage distributions

Apart from improvisation of instructional material, effective utilization of such materials is another issue of concern in Nigerian secondary schools. Table 2 above shows that 73.5% of the respondents with average mean 2.82 agree that science teachers hardly use improvised instructional materials during their teaching. Off course this expected because they hardly produce one. Similarly, 65.5% of the respondents also feel that the uses of improvised instructional materials delay their classes which explain why majority of the science teachers don't use instructional materials during their teachings. On the need for the use of improvised instructional materials, 68.5% of the respondents admitted that there is need for use of improvised instructional materials even though they are not real object.

Again, the response for the use of improvised instructional material during practical received a positive response as 75.7% on of respondents admitted when available instructional materials are used during practical classes only. This finding is similar to that of Coombs (1970) who rightly pointed out that the resources can only be utilized when they are available and that there should be investment in this wise in educational institutions for proper utilization of materials resources and skills for effective teaching of science subjects. Apart from during practical, the students also admitted that improvised instructional materials are only used again when there is external supervisor or inspectors in the school, thus 62% of the students attested to this. This shows that generally, less than average number of teachers does produce material resources.

Table 3: The challenges for effective construction and utilization of instructional materials by science teachers in Nigeria schools (Teachers)

S/N	Item	Strongly Agree Freq (%)	Agree Freq (%)	Disagree Freq (%)	Strongly Disagree Freq (%)	X	Rank
1	There is no funding to acquire some of materials for constructing instructional material	13 (26%)	25 (50%)	10 (20%)	2 (2%)	2.98	2nd
2	Time constrain	11 (22%)	22 (44%)	10 (20%)	7 (14%)	2.74	5th
3	Lack of creativity among teachers	6 (12%)	29 (58%)	8 (16%)	7 (14%)	2.68	3rd
4	Lack of adequate training on improvisation has also been a major challenge	17 (34%)	23 (46%)	3 (1.5%)	7 (3.5%)	3.00	1st
5	Laziness on the part of most science teachers	9 (18%)	26 (52%)	4 (8%)	11 (22%)	2.66	4th
6	Lack of motivation	9 (18%)	20 (40%)	11 (22%)	10 (20%)	2.56	6th

Note: figures outside parentheses are frequency distributions, (ii), figures in parentheses are percentage distributions

From the table above, 76% of the respondents admitted that inadequate funding to purchase some the materials for construction of instructional material has been a problem to effective construction and utilization of instructional materials in secondary schools. Another major challenge of improvising science instructional materials identified in from the table above is that of lack of adequate training on effective improvisation of instructional materials which is ranked 1st with a percentage of agreed response of 80% and 3.0 average mean. This finding in an indictment on several efforts by Science Teachers Association of Nigeria (STAN) to train secondary school teachers on improvisation techniques in various science subjects, hence there is need to evaluate how far the effort of the association have been able improve the teachers to improvise instructional materials for effective teaching. Another major challenge faced by teachers in the effective construction of instructional materials may be that of lack of creativity among Nigeria science teachers. Thus 70% of the respondents with an average mean of 2.68 admitted that Nigerian teachers are not creative enough to improvise instructional materials when needed most. Onwumere (2006) pointed out that creativity is hard work. Those teachers who introduce and implement exciting and innovative approaches to their daily lessons do so only after extensive planning and preparation. If creativity is working hard at applying our knowledge, and if it is working consistently to utilize our talents, then creativity can better be understood by looking at what we do in a different light. Teacher must first express a willingness to change their approach to teaching while making effective utilization of instructional materials through improvisation.

Again, 70% of the respondent also admitted that most science teachers are too lazy to improvise. Other challenges identified by the study include; time constraints (66%) with a mean difference of 2.74, off-course the result is not surprising as most Nigeria teachers are involve in one business or the other which made it impossible for them to have enough time to think of other things help the students. Lack of motivation ranked 6th position also has 58% response on the agreed side with an average mean of 2.56. This finding is similar to Fayemi, (1991) who sees lack of motivation and inability of schools to fund projects as a major setback for teachers to improvise

7. SUMMARY OF FINDINGS

From the result on extent science teachers improvise instructional materials in schools (table 1), it can be deduced that most science teachers do not improvise instructional materials. In most cases they teach without basic instructional material thus making it more difficult for students to understand. According to Maduabum (1999), instructional materials improvised should not be used for mere decoration rather it should be used to explain, describe, discuss and clarify; concepts, events, people, points, skills, attitude or idea in order to make the learners understand, retain and recall a greater part of what they were taught. However, it is a different case in our schools today because of inability of both government and the teachers to provide this.

Table 2, also shows that most science does not use improvised instructional materials in the teaching. This may be because they cannot give what they don't have. This is because most science teachers cannot improvise hence cannot use improvised instructional materials for classes and lessons. Apart from this, the time allotted for science subjects are most often too small to make any meaningful impact in the teaching not to talk of using other material.

On the other hand, table 3 identified some major constraints to effective construction and utilization of instructional materials by science teachers to include; poor funding, time constrain on the part of those teachers, lack of creativity among teachers, poor improvisation skills, Laziness on the part of most science teachers as well as lack of motivation.

8. CONCLUSION

In this paper utilization and production of instructional material resources are presented as indispensable tasks in the scientific enterprise to enrich the teaching and learning of science as a subject. The science teacher must improvise, produce and use both materials and ideas to aid instruction at all times. Some issues which could aid adequate training of teachers in production and utilization of available science material resources should be highlighted in the teacher education curriculum and instructions.

9. RECOMMENDATION

On the bases of the above findings the following recommendations are made:

1. Science teachers should always use his immediate environment to teach as it contains a lot of material-resources for effective teaching of the concepts in the subject.

2. The Federal and State Ministries of Education should make appropriate plans to train and expose Science teachers to training workshops on improvisation in order to update their techniques for improvising specific equipments.

3. Government should make funds available and sponsor the teachers' attendance at conferences, seminars and workshops on Science material resource production utilization and management.

4. Creative and resourceful teachers who improvise equipments and materials should be rewarded and motivated adequately.

5. There is need for organizations, government, Parent Teacher Association, voluntary organisations as well as philanthropists to join hands in procuring necessary science materials resources in schools.

6. Science teachers should select the cheapest available equipment for demonstration or illustration of principles and concepts in science teaching. The functionality and duration of equipment should be taken into consideration.

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