IOSR Journal of Research & Method in Education (IOSR-JRME)
e- ISSN: 2320–7388,p-ISSN: 2320–737X Volume 8, Issue 6 Ver. I. (Nov. – Dec. 2018), PP 51-55
www.iosrjournals.org

New Horizon in Technology Education From Access To Quality For Effective Utilization Of Instructional Materials In Teaching And Learning Of Chemistry In Senior Secondary Schools

[1]ABDUADAMUGAMBAKI. [2]SHEHUIBRAHIM
CURRICULUM AND INSTRUCTION DEPARTMENT. G. S. E DEPARTMENT
AMINU SALEH COLLEGE OF EDUCATION, AZAREAMINU SALEH COLLEGE OF EDUCATION, AZARE
BAUCHI STATE. NIGERIA. BAUCHI STATE. NIGERIA
EMAIL:abagambaki@gmail.com. **EMAIL:** sheibalje3@gmail.com

CorrespondingAuthor:AbduAdamuGambaki

[3]DANJUMAEZEKIEL
INTEGRATED SCIENCE DEPARTMENT
COLLEGE OF EDUCATION, WAKA BIU
BORNO STATE. NIGERIA
EMAIL: biliadary12@gmail.com

Abstract: *The purpose of this research was to find out the effective role of instructional materials in the teaching and learning of Chemistry in Senior Secondary Schools (SSS) in Katagum Zonal Education (KZEA), Bauchi State. To carry out this research work five (5) secondary schools were randomly selected within the area which comprises of public and private schools as respondents research sample were twenty (20) teachers while the students sample were one hundred (100) which make a total of one hundred and twenty (120) samples/respondents. Data were gathered using questionnaire one (1) null hypothesis; there is no significant differences in the mean scores of the students taught through instructional materials and through traditional method/way, was stated T-test method of analysis was used to analyze the sample result. The percentage of students and teachers using instructional materials, the mean scores of the students and the T-test obtained nullified the hypothesis. The effective utilization of instructional materials enhances the teaching and learning of chemistry. Teachers in the area of research were not professionally qualified to effectively put into use the adequate instructional materials for teaching. On the basis of the finding of this research, it was recommended that Chemistry teachers in SSS of KZAEA of Bauchi State should be trained on the importance and the need to utilize the instructional materials. It was also recommended that Ministry of education should provide a check on the teachers employed in Secondary Schools,to teach and train Chemistry teachers in order to improve and ensure proper usage of these instructional materials in teaching and learning of Chemistry.*
Keywords: *Effective, Utilization, Instructional Materials, Teaching, Learning, Chemistry.*

Date of Submission: 04-11-2018 Date of acceptance: 18-11-2018

I. Introduction

Today, Technology Education is the principle method which brings together learners, instructors and materials in a systematic corporation to effectively solve educational problems (Ema and Ajayi, 2008).

Chemistry is often called the central science because, it connects other sciences together for instance, Biology, Physical Geography, Agricultural Science, Medical Sciences, Pharmaceutical Science and so on. Thus, chemistry is acknowledged worldwide as the second most difficult subject of the physical science, because of its abstract, (Cerifrouge and Williams, 1999).

Chemistry is the science that is concerned with the studying the structure and composition of substances and the way that they change or combined with each other. There have been some difficulties or challenges relating the abstract concept of chemistry to understanding of the students they need to relate the

abstract terms to think which are relevant and effective to the learners in order to encourage effective learning to students and efficient teaching to teachers.

The rapid growth of educational technology in Nigerian's school system as a result of science through the utilization of instructional materials more especially the audio-visual resources (AVR), these educational media are not only been considered important to the science teachers (Chemistry teachers) and educators but are employed and applied in diverse ways or means to effectively and efficiently improves teaching and learning process. (Akpa, I.A, 2011).

Learning of chemistry can be reinforced with different instructional materials as chemistry has sub-divisions objects; physical chemistry, organic and inorganic chemistry. Each of these trios can be taught with its educational resources as well as the various topics in different sub-divisions to achieve the desired learning objectives, utilization judges, values of instructional materials, process or personal degree the single or collectively certify the derived instructional needs.

The teachers' ability to effectively utilize the available educational resources and therefore, optimize the attainment of instructional situations varies with their level of utilization (Elengu, C.C, 2011).

Teacher's knowledge has a great impact on the effective application of educational media, because the teachers need to understand the sequential presentation of instruction of the learners and its appropriateness with the instructional task. Chemistry teaching is a science subject requires the teacher to come up with a proper stated objective along with appropriate educational media its more to practicability, experiment, and manipulation of skills the chemistry subject is expected to be distinguished between aims and behavioural objectives.

A chemistry teacher should know the learning theories so as to apply them in teaching to enhance learning (Kenneth, G.J, 2009). Chemistry like any other science subject can be learnt effectively if problem solving is employed, this is the potential to engage students in authentication investigation and to develop their inquiry skills. The researchers believed that the findings of this study will greatly help Chemistry teachers in improving on new techniques, on the utilization of instructional materials; and will benefit the students in understanding the chemistry subject, which will yield a positive performance in their O'level examinations (Habu, R.I, 2011, Sala, N, 2004).

Statement of the problem

It has been identified that, using instructional materials is to facilitate learning or instructions is not always the crisis but how to utilize it and it availability to use.

1) Inadequacy of qualified Chemistry Teachers
2) Non-professional graduates with little or no knowledge of Chemistry.
3) The attitudinal disposition of most Chemistry teachers have been identified as the reasons responsible for students' poor performance in Chemistry.
4) Inadequate knowledge, poor understanding of chemical concepts.
5) Misinterpretation of questions due to the language level of the students

Purpose of the research

1) To know the effectiveness usage of instructional materials in the teaching learning process of the Chemistry subject.
2) Identify the difficulties and challenges which Senior Secondary Schools Chemistry teacher encounter/face.
3) Mental role of instructional materials in the teaching and learning of the Chemistry subject.
4) To assess students' performance in relation to adequacy of instructional materials in the teaching of Chemistry.

Research Questions

1) Are Instructional materials available for the teaching and learning of Chemistry?
2) Are the instructional materials available functional and being used by teachers and students?

Hypothesis

There is no significance differences in the mean scores of students taught through instructional media and through traditional method/way.

Research Question 1:

Are the instructional materials available for the effective teaching of chemistry in the sampled schools?

Table 1: Checkliston the materials required for the effective teaching of chemistry in secondary schools

S/N	Materials	N	Available	Functioning	Not available
1.	Periodic table	6	6(100%)	6(100%)	0

2.	Beaker	6	6(100%)	6(100%)	0
3.	Water bath	6	2(33.3%)	0	4(66.7%)
4.	Reagent Bottles	6	6(100%)	6(100%)	0
5.	Dropping Bottles	6	4(66.7%)	2(33.3%)	0
6.	Wash Bottles	6	6(100%)	6(100%)	0
7.	Brushes	6	3(50%)	1(16.7%)	3(50%)
8.	Bunsen Burner/kerosene stove	6	6(100%)	6(100%)	0
9.	Burette	6	6(100%)	6(100%)	0
10.	Clip	6	6(100%)	6(100%)	0
11.	Cork Ring	6	4(66.7%)	1(16.7%)	2(33.3%)
12.	Crucible Tong	6	1(16.7%)	1(16.7%)	5(83.3%)
13.	Desiccators	6	0	0	6(100%)
14.	Filter Papers	6	6(100%)	6(100%)	0
15.	Conical Flask	6	6(100%)	6(100%)	0
16.	Separating Funnel	6	2(33.3%)	1(16.7%)	4(66.7%)
17.	Wire Gauze	6	2(33.3%)	1(16.7%)	4(66.7%)
18.	Litmus papers	6	6(100%)	6(100%)	0
19.	Measuring Cylinder	6	6(100%)	6(100%)	0
20.	Volumetric Flask	6	6(100%)	6(100%)	0
21.	Filter Funnel	6	6(100%)	6(100%)	0
22.	Pipettes (Graduated)	6	6(100%)	6(100%)	0
23.	Rod (Stirring)	6	6(100%)	6(100%)	0
24.	Spatula	6	6(100%)	6(100%)	0
25.	Retort Stand with Clamp	6	6(100%)	6(100%)	0
26.	Test Tubes	6	6(100%)	6(100%)	0
27.	Test-tubes rack/stand	6	6(100%)	4(66.7%)	0
28.	Watch Glass	6	4(66.7%)	4(66.7%)	2(33.3%)
29.	Weighing Balance	6	4(66.7%)	2(33.3%)	2(33.3%)
30.	Distilled water	6	0	0	6(100%)
Total		**180**	**142(78.9%)**	**125(69.4%)**	**38(21.1%)**

Table 1 shows the summary of the checklist on the availability of instructional materials for the effective teaching of chemistry. The table revealed that 78.9% of the materials for the teaching of chemistry are available, while 21.1% of those materials were not available. It is apparently shown that instructional materials for the teaching of chemistry are available in the sampled schools to a great extent.This implies that there are large proportions of Chemistry equipment available for the teaching and learning of chemistry in the sampled schools.

Research Question 2

Are the instructional materials available functional and being used by teachers and students?

The result from the checklist also revealed that only 69.4% of the instructional materials available for the teaching and learning of chemistry were found to be functional. This implies that instructional materials for the teaching and learning of chemistry are functioning to some extent.

Research Hypothesis

There is no significance difference in the mean scores of students taught through instructional media and through traditional method/way.

Table 2: Summary of t-test analysis on the achievement of students taught using instructional media and those taught using traditional method

	Group	N	Mean	Std. Dev.	Df	t-cal	t-crit	p-value	remark
Scores	Experimental	50	63.16	14.499	98	8.798	1.660	0.000	significant
	Control	50	37.80	14.326					

Significant at P≤0.05

Table 2 shows the summary of t-test analysis on the achievement of students taught using instructional media and those taught using traditional method. T-test analysis revealed that at df = 98; t-crit = 1.66, p-value is less than 0.05 less of confidence. Therefore, the hypothesis is rejected. In other words, the t-cal (8.798) is greater than t-crit of 1.66. This implies that there is a significant difference between performance of students taught using instructional media and those taught using a conventional method. The Table also revealed that students taught with instructional media performed better than those taught with traditional method. This can be observed through the mean score of experimental group (63.16) and control group (37.80). The mean difference is said to be statistical significant when subjected to t-test analysis.

Scope of the Research

In this research, it takes into cognizance some selected senior secondary schools in Katagum Zonal Education Area of Bauchi State, Nigeria. These schools are science schools in Chemistry and have performed in the West African Senior Secondary Certificate Examination (WASSCE) and National Examination Council (NECO) at 70% since the last five academic sessions.

The researchers also considered the range of teaching and learning strategies employed and the approaches that could be adopted to simplify these instructional materials in some schools.

The content area of this research would be limited to two (2) only; secondary schools in the area of the study.

Methodology

The researchers had to seek for permission from principals to allow their teachers and students respond to the questionnaires to the teachers and students by the researcher.

The data were analyzed using the T-test method by simple parentage, which represent the number of questions 'N' divide by the number of respondents 'TN'.

Validation of Instrument

In order to ensure/testified high level of reliability of the instrument used, the questionnaire and practicum was pilot tested on fifteen teachers and thirty students outside those who were used for the main sampled research. The reliability test was carried out on the three main categorization and practicum of the questionnaire, i.e. availability of adequacy of instructional materials, available, functional and effectively utilized of instructions materials by students and teachers.

Significance of the Research

Considering the tremendous and immense instructional gains that are derivable from using educational media, this research will goa long way in investigating some problems encountered by Chemistry teachers and students that hindered effective utilization of the available instructional materials.

It will also assist SSS involved in teaching profession and curriculum development, Federal and State ministries of education on the need to check the operation in all SSS in Bauchi State.

II. Discussion of Results

Out of the twenty teachers teaching in the selected sampled schools eight teachers used instructional materials while the remaining twelve seldom or do not teach with instructional materials presenting in this percentage.

This study investigated the effective utilization of instructional materials in the teaching and learning of chemistry in senior secondary schools. The study revealed that there availability of instructional materials in the teaching and learning of chemistry. This study disagrees with the findings of Omiko (2016), who found out that there are no enough availability of instructional facilities in the teaching of chemistry and teachers are not effectively utilizing the instructional materials in their teaching.

The study also revealed that students taught with instructional media performed better than those taught with traditional method. This is in line with the work of Matthew and Onyejegbu (2013), who found that students taught with instructional materials performed better than those taught withoutinstructional materials in Agricultural Science.This study is also supported by the work of Stephen and Isaac (2013), who also discovered that students taught with instructional materials in chemistry performed significantly better than those taught without instructional materials.

III. Finding of Research

From the researchers work, the major findings were summarized as follows in the sampled area of the study.

1) Chemistry teachers in SSS of KZEA do not use instructional materials in teaching of chemistry subject.
2) The unavailability of instructional materials in SSS in KZEA not have sufficient available for teachers.
3) The effective usage of instructional materials enhances the teaching and learning of Chemistry in SSS.
4) Teachers in KZEA of Bauchi State were not professionally qualified to effectively put to use the available educational media to effective and efficient to teaching and learning of Chemistry.
5) The hypothesis stated was that there is no significant differences between the mean score of the students taught through the use of instructional materials and those taught without instructional materials.

Recommendation

Based on the findings and conclusion made, the researchers made the following recommendations:

1) Chemistry teachers in SSS of KZEA Bauchi State should be trained on the importance and the need to utilize instructional materials while teaching.

The training can be done by the Government and non-governmental organizations (NGOs), and individual of interest through seminars, workshops etc.

2) Federal and State Ministries of education should sponsors Chemistry teachers to acquire training in new trends in science teaching and improvisation techniques.
3) Teachers are encouraged and should endeavor to commit themselves into the effective use of instructional materials in all their instructional delivery.
4) Enough time should be allotted in the school time table for effective use of instructional materials in the teaching and learning of chemistry
5) Teachers should be encouraged to use instructional materials in teaching-learning chemistry.

References

[1]. Akpa, I.A. (2011). The role of educational Technology in Augmenting the Learning of Chemistry: A Study of Some selected secondary schools in Jos, North, LGA of Plateau State. Unpublished B.Sc (ed) Chemistry, Jos, University of Jos.
[2]. Aina, J.J. (2013). Importance of Service Education to National Development and problems militating against its development American Journal of Education Research 1(7): 225-229.
[3]. Creifrough O.J. & Williams, H.E (1999). A History of Instructional Design and Technology in R.Reiser and J.V Demysery. (eds) Trends and Issues in instructional design and technology. NJ, USA: Pretenic Hall Inc.
[4]. Eleagu, C.C. (2011). An Appropriate of the use of Information and Communication (ICT) for the effective teaching and learning of Geography in Secondary Schools, Unpublished B.Sc (ed) Chemistry, Jos, University of Jos.
[5]. Ema-Ema, A.J.U & Ajayi, D.T.W (2008), Educational Resources Management: Curriculum Design …. Implementation… Evaluation. Jos. University of Jos press Ltd. Nigeria.
[6]. Ema-Ema, A.J.U & Ajayi, D.T.W (2008), Educational Technology: Method… Materials … Machines. Abuja. Ya-byangs publishers, Nigeria.
[7]. Habu, R.I (2011). Effective use of instructional Aid in Teaching and Learning of Chemistry subject in Senior Secondary Schools in Jos LGA of Plateau State. Unpublished B.Sc (ed) Chemistry, Jos, University of Jos.
[8]. Kenneth, J.G (2009). Effects of Computers As Instructional materials in the teaching and learning of Geometry in Senior secondary schools Mathematics in Jos North LGA, Unpublished B.Sc (ed) Chemistry, Jos, University of Jos. Available online:http:/A/www.jicrelog/ertgaitse/skills/2.htm/Access February, 2018.