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Level of Availability and Utilization of Instructional Materials in the Teaching of Chemistry in Secondary Schools in Nasarawa-Eggon, Nasarawa State

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Abstract: *This study examined the level of availability and utilization of instructional materials in teaching Chemistry in secondary schools in Nasarawa-Eggon, Nasarawa State. Three research questions were raised and answered. The adopted the descriptive survey research design. The population of the study comprised the entire forty-two (42) Chemistryteachers. One thousand two hundred and forty (1,240) students offering Chemistry as a subjectin the 2021/2022 academic session across the entire forty-two (42) government-own secondary schools in Nasarawa-Eggon, Nasarawa State. A random sampling technique was employed in selecting 10 schools, 200 students, and 10 teachers giving rise to a total of 210 respondents. The instrument used for data collection was a questionnaire titled with a reliability coefficient of 0.79. The instrument was validated by three experts from the Department of Science and Technology Education. The data collected were analysed using the Cronbach Alpha method. The research questions were answered using mean and standard deviation. The findings of the study among others revealed that instructional materials such as periodic tables, pipette, beaker, retort stand, test tube, spatula, conical flask, funnel, bench reagent indicator, measuring cylinder, litmus paper, filter paper, weighing scale, are available and utilized across the schools. However, thefollowing were lacking computer software, a fire extinguisher, the fume cupboard, worn-out equipment and appliances. Lack of properly equipped laboratories, unavailability of instructional materials, high cost of instructional materials, the unconducive atmosphere in the schools, and lackof facilities are the factors militating against the effective utilization of instructional materials.The study recommended that government should make provision for well-equipped Chemistry laboratories, required in all schools within the study area for the teaching and learning of Chemistry.*

Keywords: *Level, Availability, Utilization, Instructional materials, Teaching Chemistry*

Introduction

Science is a major force to be reckoned with in the shaping of the entire populace. The dimension is multi-disciplinary. Chemistry is one of the useful, indispensable sciences which study the composition (identification of matter), transformation (processing of matter) and utilization of matter (Lim, 2021). Chemistry dates back to the period of the evolution of scientific ideas. The introduction and adoption of Chemistry as a subject in secondary schools in Nigeria adue to its vast application in life. Chemistry is given a permanent place among nine subjects offeredby Science Students in secondary schools.

According to Gordon (2021), Chemistry is the fundamental ingredient in the training of professionals such as Doctors, Pharmacists, Technologists, Engineers, Chemists, etc. He went

further to say that materials such as clothes, fuel, fertilizers, explosives etc. are of great benefit to man and are made easily accessible through research in Chemistry. The place of Chemistry in Nigeria striving towards technological greatness and self-reliance cannot be over-emphasized. The aim of teaching Chemistry can be harnessed as an effective tool which aids individuals acquire knowledge about matter and offer explanations of natural phenomena as opined by STAN (2016). From the insight above, it is obvious that for a great transformation intostrides of scientific feats as well as proving the quality of life, the study of Chemistry becomes pertinent. The goals of a nation cannot be achieved if Chemistry is not taught and learned in schools,especially in secondary schools.

According to the Federal Republic of Nigeria (2004), the board goals of secondary education are to prepare individuals for useful living within Society and Higher Education. It implies that teaching is targeted at producing a well-informed individual, the knowledge acquired in learning comprises three (3) domains (Bloom, 1956). The cognitive domain deals with recognitionand recalling information learnt. The psychomotor domain is concerned with the skills of manipulation(this is shown during the use of materials in practical work). The affective domain deals with attitudes such as critical thinking, open-mindedness etc. These domains outlined cannot be achieved without the availability and utilization of instructional materials in the teaching of Chemistry.

Achimugu (2016) defined instructional materials as materials which contain information either written or meditated that an individual will use to achieve the objectives of learning. According to Eze and Nwafor (2012), instructional materials are an extension of man whichallows him to affect other people who are not in face-to-face contact with him. Instructional materials to him include letters, Television, Computer film and Phone, and even railways are extensions by which one can communicate with others. Asele (2013) also regard instructional materials to mean aids. They assert that teaching aids are of two broad types, teaching aids whichinclude display boards, pictorial aids, flashcards, diagrams, models and blackboards, and commercially made teaching aids which comprise radio, television and overhead projector. Utah (2014) describes instructional materials as any pre-existing material that is written from the objectives. She further stressed that instructional materials may also include a statement to learnersthat indicates how to use the materials.

Instructional materials can be grouped into four types as highlighted by Utah (2014). These are the printed/reading materials: They are instructional materials that give room for quick information for classroom use (facts, figures, generalization). He includes maps, charts, Textbooks, Newspapers, magazines, and pamphlets. Visual material: These are pictures, diagrams, famed boards, chalkboards, noticeboards and so on. Teaching materials: Teaching materialsare used in programmed learning. These types of instructional materials include print media, audio-visual media, manipulated objects, and computer-based machines. The community Source: These types of materials are available within the larger society. Some of these sources include places which are community places of interest. Areas of Educational facilities like schools, universities, libraries, government agencies, airports, parks, banks, hospitals and invitation of resource people. Following the classification of instructional materials into different types above, similarities are however noted, that all types are tools for effective teaching/learning processes. In addition, they allinvolve media (materials) derive from the communication revolution, which can be used to facilitate the teaching/learning process (Utah, 2014).

Looking at the performance of students in Chemistry in secondary schools across Nasarawa-Eggon L.G.A of Nasarawa State, it has always been poor which has continued to be a

major cause of concern to stakeholders, parents, and science bodies, particularly those in the Chemical Education in Nigeria (Olagunji et al., 2018). This poor performanceof students may be attributed to several factors such as unqualified teachers, lack of instructional materials, and poor utilization of instruction materials where they are available among other things. Itis in this regard that Manurung (2012) stated that there is no gain in saying that the quality of explanation (using instructional materials) is very important for students to understand science (Chemistry) if learning must not be rote memorization. When teachers do not employ the use of instructional materials in teaching Chemistry, full explanation of concepts cannot be attainable which in turn leads to the poor performance of students in chemistry. Also, the lack of appropriate teaching and instructional materials in secondary schools coupled with the explosion of the student population has constituted the lowering standard of education leading shortage of instructional materials (Asele, 2013). Asele further added that, in some instances, poor utilization of instructional materials is caused by variables such as cost of purchase and maintenance, technicalknow-how, time taken for the preparation of materials as well as lack of storage facilities. To meet the educational objectives, instructional materials in teaching chemistry must be available and well utilized otherwise poor performance of students in Chemistry is inevitable. It was against this background that this study intended to find out the availability of instructional materials for teaching chemistry in Secondary schools in Nasarawa-Eggon L.G.A of Nasarawa State and also to determine how they are utilized.

Statement of the Problem

The poor achievement of students in Chemistry has continued to be a major cause of concern to all, particularly those in Chemical Education in Nigeria (Olagunji, Adesoji, Iroegbu& Ige, 2018). Despite the importance of Chemistry to the nation, students' achievement in Chemistry at the Senior Secondary level for several years now has persistently been poor in public orexternal examinations. To affirm this, Table 1 shows the report obtained from the ChiefExaminer of Nasarawa-Eggon and Mada Station Area education office (all in Nasarawa-EggonLGA) as regards students' performance in Chemistry in West Africa Examinations Council.

Table 1: Summary of Chemistry WAEC Results of Candidates from 2011-2020 inNasarawa Eggon L.G.A., Nasarawa State

Year	Total Candidates	Total Passed	Total Failed	Percentage (%) Passed	Percentage (%) Failed
2011	1,044	368	676	35.2	64.8
2012	1,018	321	697	31.5	68.5
2013	1,061	380	681	35.8	64.2
2014	1,063	385	678	36.2	63.8
2015	1,038	437	601	42.1	57.9
2016	747	350	397	46.9	53.1
2017	946	353	593	37.3	62.7
2018	866	338	528	39.0	61.0
019	988	401	587	40.6	59.4
2020	1,042	439	603	42.1	57.9

According to the report by the chief Examiner, the pass rate at the credit level of WAEC from2011-2020 are 35.2 %, 31.5 %, 35.8 %, 36.2 %, 42.1 %, 46.9 %, 37.3 %, 39.0 %, 40.6 % and 42.1% for 2011, 2012, 2013, 2014 2015, 2016, 2017, 2018, 2019 and 2020 respectively. This high failure rate has been attributed to many factors including non-availability and non-utilization of

instructional materials in teaching and learning Chemistry in secondary schools in Nigeria. The problem of the study put in question form; to what extent are the instructional materials available and utilized by Chemistry teachers in teaching and learning Chemistry? How often are the materials put into use? Thus, the researcher is poised to investigate the extent of availability, utilization and improvisation of instructional materials for teaching and learning Chemistry in senior secondary schools in Nasarawa-Eggon, Nasarawa State.

Research Questions

The following questions guided the study:

1. To what extent are instructional materials available for teaching Chemistry in secondary schools in the Nasarawa-Eggon area of Nasarawa State?
2. How often are the available instructional materials put to use?
3. What are the problems militating against the effective utilization of instructional materials in the teaching and learning of Chemistry in the Nasarawa-Eggon Area of Nasarawa State?

Method and Materials

The research design used in the study was a descriptive survey research design. The reason for choosing the descriptive survey research design was that the design provides a modality for gathering information from the sample size and generalizing the findings.

The study sought to provide answers to three research questions. The questionnaire used for this study is a type-questionnaire A and B. Questionnaire A for the Chemistry teachers and Questionnaire B for the Chemistry students. The items were treated on a four-point Likert scale. The response options to the items under research question 1 are: Highly Available (HA), Moderately Available (MA), Less Available (LA), and Not Available (NA). The response options to the items under research question 2 are: Very Often (VO), Often (O), Not Often (NO), and Never (N). The response options to the items under research question 3 are a major problem (M.P), problem (P), minor problem (M.P) and not a problem (N.P). The numerical values given tothe response options are 4, 3, 2, and 1 respectively

Results

Research Question One

To what extent are instructional materials available for teaching Chemistry in secondary schools in the Nasarawa-Eggon area of Nasarawa State?

Table 2: Mean and Standard Deviation of Students and Teachers on the Level of Availability of Instructional Materials for Teaching Chemistry

Item	Instructional Material	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{T}_m$	Remark
1	Periodic table	3.45	0.55	3.20	0.79	3.44	A
2	Maps	1.35	0.81	2.10	1.20	1.39	NA
3	Practical workbook	1.51	0.90	1.60	1.08	1.51	NA
4	Textbooks	2.53	1.13	2.30	1.16	2.52	A
5	Diagrams	1.86	1.08	2.00	1.25	1.87	NA
6	Pictures	1.47	0.90	1.80	1.14	1.49	NA
7	Models	2.00	1.14	1.80	1.03	1.99	NA
8	Practical manual	1.86	1.12	1.90	1.29	1.86	NA
9	Pipette	3.24	0.83	3.10	0.99	3.23	A
10	Beaker	3.14	0.93	2.90	0.99	3.13	A

11	Indicators	3.23	0.90	3.40	0.70	3.24	A
12	Retort stand	3.32	0.83	3.20	0.92	3.31	A
13	Test tube	3.00	1.06	3.00	0.94	3.00	A
14	Distiller	1.49	0.89	1.70	1.06	1.50	NA
15	Desiccators	1.92	1.08	1.90	1.10	1.92	NA
16	Thermometer	2.32	1.24	2.30	1.16	2.32	NA
17	Fume cupboard	1.40	0.82	1.80	0.92	1.42	NA
18	Spatula	3.30	0.76	3.10	0.74	3.29	A
19	Tripod Stand	2.45	1.11	2.10	1.29	2.43	NA
20	Conical flask	3.03	1.03	3.00	0.94	3.03	A
21	Erlenmeyer's flask	1.75	0.72	1.50	0.97	1.74	NA
22	Measuring cylinder	2.96	1.06	2.90	0.74	2.96	A
23	Litmus paper	3.12	0.99	2.70	1.06	3.10	A
24	Filter paper	3.03	0.97	2.20	1.03	2.99	A
25	Funnel	2.60	1.32	2.40	0.97	2.59	A
26	Burnett	2.39	1.32	2.10	0.88	2.38	NA
27	Gas plant	2.08	0.89	1.70	1.06	2.06	NA
28	Bench reagent	2.65	1.09	2.80	0.79	2.66	A
29	Stirring rod	1.99	0.85	1.90	0.99	1.99	NA
30	Liebig condenser	2.10	0.84	2.20	1.14	2.10	NA
31	Weighing scale	2.69	0.91	2.70	1.06	2.69	A
32	Capillary tube	2.35	0.80	2.30	0.95	2.35	NA
33	Calorimeter	1.88	0.86	2.10	0.74	1.89	NA
34	Bunsen burner	2.49	1.05	2.00	1.05	2.47	NA
35	Test tube rack	3.01	1.09	2.70	1.16	3.00	A
36	Wire gauze	2.27	1.15	2.60	0.84	2.29	NA
37	Crucible	2.23	1.15	2.40	1.17	2.24	NA
38	Wash bottle	2.85	1.03	2.60	1.08	2.84	A
39	Test tube holder	2.53	1.08	2.40	1.08	2.52	A
40	Forceps	2.05	0.98	2.10	0.99	2.05	NA

Key: $\overline{X}_1$ = Mean Response Students, SD_1 = Standard Deviation of Students, $\overline{X}_2$ = Mean Response Teachers, SD_2 = Standard Deviation of Teachers, T_M= Mean of Means, A= Available, NA= Not Available

The data presented in Table 2 revealed that the mean responses of students on the items are within the range of 1.35 and 3.45 while teachers' responses on the items fall within the range of 1.50 to 3.40. The values of the mean of means of the items as responded to by students and teachers arewithin the range of 1.39 and 3.44. As the table revealed, items 1, 3, 9, 10, 11, 12, 13, 18, 20, 22, 23, 24, 25, 28, 31, 35, 38 and 39 have values of the mean of means above 2.50 which imply their availability in the schools within the study area. In the same vein, the table shows that items 2, 4,5, 6, 7, 8, 14, 15, 16, 17, 19, 21, 26, 27, 29, 30, 32, 33, 34, 36, 37, and 40 have values of the mean of means below 2.50 which signify their unavailability in the schools within the study area. Therefore,it can be deduced from the table that Chemistry instructional materials such as periodic tables, pipette, beaker, indicators, retort stand, test tube, spatula, conical flask, funnel, bench reagent, measuring cylinder, litmus paper, filter paper, weighing scale, test tube holder and rack, as

well as wash bottle are available whereas instructional materials such as maps, practical workbooks, diagrams, pictures, models, practical manual, distiller, desiccators, thermometer, fume cupboard, tripod stand, Erlenmeyer's flask, stirring rod, Liebig condenser, capillary tube, calorimeter, bunsenburner, wire gauze, the crucible, and forceps are not available for the teaching of Chemistry in secondaryschools in Nasarawa-Eggon area of Nasarawa State.

The table also reveals that the standard deviations of the items as rated by students are within the range of 0.55 and 1.32 while those of teachers are within 0.74 and 1.29. From these values, it can be deduced that the standard deviations are closer to zero, indicating less variability in the responses of students and teachers concerning the level of availability of instructional materials for teaching Chemistry in secondary schools in Nasarawa-Eggon area of Nasarawa State.

Research Question Two:

How often are the available instructional materials put to use?

Table 3: Mean and Standard Deviation of Students and Teachers on the Extent of Utilization of Instructional Materials in Teaching Chemistry

Item	Instructional Material	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{T}_m$	Remark
41	Periodic table	2.82	0.44	2.90	0.57	2.82	Often
42	Maps	2.20	0.51	1.90	0.88	2.19	Never
43	Practical workbook	2.13	0.68	2.00	0.47	2.12	Never
44	Textbooks	2.80	0.56	2.90	0.74	2.80	Often
45	Diagrams	2.11	0.47	1.70	1.06	2.09	Never
46	Pictures	2.31	0.54	2.00	0.82	2.30	Never
47	Models	2.49	0.69	2.10	0.74	2.47	Never
48	Practical manual	2.08	0.69	2.00	0.82	2.08	Never
49	Pipette	2.73	0.59	2.80	0.92	2.73	Often
50	Beaker	2.83	0.59	3.00	0.47	2.84	Often
51	Indicators	2.62	0.73	2.60	1.08	2.62	Often
52	Retort stand	2.68	0.72	2.40	0.84	2.67	Often
53	Test tube	2.70	0.51	2.90	0.88	2.71	Often
54	Distiller	1.68	0.61	1.90	0.74	1.69	Never
55	Desiccators	1.77	0.69	1.60	0.70	1.76	Never
56	Thermometer	2.32	0.58	2.30	1.16	2.32	Never
57	Fume cupboard	1.60	0.49	1.70	0.48	1.60	Never
58	Spatula	2.89	0.57	2.80	1.03	2.89	Often
59	Tripod Stand	2.35	0.62	2.40	1.08	2.35	Never
60	Conical flask	2.73	0.52	2.60	0.84	2.72	Often
61	Erlenmeyer's flask	1.71	0.55	2.00	0.82	1.72	Never
62	Measuring cylinder	2.65	0.48	2.60	0.52	2.65	Often
63	Litmus paper	2.83	0.71	2.80	0.92	2.83	Often
64	Filter paper	2.73	0.62	2.60	1.08	2.72	Often
65	Funnel	2.75	0.62	2.80	0.79	2.75	Often

66	Burnett	2.34	0.53	2.30	0.95	2.34	Never
67	Gas plant	1.70	0.56	1.90	0.74	1.71	Never
68	Bench reagent	2.34	0.54	2.20	0.92	2.33	Never
69	Stirring rod	2.32	0.57	2.60	0.97	2.33	Never
70	Liebig condenser	2.15	0.53	2.20	0.92	2.15	Never
71	Weighing scale	2.69	0.55	2.70	0.82	2.69	Often
72	Capillary tube	2.25	0.64	2.30	0.95	2.25	Never
73	Calorimeter	2.28	0.67	2.40	1.06	2.29	Never
74	Bunsen burner	2.37	0.60	2.40	0.84	2.37	Never
75	Test tube rack	2.69	0.54	2.60	0.84	2.69	Often
76	Wire gauze	2.26	0.54	1.90	0.74	2.24	Never
77	Crucible	2.37	0.60	2.30	0.95	2.37	Never
78	Wash bottle	2.76	0.58	2.50	0.97	2.75	Often
79	Test tube holder	2.47	0.57	2.40	0.84	2.47	Never
80	Forceps	2.20	0.60	2.20	0.92	2.20	Never

Source: *Survey, 2022*

Table 3 revealed that the mean responses of students on the items are within the range of 1.60 and 2.89 whereas the responses of the teachers on the items fall within the range of 1.50 and 3.40. The values of the mean of means of the items as responded by students and teachers are within the range of 1.60 and 2.90. As the table revealed, items 41, 44, 49, 50, 51, 52, 53, 58, 60, 62, 63, 64, 65, 68, 71, 75, and 78 have values of the mean of means above 2.50 which imply they are often utilized in the schools within the study area. In the same vein, the table shows that items 42, 43, 45,46, 47, 48, 54, 55, 56, 57, 59, 61, 66, 67, 69, 70, 72, 73, 74, 76, 77, 79, and 80 have values of the meanof means below 2.50 which signify that they are not put to use in the schools within the study area.Therefore, it can be deduced from the table that Chemistry instructional materials such as periodictables, textbooks, pipette, beaker, indicators, retort stand, test tube, spatula, conical flask, funnel, measuring cylinder, litmus paper, filter paper, weighing scale, and test tube rack are put to use whereas instructional materials such as maps, practical workbook, diagrams, pictures, models, practical manual, distiller, desiccators, thermometer, fume cupboard, tripod stand, Erlenmeyer's flask, Burnett, gas plant, bench reagent, stirring rod, Liebig condenser, capillary tube, calorimeter,Bunsen burner, wire gauze, the crucible, forceps, and test tube holder are not put to use for the teaching of Chemistry in secondary schools in Nasarawa-Eggon area of Nasarawa State.

The table also reveals that the standard deviations of the items as rated by students are within the range of 0.44 and 0.71 while those of teachers are within the range of 0.47 and 1.08. As it is revealed, the entire standard deviations of students and teachers on the items are very close to zero which signifies a higher degree of unanimity of response among the respondents on how often instructional materials are put to use for teaching Chemistry in secondary schools in Nasarawa-Eggon area of Nasarawa State.

Research Question Three:

What are the problems militating against the effective utilization of instructional materials in the teaching and learning of Chemistry in Nasarawa-Eggon Area of Nasarawa State?

Data that were used to answer this research question are presented in Table 4.

Table 4: Mean and Standard Deviation of Students and Teachers on the Problems Associated With the Effective Utilization of Improvisation of Instructional Materials in Teaching Chemistry

Item	Instructional Material	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{T}_m$	Remark
81	There is no equipped Laboratory	2.83	1.18	2.70	1.06	2.82	P
82	Unavailability of instructional materials	2.65	0.91	2.70	0.82	2.65	P
83	High cost of instructional materials	2.60	0.97	2.70	0.68	2.60	P
84	Lack of knowledge on how to use instructional materials by teachers	1.74	0.98	1.90	1.20	1.71	NP
85	Lack of time	2.10	1.00	2.30	0.95	2.11	NP
86	Too much workload on teachers	2.47	0.89	1.90	1.20	2.44	NP
87	Lack of motivation for teachers	2.72	0.77	3.00	0.47	2.73	P
88	Unconducive atmosphere in the schools	2.78	0.82	2.70	0.82	2.78	P
89	Non-workability of the instructional materials	2.43	0.95	2.50	1.18	2.43	NP
90	Lack of facilities to enable teachers to use instructional materials	2.88	0.72	2.90	0.74	2.88	P
91	Lack of interest by students	1.90	0.99	1.70	0.95	1.89	NP

Source: *Survey, 2022Ẋ*

Key: P = Problem, NP = Not a Problem

Data presented in Table 4 revealed that the mean responses of students on the items are within the range of 1.74 and 2.88 whereas the responses of the teachers on the items fall within the range of 1.70 and 3.00. The values of the mean of means of the items as responded to by students and teachers are within the range of 1.71 and 2.88. As the table revealed, items 81, 82, 83, 87, 88, and90 have values of the mean of means above 2.50 which imply that they represent the problems militating against the effective utilization of instructional materials in the teaching and learning of Chemistry in the study area. The table further revealed that items 84, 85, 86, and 89 have values of the mean of means below 2.50 which imply that are no problems militating against the effective utilization of instructional materials in the teaching and learning of Chemistry in the study area. Therefore, it can be deduced from the table that the problems militating against the effective utilization of instructional materials in the teaching and learning of Chemistry in the study area are not lack of time, too much workload on teachers, non-workability of the instructional materials, or lack students' interest but lack of quipped laboratory, unavailability of instructional materials, high cost of instructional materials, lack of motivation for teachers, the unconducive atmosphere in the schools, and lack of facilities to enable teachers to use instructional materials.

The table also reveals that the standard deviations of the items as rated by students are within the range of 0.72 and 1.18 while those of teachers are within the range of 0.68 and 1.20. Asit is

revealed, the entire standard deviations of students and teachers on the items are closer to zerowhich signifies a higher degree of unanimity of response among the respondents with respect to the problems militating against the effective utilization of instructional materials in the teaching and learning of Chemistry in Nasarawa-Eggon Area of Nasarawa State.

Discussion of Findings

Findings based on research question one with respect to the level of availability of instructional materials for the teaching of Chemistry in secondary schools in Nasarawa-Eggon area of Nasarawa State revealed that instructional materials such as periodic tables, pipette, beaker, indicators, retort stand, test tube, spatula, conical flask, funnel, bench reagent, measuring cylinder, litmus paper, filter paper, weighing scale, test tube holder and rack, as well as wash bottle, are available across the schools within the study area. These instructional materials are available for use because they are cheap and can be easily obtained. This finding agrees withthe finding made by Ehirim et al. (2020) whose findings showed that many instructional materials were available within the schools. On the contrary, this study also found that instructional materials such as maps, practical workbooks, models, practical manuals, distillers,desiccators, thermometers, Erlenmeyer's flask, stirring rods, Liebig condensers, capillary tubes,calorimeters, bunsen burner, wire gauze, crucible etc. are not available for the teaching of Chemistry in secondary schools within the study area. Most of these unavailable instructional materials are expensive while others are cheap in price but fragile in nature (can be broken easily). It implies that a good number of Chemistry instructional materials are not available in the schools within the study area. This finding disagreeswith the findings of Achimugu (2017) whose findings revealed that a good number of laboratory equipment and audio instructional materials were available. It can be established from this study that a large number of instructional materials such as maps, pictures, and practical manuals among others that are unavailable can attribute to students' lack of understanding of the content areas in Chemistry. Therefore, the unavailability of vital instruction materials hurts students' learning and teachers' performance (Okendu, 2012).

Also, findings based on research question two with regards to how often instructional materials are put to use for the teaching of Chemistry in secondary schools in Nasarawa-Eggon areaof Nasarawa State revealed that instructional materials such as periodic tables, textbooks, pipettes, beakers, indicators, retort stand, test tube, spatula, conical flask, funnel, measuring cylinder, litmus paper, filter paper, weighing scale, and test tube rack are put to use whereas instructional materialssuch as maps, practical workbook, diagrams, pictures, models, practical manual, distiller, desiccators, thermometer, fume cupboard, tripod stand, Erlenmeyer's flask, Burnett, gas plant, bench reagent, stirring rod, Liebig condenser, capillary tube, calorimeter, Bunsen burner, wire gauze, the crucible, forceps, and test tube holder are not put to use for the teaching of Chemistry which is related to their unavailability in secondary schools within the study area. These findings imply that out of these forty (40) vital Chemistry instructional materials, only fifteen (15) are being utilised by students and teachers in the teaching and learning process. Since more than half of the instructional materials are not put to use, it can be established that instructional materials are not put to use by students and teachers within the study area. This finding is in disagreement with the finding made by Bassey et al. (2019) who examined the availability and utilization of instructional materials for effective teaching in public Junior Secondary Schools in the Port Harcourt metropolis, River State and found that instructional materials are utilized to a high extent for effective teaching. However, as this study found that most of the instructional materials are not put to use by teachers and students, it agrees with one of the findings of Ekele

(2014) who researched the availability and utilization of instructional materials in the teaching and learning of Chemistryin Secondary Schools within Olamaboro Area, Kogi State who found that most instructional materials for teaching-learning Chemistry were not often used. It can be contended that the inability of students and teachers to utilize the available instructional materials canmake teaching and learning Chemistry unproductive. It is in this regard that Megbo and Saka (2015) stated that instructional materials in Chemistry when used, the teaching of Chemistrywill be effective or properly done.

Finally, findings based on research question three concerning the problems associatedwith the effective utilization of instructional materials in the teaching and learning of Chemistry in Nasarawa-Eggon Area of Nasarawa State revealed that the problems associated with the effective utilization of instructional materials in the teaching and learning of Chemistry in the study area are not lack of time, too much workload on teachers, non-workability of the instructionalmaterials, or lack of students' interest. This finding is in disagreement with the finding made byOkori and Jerry (2017), who found that lack of time to effectively dispense workload of theScience could also be regarded as a serious constraint to the effective utilization of instructionalmaterials. With respect to the lack of students' interest which does not affect the utilization of instructionalmaterials as found in this study, it is also in disagreement with the finding made by Odo (2018)who established that lack of interest in students in the use of some certain instructionalmaterials causes their non-participation in the learning process. As this study revealed, lack ofquipped laboratories, unavailability of instructional materials, high cost of instructional materials,lack of motivation for teachers, the unconducive atmosphere in the schools, and lack of facilities toenable teachers to use instructional materials are the factors militating against the effective utilizationof instructional materials in the teaching and learning of Chemistry. This finding is supported bythe finding made by Chemwei and Tuimur (2015), who established that insufficient or lack of instructional materials hinders effective teaching by teachers. These findings are not surprising because the Nigerian educational sector is the most neglected today. Parents are contemplating whether to send their children to school and at the end of the training, their children are unemployable due to lack of hands-on skills during training because of unequipped Chemistry laboratories or to send their children to learn just hand work or trade only. which way Nigeria?

Conclusion

Based on the findings of this study on the availability, utilization and improvisation of instructional materials in teaching and learning Chemistry in secondary schools in Nasarawa-Eggon, Nasarawa State, it was concluded that instructional materials such as periodic tables, pipettes, beakers, indicators, retort stand, test tube, spatula, conical flask, funnel, measuring cylinder,litmus paper, filter paper, weighing scale, and test tube rack are put to use whereas instructional materials such as maps, practical workbook, diagrams, pictures, distiller, desiccators, thermometer, fume cupboard among others are vital for teaching and learning of Chemistry as they effectively transmit information, ideas and notes to the students as well as disseminating information in such a way that will modify their attitude, habit and practice to complete a task. For this reason, their availability and utilization become inevitable in schools for teaching Chemistry otherwise the efficiency and productivity of teachers and students' performance in Chemistry remain shamble or at stake.

Recommendations

1. A chemistry laboratory equipped with instructional materials and facilities is provided for

teachers and students to use in teaching and learning.

2. Teachers are to be motivated by providing them with a conducive atmosphere in the schools.

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