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RESEARCH ARTICLE

PERCEPTIONS OF LEARNERS AND EDUCATORS ON THE IMPACT OF USING INSTRUCTIONAL RESOURCES IN HIGH SCHOOL CHEMISTRY TEACHING

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Abstract

In the interest of investigating the implications about using educational materials in teaching and learning chemistry in Bayelsa State secondary schools from the viewpoints of both students and instructors, this study used an ex-post-facto research approach. Two hypotheses were investigated, and four research questions were addressed. A sample of 123 respondents from all 43 secondary schools in the Central Senatorial District that offer chemistry instruction was polled. A three-part survey was utilized for collecting the data, and the findings indicated that there was little utilization of teaching aids during chemistry lectures. The utilization of instructional materials in class, according to the students, helped them learn chemistry in a variety of ways.The mean scores of students who studied chemistry using instructional resources as opposed to those who did not differed significantly as well. The study's conclusion included a suggestion that the Bayelsa State government supply sufficient instructional resources in all secondary schools for effective chemistry teaching and learning.

Introduction:-

One of the sciences taught in high school is chemistry. Like other science courses, teaching chemistry needs the practice of a diversity of teaching aids to keep students' attention and make learning fun. The term "instructional materials" encompasses all educational inputs, such as structures, workshops, labs, tools, furniture, books, water, power, reagents, and information and communication technology instruments. The school's physical plant, including duplicating machines, workshop equipment, permanent and temporary structures, cars, stationery, a play area, a lawn, accessories, and a computer and its software, all serve as instructional resources (Abdu-Raheem, 2016; Yusuf, 2008; Asiyai, 2012). Instructive tools including audio, visual, and audio-visual aids can be utilized to improve chemistry teaching. Academics agree that using instructional resources is essential to improving teaching in all subject areas, particularly Chemistry (Uyagu, 2009; Onasanya & Omosewo, 2011; Igwe, Arisa & Ibe, 2013; Omiko, 2016; Achimugu & Muftawu, 2019). It follows that the suitability of instructional materials is necessary for the efficient teaching of chemistry.

When a teacher can engage pupils in activities and take them along, learning and teaching become fascinating. Students learn the material more effectively and remain attentive during the entire class this way. Scholars are aware that learning experiences achieved via learners' active engagement and the uses of tangible examples are better remembered than abstract learning experiences (Asiyai, 2012). By giving learners real-world examples, instructional materials enhance learning with elements of realism. While giving instructions, instructional materials act as a conduit between the teacher and the pupils. They could also act as teaching and learning's motivators. They're

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employed to combat boredom. For teaching, instructional materials are crucial, especially for new teachers (Adalikwu & Iorkpilgh, 2013). During instruction and learning, instructional resources of any type engage the senses. The appropriateness of educational inputs as instructional resources is crucial to the coaching of all subjects in the school curriculum (Yazid, Abdulmumin & Jamilu, 2020).

Following technological growth, educational resources, particularly projected and electronic materials, are extremely advantageous as the most radical means of globalization and social development that have favorably influenced the teaching environment in the coaching space. Highly interconnected or not, visual, auditory, or audio-visual electronic constituents are imperative steps in the dissemination of knowledge. Instructors frequently evaluate their pupils by giving tasks, projects, and tests respectively. This study investigates how secondary school students and instructors in Bayelsa State, Nigeria, perceive the impact of instructional resources on the coaching and knowledge acquisition of chemistry.

Statement of the Problem

The stakeholders in secondary education are quite concerned about the deteriorating quality of education in Nigeria, particularly in Bayelsa State. Particularly chemistry has piqued interest in science-related topics. Chemistry students are not properly exposed to the instruction of various topics through practical exercises, according to a casual observation made during visits to some state high schools for teaching practice monitoring. Stakeholders assigned several causes for the aforementioned situation, including ones that were educational and teacher-related. None of these researches were undertaken in Bayelsa State, Nigeria, despite the fact that there have been several studies on the prominence of instructional resourcesforresourceful teaching and knowledge acquisition of science and chemistry. This work seeks to close this gap.

Research Questions

In this exploration, four issues were posed and addressed.

1. To what degree do secondary school chemistry instructors in Bayelsa State use teaching aids during lessons?
2. How do teaching materials in Bayelsa State secondary schools impact students' understanding of chemistry?
3. How do chemistry instructors see the impact of instructional resources on the discipline's teaching?
4. Are there any differences between the mean performance scores of students who were taught chemistry using instructional resources and those who were not?

Hypotheses

Considering this study, two hypotheses were developed and tested.

1. The perceptions of instructors and students on the impact of using instructional resources on students' topic learning are not significantly different.

2. In Bayelsa State, no appreciable alteration was identified in the mean performance score between students who were taught chemistry using instructional resources and those who were not.

Literature Review:-

One of the core components of science, technology, and math education is chemistry (Danjuma, 2006). Nowadays, the advancement of science with respect to innovations in technology is crucial to every country's progress. Consequently, chemistry education must be acknowledged as a priority for all inhabitants of all countries. As chemistry is an activity-based science, it should be taught utilising hands-on activities and other teaching strategies that help students learn. This shows that knowledge of chemical ideas cannot be fully obtained without the usage of instructional resources. Chemistry will very definitely be taught without any instructional resources, which will lead to low student performance.Without instructional materials, Adalikwu and Iorkpilgh (2013) stressed that professionally trained science teachers would not adequately put their theories into practise. Instructional resources aid teachers in promoting their curriculum so that students may learn meaningfully, as stated correctly by Dubi (2014).

According to Enohuean (2015), instructional resources are a system component of the teaching process. They can be utilizedin thewidespread educational messages and concepts or to facilitate communication throughout the teaching process. Accordingly, instructional resources have a big impact on how biological ideas are taught, and how this improves students' educationalachievements. It was used by Ogbondah (2008) asthe entiretyof resources that the teacher must include in the pedagogical process. All types of information carriers that could be utilized to support and encourage efficient instructional activities are included in these resources.A secondary school with excellent

instructional facilities is a suitable framework for delivering high-quality educational services, claims Ugwulashi (2016). It stimulates students and instructors to be more devoted to the pursuit of the curricular activities; and minimises delinquent conduct of teacher and student, therefore increasing delight in the academic environment.

According to Adigeb, Anake, and Undie (2017), effective classroom infrastructure and the tradition of ICTs directly affect students' learning and academic accomplishment. Agreeingto the knowledgeable comments of Oladejo, Olusunde, Ojebisi, and Isola (2011) reported implied that teaching issues, such inadequate teaching resources are substantially limitations or determinants of the widespread low performance and unfavourable attitude of high school students towards chemistry. Eriba, Ogbeba, and Ityo (2015) evaluated the effects of improvised teaching materials on chemistry students' performance. The study's results demonstrated that students, who remained trained utilizing improvised teaching materials, did better than those who were taught using the traditional lecture technique.In 2019, Abdulmumini, Garba, Babangida, and Kamisu looked into how improvised teaching aids affected chemistry instruction. They showed that educational resources improved chemistry teaching and student success. According to Yazid, Abdulmumin, and Jamilu (2020), the custom of instructional resources was vital for teaching chemistry in the senior section of Katsina's Schools. According to Olaitan, Igbo, Ekong, Nwachukwu, and Onyemaechi (2019),highlighted in their report that learning that lacks tangible experiences, appropriate resources, and activities would not result in meaningful learning or transfer of what has been learnt.

In their study, Onasanya and Omesewo (2011) identified that the application of instructional resources improved both student achievement and the instruction of physics. According to Aina's (2013) research, instructional resources are essential for successful instruction, knowledge acquisition processes and effective instruction delivery in schools. Every study that was examined was directed in a different Nigerian state. The consideration Bayelsa state was central in this investigation.

Methodology:-

This survey research is ex-post facto in design. The self-determining variables under investigation are non-negotiable since they have already happened. All free secondary schools in Nigeria's Bayelsa State's Central Senatorial District make up the study's sample. According to data collected from the concerned Ministry in Yenagoa, chemistry is taught in 43 high schools in the senatorial district. Exactly 80 senior secondary students (40 males and 40 girls) and 43 chemistry instructors from free secondary schools in Yenagoa and Kolokumor make up the study's sample.As there weren't many chemistry educators, all of them were employed for the examination. Using a straightforward random sampling technique, the students' sample was chosen. The questionnaire employed to source information from the respondents was termed "Learners and Educators Perspective on the implications of Usage of Instructional Resources in the Teaching and knowledge acquisition of Chemistry Questionnaire (LEPIUIRTKACQ)". There were three sections with 26 things total. Eight topics on using teaching resources during chemistry teaching and knowledge acquisition were embraced in the first section. The next section included 10 questions on how students felt using instructional resources, and the last section included 8 things on how chemistry teachers felt using those same materials.

The criteria for making decisions are founded on the items' average mean scores, which range from Strongly Agreed (4 points) to Strongly Disagree (1 point), with a four-point scale. Two scientific education instructors examined the instrument and provided feedback that was utilized to tweak the items before creating the final copies, giving it face validity. The instrument's internal consistency was justified based on the instrument's reliability analysis using Cronbach's alpha, which produced a notable outcome of0.84. The explorative questions were answered using percentages, means, and standard deviation. The supposition was verified via t-test statistics at 0.05 alpha threshold of significance.

Results:-

The tables below display the discoveriesto the analyzed data.

Table 1:- Responses of students on the extent of usage of instructional materials during lesson by chemistry teachers in Bayelsa State secondary schools.

S/N	ITEMS	FA	%	FD	%	Remark
1	My chemistry teacher uses charts to explain topics during lesson	28	36	50	64	Disagreed
2	My chemistry teacher uses models to explain topics during lesson	25	32	53	68	Disagreed

3	My chemistry teacher sometimes uses apparatus to demonstrate when teaching in the classroom	52	67	26	33	Agreed
4	My chemistry teacher regularly conducts practical lesson using instructional resources during lesson	38	49	40	51	Disagreed
5	My chemistry teacher sometimes divides students into small groups to perform experiment using instructional resources during lesson	44	56	34	44	Agreed
6	My chemistry teacher does not regularly use instructional resources to explain topics during lesson	56	72	22	28	Agreed
7	Most of the time my chemistry teacher do not conduct practical exercises due to non-availability of instructional resources	50	64	28	36	Agreed
8	My chemistry teacher only conducts practical classes using instructional resources at the approach of external examination	66	85	12	15	Agreed

KEY: FA = Frequency Agree, FD = Frequency Disagree

Table 1 indicates that chemistry teachers do not regularly conduct practical lessons because there aren't enough instructional resources available, and they only do so in the weeks leading up to external exams. They also do not regularly use charts and models to explain topics during lessons in the instruction environment. It may be said that Bayelsa secondary schools use instructional resources sparingly when teaching and studying chemistry.

Table 2:- Responses of students on effect of usage of instructional resources on their learning of chemistry.

S/N	ITEMS	Mean	SD	Remark
1	Instructional resources when used during chemistry lesson can help to make what is learnt more meaningful	3.24	0.38	+
2	Instructional resources help to retain what is learnt	3.33	0.44	+
3	Instructional resources when used during chemistry lesson help to enhance practice skills	2.90	0.62	+
4	Instructional resourceshelp to enhance active learning in the schoolroom	3.00	0.59	+
5	They help to make learning more interesting to students	3.40	0.88	+
6	Students get excited to learn when instructional resourcesare used	2.98	0.64	+
7	Students can easily recall what was learnt when instructional resourcesare used during lesson	3.28	0.84	+
8	Students understanding of difficult topics in chemistry can be improved when teachers use instructional resources	3.10	0.79	+
9	The use of instructional resourcesduring chemistry lesson enhances students' development of knowledge process services	3.06	0.66	+
10	Instructional resourceswhen used to teach chemistry topics help to make what is taught real to students	2.88	0.94	+

Note: + = Agreed, - = Disagreed

According to Table 2, the average score for each item is higher than the cut-off mark of 2.50. Entirely, the items thus show how the usage of teaching tools affects students' understanding of chemistry. From the response, it is obvious that instructional resourcesused to teach chemistry make learning chemistry more engaging for students, help students retain what they were taught, help them recall what they were taught, help make topics taught more meaningful to students, improve students' understanding of difficult chemistry topics, enhance students' development of knowledge process services, enhance active learning in the classroom, and get students excited about learning chemistry.

Table 3:- Rating perceptions of chemistry teachers regarding the effect of use of instructional resources on the teaching of the subject.

S/N	ITEMS	Mean	S D	Remark
1	I teach more effectively when I use instructional resources to explain point during chemistry lesson	2.95	1.00	+
2	The use of instructional resourcesduring chemistry lesson help me to drive home the points being explained	3.18	0.96	+
3	Instructional resourcescan help to maximize the time allotted for chemistry	2.96	0.89	+

	lesson			
4	I teach chemistry more competently when I use instructional resourcesduring lesson	3.30	0.67	+
5	The use of instructional resourcesduring chemistry lesson can help teachers to get all students involved in the lesson	2.94	0.59	+
6	The teacher can encourage all students to learn when applicable instructional resourcesare used	3.10	0.99	+
7	Instructional resourceshelp chemistry teachers to guarantee that students do activities individually or in groups during lesson	3.08	0.62	+
8	Instructional resourceswhen used during teaching help to boost the teachers' motivation	3.46	0.82	+

KEY: 2.50 = Bench mark. Mean score from 2.50 and above = +, Man score from 2.49 downwards = -

The mean score for all the items was higher than 2.50, which is the threshold for accepting an item as agreed, according to data in Table 3. Consequently, every item in Table represents theoutcome of operation of educational resources in chemistry instruction process.

Table 4:- Mean performance scores of students taught chemistry using instructional materials and those taught without instructional materials.

Variables	**Mean**	**Std. Dev**
Without instructional resources	33.38	8.10
With instructional resources	44.21	8.47

According to data in Table 4, students who were educatedin chemistry without the use of instructional resources had a mean performance score of 33.38 and a standard deviation of 8.10. Students who were educated in chemistry using instructional resources had an average performance score of 44.21; the standard deviation was 8.47. Data suggests that using instructional resources helped students perform better, with a mean difference of 10.83.

Table 4:- Analysis of mean difference of learners and chemistry educators on the implications of instructional resources usage on the teaching and knowledge acquisition in the subject.

Variables	N	Mean	SD	t-Cal	P	Decision
Chemistry Students	76	31.17	6.78	1.033	0.001	Not Significant
Chemistry Teachers	40	21.97	6.54.			

t-critical = 1.960, DF = 114, $p<0.05$

At $p<0.05$, the t-calculated value of 1.033 in Table 4 is below the t-critical value of 1.960. We accept the null hypothesis. This indicates that no discernible modification in the instructors' and students' average perception ratings of the implications of using instructional resources in the instruction and acquisition of knowledge in chemistry is observed. They perceive things similarly.

Table 5:- Comparable percentage rating of students educated in chemistry with or without instructional resources.

Variables	Senior Secondary School 2	Senior Secondary School 3
Without instructional resources	46%	48%
With instructional resources	58%	62%

According to Table 5, the average performance score for chemistry students in senior high school 2 when taught without the application of educational resources is 46%, but it rises to 58% when such materials are employed by the educator during instruction. The average performance score for chemistry students in senior high school 3 rose from 48% to 62% when the teacher used instructional resources while delivering the lesson.

Discussion:-

To promote student-centered learning, chemistry teachers might make sure that students complete tasks during lessons either independently, in groups, or in pairs. They may work more effectively together and learn more thanks

to this practice. Students of various levels are given the chance to take part in learning through this pattern of education. Instead of merely memorizing information, they adequately recollect facts and analyze critically.
The results support Olaitan, Igbo, Ekong, Nwachukwu, and Onyemaechi's (2019) conclusion that meaningful learning requires the tradition of instructional resources. Enohuean (2015), who claimed that instructional resources helped biology students retain information, perform better, and provided adequatesuggestionsfor thesustenance of deductions respectively. Also, the outcomes of this investigation are consistent with those of Adalikwu and Iorkpilgh (2013), who claimed that the usage of instructional resourcesenhanced students' high academic attainment and a better grasp of chemistry in the State of reference.

The third finding shows that chemistry teachers felt that using instructional resourcesduring lessons improved their ability to teach, drove home the points being made, helped them to motivate all students to learn, facilitated the dissection of students into activity groups, helped them to explain points and concepts more effectively, and helped them make the most of the obtainable instructional time. These results concur with those of Onasanya and Omesewo (2011), who discovered beneficial outcomes from the usage of instructional resources in physics instruction and learning. Aina (2013) provided evidence indicating the employability of instructional resources improved successful scientific teaching and science learning in schoolswith the intentions to provide adequate credence to the conclusion.

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