

EXAMINING THE INFLUENCE OF AUDIO-VISUAL MATERIALS ON CHEMISTRY STUDENTS' INTEREST IN LEARNING CHEMISTRY IN AWKA EDUCATION ZONE, ANAMBRA STATE, NIGERIA

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Abstract

The study sought to examine the influence of audio-visual materials on students' interest in learning chemistry among secondary school students in Awka Education Zone of Anambra state. Four research questions were raised to guide the study. A descriptive survey design was employed. One hundred and twenty four (124) chemistry students drawn from 1,821 senior secondary year two students (SS2) in Awka Education zone in Anambra State formed the sample for the study. Thirty (34) item structured questionnaires on a four-point rating scale developed by the researchers were used for data collection. The instrument used for data collection was questionnaire which was validated by three experts. A reliability coefficient of 0.83 was established using Cronbach Alpha techniques. After the administration of the instrument to the respondents, the data obtained were analyzed using mean, standard deviation, frequency and percentage. The finding among others revealed that some audio-visual materials are available in the chemistry classroom and they are effective in enhancing students' interest in learning chemistry. There are factors that hinder the effective use of audio-visual materials in learning chemistry; they are lack of qualified chemistry teachers with adequate knowledge of modern audio-visual materials. It was recommended among others that government should endeavor to make adequate provision of modern audio-visual materials in schools, teachers should be 8retrained through seminars, workshops and conferences so as to enable them have adequate knowledge of the use of modern audio-visual materials.

Keywords: Audio-Visual Materials, Interest, Learning, Chemistry

Introduction

Chemistry is a very important science subject and a requirement for further learning of a number of science-related professional courses like medicine, agriculture, pharmacy (Samuel, 2017). According to Nwanze and Okoli (2020), chemistry is the study of the composition, properties, changes and uses of matter that form the environment around us. The study of chemistry both at the senior secondary and tertiary education levels of education has however been bedeviled by serious and appalling notes. Chemistry is one of the science subjects that senior secondary school students offer at the senior levels in the Nigerian secondary schools. Chemistry involves experimentation and the learner is required to observe, record, calculate and make intelligent references (Nnoli, 2022). In contemporary Nigeria, greater emphasis is placed on science and technological development. As a result, students are being encouraged to take up science-related subjects. Today, chemistry pervades literally every field of human endeavor, and plays a

fundamental role in educational advancement (Egolum, Samuel & Okonkwo, 2021)). Chemistry is a discipline of science that focuses on the investigation of matter, including its composition, characteristics, and how it transforms. Consequently, a solid foundation in secondary schools, particularly in Nigeria, needs a solid foundation for effective and efficient chemistry education (Nwafor, Eke and Ibe, 2023).

The teaching of chemistry without instructional materials may certainly result in poor academic achievement. Poor academic achievement in chemistry could also be attributed to many factors such as, low interest of students in Chemistry, inadequate motivation from teacher, poor incentives to chemistry teachers, lack of adequate supply of instructional materials, lack of qualified teachers, and use of teacher centered instructional strategies, inadequate use of instructional materials and use of abstract standardized materials (Zhang, 2021). This implies that the mastery of chemistry concepts might not be fully achieved without the use of instructional resources that the students are abreast with (George, 2020). The teaching of chemistry without instructional materials may certainly result in poor academic achievement. Abdeljalil (2021) observed that there is lack of adequate and appropriate instructional resources for effective teaching of chemistry in schools. Professionally qualified chemistry teacher no matter how well trained, would be unable to put his ideas into practice if the school setting lacks the equipment and material resources necessary for him or her to translate his competence into reality. According to Okebukola (2014), the poor state of laboratory facilities and inadequate use of instructional materials has constituted a cog in the wheel of students' achievement in chemistry in the Senior School Examination. The verbal exposition does not promote skill acquisition, objectivity, and critical thinking abilities that will enable the child to function effectively in the society and increase students' interest.

Interest is a feeling which one has for something he/she feels is valuable and beneficial. It is a state of curiosity about something. According to Egolum, Samuel & Okonkwo (2021), interest is an individual behavioural tendency to be attracted towards a certain class of activities Interest promotes intrinsic motivation which has been shown to drive and sustain students engagement in a particular task, Students' interest in chemistry could be achieved by chemistry teachers through careful choice of the most appropriate teaching methods and devices.

Audio-visual media are those devices which are used in the classroom to encourage teaching and learning and make it easier and interesting, the audio-visual media are charts, maps, modules, filmstrip, projectors, radio and television (Bolick, 2003). Audiovisual materials are effective tool that invest the past with an air of realistic experience, which capture their attention and help in the understanding of the historical phenomena, they appeal to the mind through the visual auditory senses (Adukwu and Ezechi, 2021). According to Seo (2020), Audiovisual material are important in education system because they are the best tool for making teaching effective for dissemination of knowledge, so there is no doubt that technical devices have greater impact and dynamic informative system. It is only by the use of audiovisual resources that learners can be offered the opportunity to learn by doing. This is because attention, motivation, concentration and retention of facts are enhanced through the use of audio-visual materials (Poggi, 2021).

However, there has been no consensus on the work ability or otherwise of the use of audiovisual resources in teaching and learning of the numerous works done by researchers and authors of repute. On the contrary, there has been a surge in the number of people who feel worried about the negative aspects in the use of audio-visual resources. In fact, they saw the use of audio-visual resources in teaching and learning as an eccentric in totality.

Statement of the Problem

The act of teaching is fundamentally concerned with passing ideas, skills and attitude from the teacher to the learner (Nnoli, 2023) In Nigeria, for example experience has shown that spoken words alone in the communication of ideas are grossly ineffective and inefficient in producing desired learning outcomes. The reason for this could be ascribed to the fact that there are topics in chemistry that pose serious problem of comprehension to students. There are some topics that cannot be taught effectively without the use of relevant instructional materials like audiovisuals to make the learning practical. On the foregoing, scholars have emphasized the influence of audio-visual materials utilization on teaching and learning. According to them, we learn and remember 10% of what we hear, 40% of what we discuss with others and as high as 80% of what we experience directly or practice (George, 2020). Hinged on this, the problem of the study is to examine the influence of audio-visual materials in chemistry students' interest in learning chemistry in senior secondary school.

Purpose of the Study

This study sets out to investigate the influence of audio-visual materials in chemistry students' interest in learning chemistry in senior secondary school students in Awka Education zone of Anambra state. Specifically, the study sought to examine the;

1. Availability of audio-visual materials in chemistry classrooms.
2. Influence of audio-visual materials on students' interest in learning chemistry.
3. Hindrance to the effective use of audio-visual materials in learning chemistry.
4. Ways of solving the problems to the effective use of audio-visual materials in learning chemistry.

Research Questions

The following research questions have been raised to guide the study:

1. What is the extent of availability of audio-visual materials in chemistry classroom?
2. What is the influence of audio-visual materials on students' interest in learning chemistry?
3. What are the factors affecting the effective use of audio-visual materials in learning chemistry?
4. What are the ways of solving the problems affecting the effective use of audio-visual materials in learning chemistry?

Methods

A descriptive survey design was used for the study. The area of the study was in Awka Education Zone of Anambra State, Nigeria. The population of this study consisted of 1,821 senior secondary year two (SS2) students offering chemistry in all the 61 public secondary schools in Awka Education Zone of Anambra state for the 2021/2022 academic session. Simple random sampling technique by balloting was used to select 124 SS2 chemistry students from three co-educational schools. The sample was drawn from the population of 1,821 SS2 chemistry students in Awka Education Zone of Anambra State. The instrument for data collection was 34 items structured questionnaire on a four-point scale of strongly agreed, agreed, disagreed and strongly disagreed developed by the researcher. The questionnaire had two parts, the first comprised of bio-data of the respondents and the second part was further subdivided into 4 sections according to the 4 research questions. The instrument was validated by two science education lecturers and one expert in measurement and evaluation, dept of education foundation all from Nnamdi Azikiwe university, Awka. Their corrections were effected before the final questionnaire was produced. To establish the reliability of the Instrument, the responses from the respondents not used for the sample were subjected to a reliability analysis using Cronbach alpha which gave a co-efficient of 0.83. The researchers administered the copies of the questionnaire personally to the 124 chemistry students in the three (3) government co-educational schools and all the copies were collected after completion on the spot, this was to avoid instrument mortality rate. The data collected was analyzed using mean and standard deviation. A mean of 2.50 and above indicated that the respondents agreed with items on the questionnaire while a mean below 2.50 indicated that the respondents disagreed with the items. Frequency and percentage were also used to answer questions on availability; 50% indicated availability while below 50% was used as not available.

Results

Research Question One

What is the availability of audio-visual materials in chemistry classroom?

Table 1: Frequencies and percentages of the available audio-visual materials in chemistry classroom

| S/N | Items (ICT Facilities) | Available | | Not Available | | Remarks |
|-----|-------------------------------|-----------|------|---------------|------|---------------|
| | | F | % | F | % | |
| 1. | Interactive whiteboard | 100 | 80.6 | 24 | 19.4 | Available |
| 2. | Infographics | 80 | 64.5 | 44 | 35.5 | Available |
| 3. | Overhead projector | 80 | 64.5 | 44 | 35.5 | Available |
| 4. | Opaque projector | 60 | 48.4 | 64 | 51.6 | Not Available |
| 5. | Motor pictures | 30 | 24.2 | 94 | 75.8 | Not Available |
| 6. | Flip charts | 80 | 64.5 | 44 | 35.5 | Available |
| 7. | Bulletin Board | 85 | 68.5 | 39 | 31.5 | Available |
| 8. | Central Processing Unit (CPU) | 60 | 48.4 | 64 | 51.6 | Not Available |
| 9. | Monitor | 39 | 31.5 | 85 | 68.5 | Not Available |

| | | | | | | |
|---------------------------|-------------------|-------------|------|-------------|------|------------------|
| 10. | Internet | 34 | 27.4 | 90 | 72.6 | Not Available |
| 11. | Charts | 85 | 68.5 | 39 | 31.5 | Available |
| 12. | Flashcards | 30 | 24.2 | 94 | 75.8 | Not Available |
| 13. | Slides | 75 | 60.5 | 49 | 39.5 | Available |
| 14. | Apparatus | 80 | 64.5 | 44 | 35.5 | Available |
| 15. | Textbooks | 120 | 96.8 | 04 | 3.2 | Available |
| 16. | Tape recorder | 80 | 64.5 | 44 | 35.5 | Available |
| 17. | Virtual classroom | 50 | 40.3 | 74 | 59.7 | Not Available |
| 18. | Laptop | 78 | 62.9 | 46 | 37.1 | Available |
| Overall Percentage | | 55.8 | | 44.2 | | Available |

Table 1 revealed that most of the items were considered to be available in chemistry classroom by the respondents. However, items 4, 5, 8, 9, 10, 12 and 17 were considered not available by most of the respondents. The grand percentage showed that most items are available since they scored 50% and above which is the percentage criterion.

Research Question Two

What is the influence of audio-visual materials on students' interest in learning chemistry?

Table 2: Mean scores and Standard Deviation of the respondents on the influence of audio-visual materials on students' interest in learning Chemistry.

| SN | ITEMS | \bar{X} | SD | Decision |
|--|---|------------|-------------|--------------|
| 19 | I am always happy when overhead projector is used during chemistry lessons. | 3.32 | 1.87 | Agree |
| 20 | I do not like missing any chemistry class because I get to learn using a computer. | 3.04 | 1.41 | Agree |
| 21 | I spend time to study Chemistry at least once a week in a virtual classroom. | 2.92 | 1.37 | Agree |
| 22 | I usually come late or avoid coming to school because I don't understand Chemistry textbooks during chemistry lessons. | 2.0 | 1.41 | Disagree |
| 23 | I indulge in discussions or distract myself so as not to listen whenever a chemistry lesson is going on because my teacher uses motion pictures to teach. | 1.54 | 1.73 | Disagree |
| 24 | I love to participate in class works during chemistry lessons because I get to work with apparatus. | 3.22 | 1.52 | Agree |
| 25 | I do not like to solve chemistry calculations using flashcard. | 1.67 | 1.58 | Disagree |
| Grand mean and standard deviation | | 2.5 | 0.74 | Agree |

Results in table 2 show items 22, 23 and 25 with mean scores below 2.50 (disagreement), while items 19, 20, 21 and 24 had positive response with mean scores above 2.50. The grand mean was 2.53 with standard deviation of 0.74 showing agreement by the respondents.

Research Question Three

What are the factors affecting the effective use of Audio Visual in learning Chemistry?

Table 3: Mean ratings of the respondents on the factors affecting the effective use of Audio Visual in learning Chemistry.

| SN | ITEMS | \bar{X} | SD | Decision |
|--|--|-------------|-------------|--------------|
| 26 | Lack of good quality Audio Visual materials can affect learning. | 3.33 | 1.58 | Agree |
| 27 | Educational qualification of the teacher can affect learning. | 3.28 | 1.58 | Agree |
| 28 | Unconducive learning environments can affect learning with audio visual materials. | 3.38 | 1.66 | Agree |
| 29 | Not using the appropriate Audio Visual material in a lesson can affect learning. | 3.26 | 1.58 | Agree |
| 30 | Socio economic factors can affect learning with audio visual materials. | 3.02 | 1.41 | Agree |
| Grand mean and standard deviation | | 3.25 | 0.81 | Agree |

Data in table 3 revealed that the respondents considered all the items as factors affecting the effective use of Audio Visual in learning Chemistry. Hence all the items have mean scores of above 2.50 (agreement).

Research Question Four

What are the ways of solving the problems affecting the effective use of Audio-Visual materials in learning Chemistry?

Table 4: Mean rating on the ways of solving the problems affecting the effective use of Audio-Visual materials in learning Chemistry.

| SN | ITEMS | \bar{X} | SD | Decision |
|--|---|-------------|-------------|--------------|
| 31 | Employment of qualified teachers can help solve the problem. | 3.22 | 1.52 | Agree |
| 32 | Providing conducive learning environment for effective learning. | 3.51 | 1.38 | Agree |
| 33 | Provision of good quality Audio-Visual materials by the government, school principal and parents. | 3.61 | 1.40 | Agree |
| 34 | Proper use of Audio-Visual material in teaching methods. | 3.32 | 1.58 | Agree |
| Grand mean and standard deviation | | 3.41 | 0.59 | Agree |

Items in table 4 showed that all the items were agree with mean scores above 2.50 indicating that all the items were possible solutions to problems affecting the effective use

of Audio-Visual materials in learning Chemistry. The grand mean was 3.41 (agreement) and standard deviation score of 0.59.

Discussion

The study revealed from research question one that some audio-visual materials are available in the chemistry classroom. Adukwu and Ezechi (2021) reported that teachers only use audiovisual materials when they are explaining concepts that students have not heard before, hence, it shows that audio visual materials are effective in enhancing students' interest in learning Chemistry. This is in line with Poggi, (2021) who reported that a teacher can promote the change of situational interest to personal interest by systematically choosing seductive, vivid, coherent and relevant content in an appropriate context and guide his or her students to autonomy supporting activities in learning Chemistry. There are factors that hinder the effective use of Audio-Visual materials in learning Chemistry. This is in line with Adukwu and Ezechi (2021) who noted that Lack of effective supervision of teachers during instructional process hinders effective use of audiovisual materials by the teachers.

Finally, the findings of this study showed that the hindrance for the effective use of audio visual materials in learning Chemistry should be solved when there is a provision of good quality audio visual materials by the government, school principal and parents, proper use of audio visual materials in teaching methods (Okebukola, 2014). These problems if properly addressed, will improve the effective use of audio-visual material in learning chemistry.

Conclusion

The researchers concluded that Audio Visual materials are useful for facilitating and developing learning, since they promote Students' interest in the lessons and provide teachers with a greater variety of pedagogical tools. It can explained that by the fact that audio visual materials can make the lesson livelier and make teaching and learning of Chemistry more enjoyable and interesting, leads to better understanding. Therefore, we suggest extending this strategy to other subjects in science as well as to other disciplines

Recommendations

From the findings of the study, the following recommendations were made.

1. Government should endeavor to make adequate provision of modern audio-visual materials in schools in Nigeria.
2. Teachers should always make adequate utilization of available audio-visual materials in teaching the students.
3. Teachers should be retrained through seminars, workshops and conferences so as to enable them have adequate knowledge of how to use modern instructional materials like projector and others.
4. Practical activities should be introduced and enforced in the teaching of chemistry topics to remove the abstract nature of chemistry concepts and replaced them with concrete experiences for creativity through the use of audio-visual materials.

5. Chemistry curriculum should be re-structured to enable students relate chemistry to nature.
6. Seminars, Conference and workshops on audio-visual and practical activities should be encouraged among chemistry teachers to help them have confidence and develop creativity skills.
7. Undergraduate education should be made to foster creativities by making changes in the university curriculum human resource policies using research and connecting resources that have sustainable benefits.
8. Professional development of the science teachers should be encouraged in order to keep the teachers abreast of the current issues in education and help them refine their professional practice with a focus on skills development.

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