Level of Audio-Visual Materials Use for Teaching and Learning of Basic Science and Technology in Junior Secondary Schools in Ondo State

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Abstract

At all stages of education, audio-visual (AV) materials are vital to teaching and learning. AV materials increase effectiveness in instruction thereby making learning more interesting. This study investigated the extent of audio-visual materials use for teaching and learning of Basic Science and Technology (BST) in Junior Secondary Schools in Ondo State. Descriptive research design of the survey type was adopted for the study. The population comprised all secondary school BST students (over 5000) and teachers (over 200) in Ondo State. A sample of two hundred (200) students and fifty (50) teachers were randomly selected for the study. Three research questions were formulated and one hypothesis raised for the study. Structured questionnaire duly validated (0.82 and 0.87 for students and teachers respectively) were used for data collection. The data collected were analyzed using mean, standard deviation and t-test. The findings revealed that audio-visual materials influence BST student's learning (X=3.09), multimedia projector, virtual classroom/Zoom, electronic bulletin board, VCD/DVD player and Film Projector are not used for BST teaching and learning (X =2.41). Findings also reveal that BST teachers have enough knowledge on how to use audio visual for teaching the subject. (X =2.70). Furthermore, there is no significant difference in the use of audio-visual aids for instruction between male and female teachers [t (48) = 0.839; P>0.05]. It was concluded that AV materials are not properly utilize in Ondo state schools. BST teachers are therefore encouraged to use audio-visual instructional material for instruction to enhance students' comprehension in the subject.

Keywords: Audiovisual, Teaching and Learning, Basic Science and Technology, Junior Secondary School Students

Introduction

The teaching of Basic Science and Technology (BST) in the 21st century is expected to be dynamic, practical centered and activity based. This is because the subject lay a formidable science background for future science studies latter in senior science classes and at higher institution. The provision of adequate audio-visual materials would make this expectation see the light of the day. The benefits of audio-visual materials are only realized when the materials/facilities are utilized by teachers in teaching-learning process. It appears from the researcher's observation that most teachers have formed the habit of adopting solely the theoretical method as a way of teaching subjects in secondary schools. The reason for this could be insufficient or unavailability of audio-visual materials in the schools. It was reported that even when audio visual materials are available in schools, some teachers still do not use them for teaching (Akingbemisilu and Ihekoronye 2016).

The non-use of audio-visual materials in the teaching learning process by teachers could lead to all kinds of misconceptions, poor motivation, dampening of aspirations, killing of morales and poor skill development of students. Audio-visual for education is the educational instruction where materials are used to stimulate the senses of sight and hearing of the learners thereby enriching their learning experiences. According to the Webster dictionary (2020), audio-visual materials is defined as training or educational materials directed at both the senses of hearing and the sense of sight, examples are films, recordings, videos, etc. These materials are used in classroom instructions or in the library collections. They are those devices which are used in classrooms to encourage the teaching and learning process thus, making it easier and interesting. Rasul, Bukhsh & Batool (2011) describe audio-visual materials as the best tools for making teaching effective and the best means of disseminating knowledge. Examples of audio-visual materials are multimedia projector, Film projector, TV, Computer, VCD player, Virtual Classroom etc.

Effective use of Audio-visuals can be vital to the success of any BST programme. Oketunji, (2010) stressed that audio-visual materials when effectively used have these advantages: they lessen major weakness of verbalism, humanize and vitalize subject matter, provide interesting approach to new topics and give initial correct impressions, economize time in learning, supply concrete materials needed, as well as stimulate the initiative of the students. Swank et. al, (2018) further stressed the effectiveness of visual materials in leaning, estimating that about 40% of lesson concepts are based upon visual experience, 25% upon auditory, 17% on tactile, 15% upon miscellaneous organic sensation and 3% upon taste smell. With this assertion, one gets a clearer view of the need for audio-visual materials use in the teaching and learning processes, especially for a foundational science subject like BST.

Objectives of the Study

The purpose of the study is to investigate the extent of audio-visual materials use for teaching and learning of basic science and technology in junior secondary schools in Ondo State**.** Specifically, the objectives of the study are to:

1. examine whether audio visual materials are in use during teaching and learning of Basic Science and Technology at junior secondary school;
2. ascertain if science teacher have the knowledge on how to use audio visual in teaching Basic Science and Technology; and
3. determine the teachers and students perceived influence of audio-visual materials in learning Basic Science and Technology among students.

Research Question

The following research questions are raised to guide the objectives of this study

1. Are audio-visual materials being used for instruction of Basic Science and Technology at junior secondary school?
2. Do Basic Science and Technology teachers have the knowledge on how to use audio-visual materials for teaching the subject?
3. What is the influence of audio-visual materials in learning Basic Science and Technology among students?

Research Hypothesis

The null hypothesis formulated was:

Ho: *There is no significant difference between male and female teachers in the use of audio-visual materials for their instruction.*

Methodology

This study adopted descriptive research design of the survey type. This design is suitable for this study because it involves collection of information from sample of secondary school basic science and technology teachers and students. The population of this study comprised of all secondary school Basic Science and Technology teachers and students in Akoko South West Local Government Area of Ondo State. A sample of 50 (fifty) Basic Science and Technology teachers and two hundred (200) junior secondary school students were randomly selected from ten (10) secondary schools within the population. Simple random sampling was used to select twenty (20) Basic Science and Technology students from each of the (10) schools and five (5) Basic Science and Technology teachers from each of the (10) schools selected.

The research instrument used for this study is a self-constructed questionnaire. The questionnaire was categorized into two (2) sections; A and B. Section A elicited demographic information of the respondents such as name of school and gender for the student's questionnaire. Section B consisted of items in accordance with the research questions. The item section of the instrument was measured on a 4-point

Likert scale, ranging from strongly agree, agree, disagree to strongly disagree. The teachers' questionnaire, is categorized to two (2) sections A and B. Section A elicited demographic information of the respondent such gender and qualification. Section B consisted of items in accordance with the research question. The item section of the instrument was measured on a 5-point Likert scale, ranging from Always in use (AIU); Sometimes in use (SIU); Rarely in use (RIU); Never in use (NIU); and Not Certain (NC). The items in the questionnaire were carefully reviewed by educational research experts and educational technologists for necessary corrections and modification. Comments and corrections made by these experts were carefully adjusted to in other to establish the face and content validity of the instrument. Later**,** test-retest method was employed to establish the internal consistency of the instrument. The instrument was administered twice within an interval of two weeks to twenty (20) student respondents and ten (10) teacher respondents who were not part of the sample but within the population. The reliability of the instruments were ascertained using Pearson Product Moment Correlation (PPMC) and the value yielded were 0.82 and 0.87 respectively for students and teachers questionnaire.

The researcher visited the sampled schools and obtained permission from the schools' managements. After which copies of the questionnaires were distributed to the respondents by the researcher. Completed questionnaires administered were collected by the researcher immediately after giving the respondents sufficient time to complete the instrument. They were allowed to ask questions on areas where they do not understand and explanations were provided to guide them in completing the instrument. The data collected were analyzed using frequency counts, means, standard deviations to provide answer to three research questions generated and t- test statistics was used to test one null hypothesis formulated for the study.

Results

Research Question One: Are audio-visual materials being used for instruction of Basic Science and Technology at junior secondary school?

Table 1: Mean and Standard Deviation of responses on the usage of audio-visual aids for Basic Science teaching and learning

S/N	Items	Mean	SD	Decision
1	Multimedia projector	2.31	0.42	Disagreed
2	Virtual classroom/Zoom	2.36	0.47	Disagreed
3	Electronic bulletin board	2.34	0.45	Disagreed
4	VCD/DVD player	2.41	0.52	Disagreed
5	Film Projector	2.28	0.34	Disagreed
6	Interactive white board	2.61	0.72	Agreed

7	Computer set	2.58	0.64	Agreed
	Grand Mean	**2.41**		

Mean average of 2.50 was set to take decision

Analysis shown in Table 1 revealed that the mean scores of most of the items fell below the 2.50 benchmark. The grand mean further attested to that fact; hence it is deduced that multimedia projector, virtual classroom/Zoom, electronic bulletin board, VCD/DVD player and Film Projector are not fully used for basic science teaching and learning as deduced by both teachers and students

Research Question Two: Do Basic Science and Technology teachers have the knowledge on how to use audio-visual materials for teaching the subject?

Table 2: Mean and Standard Deviation of responses on the basic science teachers' knowledge on how the usage of audio-visual aids in teaching basic science

S/N	ITEMS	Mean	SD	Decision
8	Basic science teacher have no ideas on how audio-visual aids materials work	2.81	0.91	Agreed
9	Teachers allow the students to participate in class work when teaching and learning audio visual aids	2.63	0.72	Agreed
10	Students are not allowed to ask questions during the use of audio-visual aid in class	2.87	0.98	Agreed
11	Teachers do not allow the students to demonstrate simple experiment in class for student easy understanding after the use of audio-visual aid materials	2.91	1.03	Agreed
12	Basic science teachers have the knowledge on how to use audio-visual aid materials in teaching and learning of basic science education	2.45	0.51	Disagreed
13	Assignments are not given by the teachers at the end of basic science and technology lesson	2.48	0.54	Disagreed
14	Teachers find it difficult to use audio-visual aid in teaching and learning of basic science	2.74	0.81	Agreed
	Grand Mean	**2.70**		

Mean average of 2.50 was set to take decision

Analysis shown in Table 2 revealed that the mean scores of most of the items fell above the 2.50 benchmark. The grand mean (2.70) further attested to that fact; hence it was deduced that basic science teacher have sufficient knowledge on how to use audio visual materials in teaching basic science and technology.

Research Question Three: What is the influence of audio-visual materials in learning BST among students?

To answer this question, table 3 was used

Table 3: Mean and Standard Deviation of responses on the influence of audio-visual aid in learning basic science among students

S/N	Items	Mean	SD	Decision
1	I understand better when audio-visual aids material is being used during teaching and learning in class room	3.09	0.85	Agreed
2	Audio-visual materials improve my comprehension in class activities	3.12	0.94	Agreed
3	Learning with the audio-visual materials make the class interesting to me	3.05	0.81	Agreed
4	Audio visual materials improve my study habit	3.16	0.98	Agreed
5	I remember quickly when I am taught with audio-visual aids material while learning	3.02	0.78	Agreed
	Grand mean	**3.09**		

Mean average of 2.50 was set to take decision

Analysis shown in Table 3 revealed that the mean scores of all the items fell above the 2.50 benchmark. The grand mean (3.09) further attested to that fact; hence it is deduced that audio-visual materials influence basic science students learning positively.

Testing of Hypothesis

Research Hypothesis: *There is no significant difference between male and female teachers in the use of audio-visual materials for their instruction.*

Table 4: T-test table showing the difference between male and female teachers on the use of audio-visual materials for instruction

Gender	N	X	SD	df	t-cal	p-value	Decision
Male	17	32.44	4.445	48	0.839	0.403	Not sig
Female	33	31.57	6.266				

In table 4, the mean and SD of the male are 32.44 and 4.445 respectively while the mean and SD of the female are 31.57 and 6.266 respectively. The t-cal is 0.839 while the p-value is 0.403. Since the t-calculated 0.839 is greater than the p-value 0.403 ($p>0.05$). This indicates that there is no significant difference in the male and female teachers on the use of audio-visual aids for their instruction. Hence the null hypothesis 1 is therefore not rejected.

Discussion and implications of Findings

Result of findings for research question one revealed that; most of the respondents disagreed that multimedia projector, virtual classroom/Zoom, electronic bulletin board, VCD/DVD player, film projector, interactive white board and computer set are used for basic science teaching and learning. This is in line with the findings Olanusi and Falade (2022) who conducted a study on the integration of ICT in Nigerian primary and secondary schools. The study identified and established some challenges that full utilization of ICT face. The identified challenges are similar to the findings of this study.

Result of findings for research question two revealed that; most of the respondents agreed that basic science teachers have sufficient ideas on how audio-visual materials were available. Teachers allow the students to participate in class work when teaching and learning audio visual aids, students are not allowed to ask questions during the use of audio-visual aids in class, teachers do not allow the students to demonstrate simple experiment in class for student easy understanding after the use of audio-visual aid materials, basic science teachers have the knowledge on how to use audio-visual aid materials in teaching and learning of basic science education, assignments are not given by the teachers at the end of basic science and technology lesson and teachers find it difficult to use audio-visual aids in teaching and learning of basic science. This finding is in line with the findings Idaka and Umoh (2023) who stated that innovative teaching strategies such as Audio Visual materials can be utilized for improving the performance of students in Chemistry.

Result of findings for research question three revealed that; most of the respondents agreed that they understand better when audio-visual material is being used during teaching and learning in class room, audio-visual materials improve their comprehension in class activities, learning with the audio-visual materials make the class interesting to them, audio visual materials improve their study habit and they remember quickly when they are taught with audio-visual material while learning. This finding is in line with the findings of Oketunji (2000) who informed on the importance of audio-visual materials, emphasizing that when effectively used, audio-visual aidshave these advantages amongst others; they make up for gaps which emanate from oral presentations, inject interactivity with objects and collaboration with humans in the teaching or learning process, provide interestingly innovative approaches to new topics thereby stimulating the initiative of the junior secondary school students and promoting the development of reading skills.

The research hypothesis one revealed that there is no significant difference in the male and female teachers on the use of audio-visual materials for their instruction.. This is in line with the findings of Janse and Adank (2012) who stated that there is no difference in the use of audio-visual aids between male and female teachers.

Conclusion

The study concludes that:

1. Usage of audio visual aids for the learning and teaching BST is low.
2. BST teachers have sufficient knowledge on how to use audio visual materials where available for teaching.
3. Audio visual materials influence basic science learning positively.
4. There is no significant difference in the male and female teachers on the use of audio-visual materials for their instruction.

Recommendations

Based on these findings, the following recommendations were made:

1. Science teachers (BST especially) should be encouraged to use audio visual material for their instructions rather than using mere conventional method of teaching, this would enhance students' comprehension in their subjects.
2. Curriculum planners and stakeholders in education should include usage of audio visual materials in teaching and learning in our junior secondary schools.
3. Governments at all levels should provide easy access for science teachers to attend in- service and pre-service training, seminar, workshops and conferences where they can learn and develop in the use of audio-visual materials.
4. Also, adequate provision for audio- visual materials such as: projectors, computer, screen, power supply/generators and human personnel should be provided for in various secondary schools for instruction.

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