EFFECTS OF AUDIOVISUAL MATERIALS ON THE TEACHING AND LEARNING OF PHYSICS IN SENIOR SECONDARY SCHOOLS IN GASHUA, BADE LOCAL GOVERNMENT, YOBE STATE, NIGERIA.

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Abstract

This study examines the effects of audiovisual materials on the teaching and learning of physics in senior secondary schools in Gashua, Bade Local Government, Yobe State, Nigeria. The study employed a descriptive survey research design, involving a sample of 702 respondents drawn from a total population of 5,640. A structured questionnaire, "Effect of Audio-Visual Material in Teaching Physics (EAVP)," was utilized for data collection. Data were analyzed using mean and standard deviation, while hypotheses were tested using ANOVA at a 0.05 level of significance. The findings reveal that audiovisual materials enhance student retention and comprehension of physics concepts. However, the availability of these materials is limited, and many teachers rely primarily on theoretical instruction. Recommendations include the provision of more audiovisual resources and training for teachers to maximize their use in physics education.

Keywords: Audiovisual materials, Teaching and learning, Physics, Senior Secondary Schools.

1. Introduction

Physics is one of the basic science subjects which deal with the study of matter and energy and how they interact. It is one of the science subjects taught at the senior secondary level of Nigeria educational system. Physics deals with the study of matter and natural events, which is based mostly on empirical observations and quantitative measurements. Henry (2009) defined physics as "the rational development of tests, observations, and theories to explain the fundamental structure of what we observe". This definition is critical for effective living in this age of research and technology. Physics provides the foundational knowledge required for future technological advancements that will continue to power the world's economic engines. The knowledge of Physics brings about a lot of innovations in field of science and technology either directly or indirectly to performing tasks with the aid of technological gadgets. Among other technology gadgets that facilitates teaching and learning is audio visual materials.

Audio visual are materials which assist teachers to make their lessons explicit to students, transmit information, ideas and notes to learners. Audio visual materials include both visuals and audiovisuals such as pictures, flashcards, posters, charts, tape recorder, radio, video, television, computers among others. These materials serve as supplement to the normal processes of instruction. The use of audio- visual in industries has been extensive, as it has been effective in increasing productivity and retention rates, where research has shown that people remember 20% of what they see, 40% of what they see and hear, but about 75%of what they see and hear and do simultaneously (Lester, 2012).

Audio visual is now permeating the educational system as a tool for effective teaching and learning. With audiovisual, the communication of information can be done in a more effective manner and it can be an effective instructional medium for delivering information. Audio-visual access to knowledge is one of the possibilities of information and communication technology that has tremendous impact on learning. The instructional media have emerged in a variety of resources, and equipment, which can be used to supplement or complement the teachers' efforts in ensuring effective learning by students. It is recognized that conventional media technologies can no longer meet the needs of our teaching and learning processes; as a

result they are being replaced by audio visual technology. This technology provides a learning environment that is self-paced, learner-controlled and individualized.

Similarly, Audio visual is defined as the combination of various digital media types such as text, images, sound and video, into an integrated multi-sensory interactive application or presentation to convey a message or information to an audience. In other words, audio visual means "an individual or a small group using a computer to interact with information that is represented in several media, by repeatedly selecting what to see and hear next" (Ogunbote and Adesoye, 2016). Olawalem, (2013) identified different types of audio visual communication, some of which include physics hardware, physics software, public address systems, slides, overhead projectors, opaque projectors, videos, cassettes, audio tapes, cassette recorders, flip, time sequence, stream charts, Diorama still motion pictures among others Audio visual in Education. Audio visual in Education has been extremely effective in teaching individuals a wide range of subjects. Audio visual is changing the way we communicate with each other. The way we send and receive messages is more effectively done and better comprehended. While a lecture can be extremely informative, a lecture that integrates pictures or video images can help an individual learn and retain information much more effectively. Using interactive CD-ROMs can be extremely effective in teaching students a wide variety of disciplines, most notably languages and music. A multi-sensory experience can be created for the audio ence, which in turn, elicits positive attitudes towards its application (Neo and Neo, 2001). Audio visual has also been shown to elicit the highest rate of information retention and result in shorter learning time (Komiya, 2019). Furthermore, the use of relevant instructional materials in science teaching enables students to acquire the necessary science process, attitudinal, creative and practical skills which will enable them function as effective and productive members of the society. The use of instructional materials in teaching process provides the basis for improved teaching and learning of a subject.

Teaching is a set of events outside the learners which are designed to support internal process of learning. Some of the teaching techniques used to facilitate the education of students with different learning styles. The different teaching strategies are intended to help students develop critical thinking and engage with the material. The choice of teaching strategy depends

on the concept being taught, and indeed on the interest of the students such, as demonstration, inquiry, peer-tutoring, project, lecture-demonstration, lecture performance, problem-solving, field trips, cooperative or group learning, excursion, remedial, laboratory and guided discussion and the use of audio-visual materials have been recommended for the teaching of Physics. Method is very vital in any teaching and learning situation. The method adopted by the teacher may promote or hinder learning. It may sharpen mental activities which are the bases of social power or may discourage initiatives and curiosity thus making self-reliance and survival difficult (Dantai and Paul, 2017). What constitutes good/effective teaching and learning of school subject is the use of appropriate method of teaching. Sola (2017) asserted that one of the most persistent and compelling problems besetting academic achievement in Nigeria is poor quality of teaching. There is a number of teaching methods for physics teachers to use. These include: lecture, discussion, demonstration, laboratory, inquiry, individualized instruction, field–trip, peer- group teaching methods and so on. According to Obeka (2015), Physics as a subject is bulky in nature in terms of content; a subject teacher usually adopt lecture method of teaching in order to cover the syllabus within the stipulated time and thus does not give room for proper understanding of the subject.

Gashua is a community in Yobe State, in northeastern Nigeria. Since 1976, it has been the headquarters of the Bade Local Government Area, with about 125,100 inhabitants. The average elevation is about 299 m.

This study sought to determine the effects of audiovisual materials on the teaching and learning of physics in senior secondary schools in Gashua.

2. Theoretical Framework

The study is anchored in the VARK (Visual, Aural, Read/Write, Kinesthetic) learning theory proposed by Fleming (2006). The VARK model categorizes learners based on their preferred sensory modalities, emphasizing the significance of audiovisual materials in enhancing physics instruction.

3. Research Hypotheses

- **Ho1:** There is no significant difference in the mean responses of principals, teachers, and students regarding the availability of audiovisual materials for teaching physics.
- **Ho2:** There is no significant difference in the mean responses of principals, teachers, and students on the effects of audiovisual materials on physics learning.

4. Methodology

The study utilized a descriptive survey design. The target population consisted of 5,640 individuals (9 principals, 847 teachers, and 4,793 students). A sample of 702 respondents was selected using purposive sampling. Data collection was conducted using a validated questionnaire with a reliability coefficient of 0.917 (Cronbach's Alpha). Data analysis was performed using SPSS version 20, employing mean, standard deviation, and ANOVA.

5. Results

5.1 Availability of Audiovisual Materials

The study found that while whiteboards, textbooks, and PowerPoint presentations were widely available, other essential materials such as video sets, computers, and tape recorders were scarce.

Table 1: Means and Standard Deviation of Responses of the Respondents on the availability of audio-visual materials in teaching and learning Physics in senior secondary School in Bade Local Government

N = 702

S/n	Items	Mean	SD	Remark
1	Tape recorder	3.25	0.91	Very Low in Supply
2	Radio set	2.29	0.64	Very Low in Supply

3	White board	3.80	0.80	Very Highly Available
4	Models	3.06	0.65	Very Low in Supply
5	Objects and specimens	3.51	1.10	Very Highly Available
6	Textbooks /Library	4.07	0.96	Very Highly Available
7	Power point	3.58	0.91	Very Highly Available
8	Charts	3.43	1.18	Very Low in Supply
9	Articulated skeleton	2.52	1.35	Very Low in Supply
10	Video sets	2.30	0.91	Very Low in Supply
11	Computer	2.45	0.92	Very Low in Supply

Table 2: Analysis of Variance (ANOVA) of the Mean Responses of the Respondents on the availability of audio-visual materials in teaching and learning Physics in senior secondary School in Bade Local Government

N = 702: Principals 4, Teachers 18 and Students 680.

S/n	Items	Mean	SD	df	F	sig	Remark
1	Tape recorder	3.25	0.91	2	0.006	.994	S
2	Radio set	2.29	0.64	2	0.018	.982	S
3	White board	3.80	0.80	2	0.006	.994	S
4	Models	3.06	0.65	2	1.591	.204	S
5	Objects and specimens	3.51	1.10	2	1.733	.178	S
6	Textbooks /Library	4.07	0.96	2	1.001	.368	S
7	Power point	3.58	0.91	2	1.993	.137	S
8	Charts	3.43	1.18	2	0.026	.974	S
9	Articulated skeleton	2.52	1.35	2	0.157	.855	S
10	Video sets	2.30	0.91	2	0.005	.995	S

11	Computer	2.45	0.92	2	0.235	.790	S

S = Significant, NS = Not Significant SD = Standard Deviation

Table 2 indicates that the calculated F values for items 1-11 are above 0.05 significant levels. For this reason, there is no significant difference in the mean responses of the respondents on those items.

5.2 Effectiveness of Audiovisual Materials

Findings indicate that audiovisual materials enhance student retention, engagement, and understanding of physics concepts. However, many teachers overlook their use, believing theoretical instruction to be sufficient.

Table 3: Means and Standard Deviation of Responses of the Respondents on the effect of using audio-visual materials in teaching and learning Physics in senior secondary School in Bade Local Government

N=702

S/n	Items	Mean	SD	Remark
12	Utilization of audiovisual aids make the students to remember the concept for longer period of time	4.76	0.57	Agree
12	Teachers often over-look using audio-visual materials	3.91	0.28	Agree
13	Most teachers believe that Physics can still be understood theoretically without the use of audiovisual material	3.63	0.85	Agree
14	Teachers only use audiovisual materials when they are explaining concepts students have not heard before	3.63	0.78	Agree
15	Teachers utilize audio-visual materials often	3.53	1.13	Agree

Table 4: Analysis of Variance (ANOVA) of the Mean Responses of the Respondents on the effect of using audio-visual materials in teaching and learning Physics in senior secondary School in Bade Local Government

N=702: Principals 4, Teachers 18 and Students 680.

	Items	Mean	SD	df	F	Sig	Remark
12	Utilization of audiovisual aids make the students to remember the concept for longer period of time	4.76	0.57	2	1.741	0.176	S
12	Teachers often over-look using audio-visual materials	3.91	0.28	2	0.768	0.464	S
13	Most teachers believe that Physics can still be understood theoretically without the use of audiovisual material	3.63	0.85	2	0.062	0.939	S
14	Teachers only use audiovisual materials when they are explaining concepts students have not heard before	3.63	0.78	2	0.074	0.929	S
15	Teachers utilize audio-visual materials often	3.53	1.13	2	0.079	0.924	S

S = Significant, NS = Not Significant, SD = Standard Deviation

Table 4 indicates that the calculated F values for items 1 to 5 are above 0.05 significant levels. Hence, there is no significant difference in the mean responses of the respondents on those items.

6. Conclusion

The study confirms that audiovisual materials significantly enhance physics education by improving concept retention and student engagement. However, their availability remains limited. It is recommended that schools invest in audiovisual resources and provide training for teachers to effectively utilize these materials.

7. Recommendations

1. Government and school administrators should prioritize the provision of audiovisual teaching aids in physics laboratories.
2. Teachers should receive training on the effective use of audiovisual materials.
3. Schools should encourage teachers to improvise and develop locally available audiovisual resources.
4. More research should be conducted on innovative ways to integrate technology into physics education.

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