

AVAILABILITY AND USE OF AUDIO-VISUAL MATERIALS FOR TEACHING MATHEMATICS AT THE SENIOR SECONDARY SCHOOL IN IBADAN, SOUTH-WEST LOCAL GOVERNMENT, OYO STATE

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ABSTRACT

The paper investigates the availability and use of audiovisual materials for teaching Mathematics at the Senior Secondary School level in South-west Local Government Area in Ibadan, Oyo State, Nigeria. The objectives are to identify various audio-visual materials that are available and used by teachers of mathematics during lessons as well as the benefits teachers derived on the use of instructional materials and the challenges militating against their usage. The study employed descriptive survey research design involving seventy- three mathematics teachers in sixteen Senior Secondary School selected randomly from twenty-four Senior Secondary School in Ibadan South-west Local Government. The main instrument for data collection was the questionnaire, of which seventy-three copies of questionnaire were distributed and sixty-eight were returned and valid for analysis while data gathered were analyzed using frequency count, table and percentage. The result revealed that audio-visual materials such as chalkboard, calculator, four figure table, graph board, mathematical textbook, charts, mathematical sets, chalk board and meter ruler were all available and utilized in all the schools while materials such as chalkboard compass, chalkboard pairs of divider and interactive white board were not available in any of the schools. Meanwhile some of the materials have disparity on the availability and their use. It also revealed that teachers derived satisfaction when teaching aids are inculcated in teaching while the major challenge was funding to acquire necessary materials Based on these findings, one of the recommendations made was that stakeholder in education sector should be of helping hand in the provision of some materials rather than depending on government only.

Keywords: Audio-visual materials, Mathematics, Mathematical instructional materials

INTRODUCTION

Audio-visual materials are important aspect in teaching and learning in all stages of education. They are considered as essential means of increasing effectiveness in teaching and learning, they make learning more interesting thereby contributing to the depth and way of learning (Mcnaught, 2007). The advance made in technology has provides for teachers of particular subject to teach in way that learners or students are able to retain knowledge better through visualizing what is been thought. Therefore, audio-visual materials are teaching aids using both sight and sound which could be inform of models or video. They exist to support the goals of teaching and learning in our schools, thereby making teaching and learning to be more effective. This fact if proven from the adage that says’’ tell me I forget, show me I remember, involve me and I understand’’.

Teachers of mathematics can make teaching of the subject easy and interesting through the use of appropriate audio-visual materials. Therefore, Mathematical teaching aids are instruments, tools or equipment used for teaching and learning Mathematics in a practical way. These teaching aids could come in form of audio, visual as well as models. Therefore, the method employed by teachers of mathematics will depend on the teaching aids been provided by the school to teach to the understanding of the students. (Apte, 2014).

Mathematics is a subject that connects all other science subjects as well as compulsory subject in primary and secondary education. Therefore, the available and use of audio-visual aids in teaching the subject is imperative, this is because audio-visual materials creates a stimulating and interactive environment which is conducive in learning thereby helping students to develop skill in solving mathematical problems. According to Nwachukwu (2006) asserts that audio-visual aids are instructional materials meant to improve the quality of teaching for effective academic performance of students in schools

STATEMENT OF THE PROBLEM

Mathematics is considered as one of the compulsory subjects that students must pass at every exam they take, mostly especially the exams for the senior secondary certificate that will qualify them to gain admission into higher institutions of learning, for this reason, it becomes necessary for teachers who teaches mathematics to inculcate the use of audio-visual materials in other to

make teaching of mathematics interesting, understanding as well as save the time of the teacher. Unfortunately, sometime these audio-visual materials may not be available for teachers to use in teaching the subject or teachers themselves may neglect to make use of the teaching aids in teaching mathematics. It is on this note that the study aimed to find out the availability and the use of audio-visual materials by teachers in teaching mathematics.

OBJECTIVES OF THE STUDY

1. To ascertain the types of audio-visual materials available in teaching of mathematics at the Senior Secondary School in Ibadan, South-west, Local Government
2. To ascertain the audio-visual material that is often used in teaching Mathematics to students in Ibadan, South-west, Local Government
3. To ascertain the benefit derived from the use of audio-visual materials in teaching Mathematics School in Ibadan, South-west, Local Government
4. To ascertain the problem encounter in the use of audio-visual in teaching Mathematics School in Ibadan, South-west, Local Government

RESEARCH QUESTIONS

1. What are the available audio-visual materials for the teaching of Mathematics at the Senior Secondary School under study?
2. Which of those audio-visual materials are often used in the teaching of Mathematics?
3. What benefit do teachers derived from the use of audio-visual material in teaching mathematics?
4. What are the problems encounters in the use of audio-visual material while teaching Mathematics?

LITERATURE REVIEW

CONCEPT OF AUDIO-VISUAL MATERIAL

The concept of audio-visual material has been defined by various scholars and researchers. For Instance, Dike (1993) viewed audio-visual materials as those materials which does not depend solely upon reading to convey messages; they present information through the sense of hearing as audio materials or through the sight as visualized materials or it could be through the

combination of both senses. According to Kinder (2015) defines audio-visual materials as any devices which can be used in teaching in order to make learning more effective, more concrete, more realistic and more dynamic. In another development Rather (2004) defines audio-visual materials as any instructional aids such as map, chart, models, projector, television and so on used in the classroom to aid learning and thereby making it easier and interesting to students to understand.

The use of audiovisual materials in teaching of mathematics at the senior secondary school refers to those resources employed or available to teachers that help to inculcate understanding of the subject to the students. Therefore, Mathematics refers to science subjects that deal with logic of shapes, quantity and arrangement; it is considered as a building block that revolves our daily activities (Live science, 2013). Similarly, Steen (1990) viewed Mathematics as an exploratory science subject that seeks to understand every kind of pattern such as patterns that occur in nature, patterns invented by the human mind, and patterns created by other patterns. He added that for students to understand and grow mathematically, they must be exposed to a rich variety of appropriate teaching aids to their own lives through which they can see variety, regularity and interconnections.

IMPORTANCE OF AUDIO-VISUAL MATERIALS IN TEACHING AND LEARNING MATHEMATICS

The application of audio-visual materials in teaching makes learning more interesting and effective. It has made it possible to breach the gap that exists among students who have low level in comprehending learning. According to Osokoya (1987) stated that the use of audio-visual materials in teaching and learning does not only involve the use of textbooks but it includes other instructional materials that enable students to visualize the conceptual implication of what is being taught. He added that use of audio-visual materials in teaching enable the teachers to arrest and gain the attention of the students.

In addition, audio-visual materials are recognized as sources that aid teachers by imparting knowledge in all levels of education. It has assisted teachers to present teaching in a more practical way thereby overcoming difficulties that exist in teaching a particular subject matter

(Gopal, 2010). Also, Cummins (2001) posited that audio-visual aids assist students to find solution to problems when they are able to view them practically.

The use of audio-visual materials in teaching and learning made teaching interesting to students and their teachers as well as creating better relationship in the classroom, and promoting effective communication between the students and their teachers. Teaching aids have help students to retain knowledge better thereby making learning to be permanent; it enables students to retain and recall what they have learnt. This is made possible because they were able to visualize what was been taught in the classroom. (Dike, 1993 and Natoli, 2011).

Furthermore, the availability and effective use of audio-visual material in teaching at secondary schools enhances and increases the rate of learning, thereby saving the time of the teachers which can be channel to other activities such as teachers' participation in curriculum development, compilation of lesson note etc. The inculcation of teaching aids helps students to experience concept virtually which result in making lessons explicit to the students and expanding their horizon of experience. (Joseph, 2003).

Adebanjo (2007) highlighted that the use of audio-visual materials by teachers of mathematics motivate students to learn fast, promote and sustain their interest thereby enable the students to discover their potentials as well as engaged in self-instruction in solving mathematical problems. Apte (2014) also posited that the use of teaching aids such as charts, models, pictures, graphics, posters etc enables the mathematics teacher to demonstrate, explain and reinforce abstract mathematical ideas through the use of these concrete objects.

CATEGORIES OF AUDIO-VISUAL MATERIALS USED IN TEACHING AND LEARNING MATHEMATICS

The Library and Information Science Network(2013) categorized audio-visual material that enhance teaching in every stage of education in to three parts; they are Firstly, auditory materials which involves the use of sense of hearing such as telephone, recording, tele-lecture, sound films and radio; the second category is the visual material which involves understanding an object by visualizing it through the sense of seeing such as chart, picture, projected materials, illustrated books, globes etc while the third category is the audio-visual materials which involves the

combination of auditory materials and the visual materials for effective teaching; these include the use of television, motion picture, printed materials with recorded sound, demonstration etc.

In addition, Dike (1993) posited that audio-visual materials used in the classroom to enhance learning includes audio resources such as records, radio broadcast and tapes and cassettes while the visual resources are model, real objects, the chalkboard, graphs, diagrams maps, three-dimensional display, poster, pictures as well as other educational programs like field trips, games and demonstration.

In another development, Apte, (2014) posited that the chalkboard is the foremost and commonest audio-visual aid used in teaching mathematics because it assists the teacher to displace diagrams and enable students to understand concrete ideas about figure and objects. He also added that other audio-visual aids that assist the teachers in teaching mathematics includes the textbook, drawing instrument, measuring instrument, log table, calculator, CDs, television, interactive board and radio etc.

CHALLENGES OF USING AUDIOVISUAL MATERIALS IN TEACHING AND LEARNING MATHEMATICS

Audio-visual materials used in teaching and learning offer great opportunity for teachers to impart knowledge easily in the students. These teaching tools help teachers to facilitate communication, build interest and confident in the students in learning the subject called mathematics. However, despite the numerous benefits of using mathematical teaching aids to facilitate learning many of our schools are still in shortfall of these facilities that promotes and enhances learning. Adebule, (2009) enumerated some of these problems in teaching and learning of mathematics which included non-availability of audio-visual teaching aids, language problem, students' attitude towards mathematics, lack of qualify teachers to handle and Manned the teaching aids appropriately. In another development, Jones (2004) opined that teachers who have little or no skill in the use of teaching aids will try as much as possible to avoid using the materials.

Furthermore, mathematics education in our schools from the onset has been affected by culturally, students believe and considered mathematics as a dull and difficult subject to teach and learn, for these reasons fear has been created in the mind of the students and this result in the

development of phobia among the students thereby resulting to lack of interest on the part of the students to learn the subject, and the teacher find it difficult to arrest the attention of the students. (Apte, 2014).

RESERCH METHOLOGY

Research design

The research design adopted for the study is the descriptive survey research method. This design was adopted because the study seeks to provide information on existing situation about the availability and use of Audio-visual materials in teaching mathematics in selected Senior Secondary Schools in Ibadan, South-west Local Government area in Oyo State, Nigeria.

Population and sampling technique

The population for this study consists of seventy-three mathematics teachers in sixteen Senior Secondary School randomly selected from twenty-four public senior secondary school in South - west Local Government. All the mathematics teachers in the selected schools were involved in the study.

Instrumentation for data collection

The research instrument for this study is a questionnaire designed following the rigorous review of literature. The questionnaire comprises five sections that are used to elicit data on respondents' demographic data, availability of audio-visual materials, audio-visual materials used in teaching and learning mathematics, benefits derived in the use of audiovisual materials in teaching mathematics and the challenges encountered in the use of audio-visual materials while teaching mathematics at the Senior Secondary School level.

Data analysis

The data collected for this study were analyzed using the descriptive statistics, such as frequencies, percentages, and tables; these were used to summarize the data obtained from respondents

PRESENTATION OF RESULTS

Response rate of respondents

Table 1: Response rate of respondents

S/N	Name of Schools	No. of Questionnaires Distributed	No. of Questionnaires Retrieved
1	Government College, Apata	5	5
2	Queens College, Apata	5	5
3	I.M.G. High School, Apata	4	4
4	Our Lady of Apostles College, Odo-Ona	5	5
5	Odo-Ona Girls Grammar School, Odo-Ona	4	3
6	Basorun Ogunmola High School, Ring Road	5	5
7	Oluyole High School, Ring Road	5	4
8	Community Grammar School, Ring Road	4	3
9	Ansaru-Deen High School, Liberty Road	5	4
10	Baptist Secondary School, Oke-Ado	5	5
11	Saint Teresa's College, Oke- Ado	5	5
12	Oke Bola Comprehensive High School, Oke- Bola	5	5
13	Ibadan Boys high School, Oke Bola	5	5
14	Community Grammar School, Elewura	3	3
15	Peoples Girls Grammar School, Molete	4	3
16	Baptist Grammar school, Idi-Isin	4	4
	Total	73	68
	Percentage	100%	93.2%

Table 1 revealed that a total of seventy-three (73) copies of questionnaire were distributed to respondents, out of which sixty-eight (68) were retrieved and valid for analysis, thereby constituted 93.2% of the respondents.

Demographic Information of Respondents

Table 2: Demographic Information of respondents

S/N	Items	No.	Percentage (%)
A	Age Bracket (years)		
1	21-30	06	8.8
2	31-40	39	57.4
3	41 and above	23	33.8
	Total	68	100
B	Marital status		
1	Single	05	7.4
2	Married	63	92.6
	Total	68	100
C	Gender		
1	Male	40	58.8
2	Female	28	41.2
	Total	68	100
D	Academic Qualification		
1	Bachelor Degree/ HND	39	57.4
2	Master Degree	29	42.6
	Total	68	100

Table 2 shows that the highest age brackets of the respondents were between 31-40 years old which constituted 57.4%, this is followed by the age brackets of 41 years and above with the response rate 33.8% while the least age brackets of respondents were between 21-30 years which constituted 8.8%. Also, 92.6% of the respondents were married while 7.4% were single.

In addition, the demographic information revealed that 58.8% of the respondents were male while 28% were female. This indicated that there were more male than the female respondents. The table also revealed that 57.4% of the Mathematics teachers have either bachelor degree or HND while 42.6% of the Mathematics teachers have master degree.

Research Question 1

Table 3: Availability of Audio-visual Materials in Senior Secondary Schools Under Study

S/N	Facilities	Available Functional		Available Not functional		Not Available		Total	
		N	%	N	%	N	%	N	%
1	Chalk board	68	100	-	-	-	-	68	100
2	Calculator	68	100			-	-	68	100
3	Four figure table	68	100	-	-	-	-	68	100
4	Model of cylinder	23	33.8			45	66.2	68	100
5	Model of cuboid	48	70.6	-	-	20	29.4	68	100
6	Model of cube	52	76.5	-	-	16	23.5	68	100
7	Model of prism	22	32.4	-	-	46	67.6	68	100
8	Model of pyramid	18	26.5	-	-	50	73.5	68	100
9	Graph board	68	100	-	-	-	-	68	100
10	Chalk board Meter ruler	68	100	-	-	-	-	68	100
11	Chalk board protractor	15	22.1	-	-	53	77.9	68	100
12	Chalk board set of squares	10	14.7	-	-	58	85.3	68	100
13	Chalk board pairs of dividers	-	-	-	-	68	100	68	100
14	Mathematical textbook	68	100	-	-	-	-	68	100
15	Mathematical charts	68	100	-	-	-	-	68	100
16	T square	47	69.1	-	-	21	30.9	68	100
17	Mathematical sets	68	100	-	-	-	-	68	100
18	Chalk board compass	-	-	-	-	68	100	68	100
19	Interactive white board	-	-	-	-	68	100	68	100

Table 3 revealed that all the schools under study have chalkboard, calculator, four figure table, graph board, mathematical textbook, charts, mathematical sets and chalk board meter ruler which constituted 100% of the respondents, while chalk board pairs of divider, interactive white board and chalk board compass were not available in any of the schools. The table also shows that

audio-visual materials like T- square and model of cube were available at 69.1%, 76.5% respectively as indicated by respondents while model of cylinder (33.8%), model of prism (32.4%), model of pyramid (26.5%), chalk board protractor (22.1%) and the least available audio-visual materials is chalkboard set of squares at 14.7% as indicated by respondents

Research Question 2

Table 4: Audio-Visual Materials Often used In Teaching Mathematics

S/N	Audio-visual materials	Use Daily		Use Weekly		Use monthly		Not Use		Total	
		N	%	N	%	N	%	N	%	N	%
1	Chalk board	68	100	-	-	-	-	-	-	68	100
2	Calculating machine	68	100	-	-	-	-	-	-	68	100
3	Four figure table	56	82.4	12	17.6	-	-	-	-	68	100
4	Model of cylinder	-	-	14	20.6	9	13.2	45	66.2	68	100
5	Model of cuboid	-	-	25	36.8	23	33.8	20	29.4	68	100
6	Model of cube	-	-	21	30.9	31	45.6	16	23.5	68	100
7	Model of prism	-	-	14	20.6	8	11.8	46	67.6	68	100
8	Model of pyramid	-	-	11	16.2	7	10.3	50	73.5	68	100
9	Graph board	-	-	42	61.8	26	38.2	-	-	68	100
10	Chalk board Meter ruler	69	100	-	-	-	-	-	-	68	100
11	Chalk board protractor	-	-	6	8.8	9	13.2	53	77.9	68	100
12	Chalk board set of squares	-	-	-	-	10	14.7	58	85.3	68	100
13	Chalk board pairs of dividers	-	-	-	-	-	-	68	100	68	100
14	Mathematical textbook	68	100	-	-	-	-	-	-	68	100
15	Mathematical charts	68	100	-	-	-	-	-	-	68	100
16	T square			18	26.5	29	42.6	21	30.9	68	100
17	Mathematical sets	68	100	-	-	-	-	-	-	68	100
18	Chalk board compass	-	-	-	-	-	-	68	100	68	100
19	Interactive white board	-	-	-	-	-	-	68	100	68	100

Table 4 presents data with regards to how often do mathematics teachers used audio-visual material while teaching. The results revealed that chalk board, calculating machine, Mathematical textbook, mathematical chart and chalk board meter ruler have 100% daily usage

while four figure table has 82.4% used daily as indicated by respondents. Chalk board pairs of compass, interactive white board and chalk board pairs of dividers were not in used at all, this is because such materials were not available in any of the school. The results also indicated that audio-visual materials such as model of cylinder, model of cuboid, model of cube, model of prism, model of pyramid, graph board, chalk board protractor, chalk board set of square and T-square were used on weekly and monthly bases at very low percentage except graph board that has 61.8% weekly usage and 38.2% monthly usage as indicated by respondents. Furthermore, the findings indicated that materials like model of cylinder (66.2%), model of cuboid (29.4) , model of cube (23.5), model of prism (67.6), model of pyramid (73.5), chalk board protractor (77.9), chalk board set of square (85.3) and T- square (30.9) were not in used in some of the schools, this is because such facilities were not available for use.

Research Question 3

Table 5: Benefit Delivered from use of Audio-Visual Material in Teaching Mathematics

S/N	Benefit Derived	Strongly Agree		Agree		Strongly Disagree		Disagree		Total	
		N	%	N	%	N	%	N	%	N	%
1	It helps the teacher to gain the attention of the students	68	100	-	-	-	-	-	-	68	100
2	It saves the time of the teacher spend in teaching	51	75	17	25	-	-	-	-	68	100
3	Students understands well when teaching aids are applied	50	73.5	18	26.5	-	-	-	-	68	100
4	Students participate in learning actively with the use of audio-visual materials	68	100	-	-	-	-	-	-	68	100
5	Audio-visual materials help students to retain knowledge permanently	53	77.9	15	20.1	-	-	-	-	68	100
6	It assists the teacher to present what is been taught practically	68	100	-	-	-	-	-	-	68	100

Table 5 revealed the benefits of use of audio-visual materials in teaching mathematics. All the respondents strongly agreed or agreed to the benefits derived from the application of teaching aids while teaching. The most accepted were indicated with 100% of the respondents strongly agreed that the use of audio-visual materials in teaching mathematics helps the teachers to gain the attention of the students, students participate in learning actively with the use of audio-visual

materials and assist the teachers to present what is been taught practically. Also, 75% of the respondents strongly agreed that it saves the time of the teacher spent in teaching, 73.5% strongly agreed that students understand well when teaching aids are applied while 77.9% strongly agreed that audio-visual materials help students to retain knowledge permanently. The analysis of the table indicated that use of audio-visual materials in teaching offers great opportunities for teaching in impacting knowledge to students.

Research Question 4

Table 6: Challenges encountered in the use of Audio-Visual Materials for Teaching Mathematics

S/N	Challenges	Strongly Agree		Agree		Strongly Disagree		Disagree		Total	
		N	%	N	%	N	%	N	%	N	%
1	Lack of adequate audio-visual materials in teaching Mathematics	52	76.5		-	-	-	16	23.5	68	100
2	Lack of fund to purchase required aids in teaching mathematics	45	66.2	23	33.8	-	-	-	-	68	100
3	Lack of maintenance culture	37	54.4	9	13.2	-	-	22	32.4	68	100
4	Lack of modern teaching aids	26	38.2	42	61.8	-	-	-	-	68	100
5	Lack of required skill on the use of teaching aids	37	54.4	17	25	14	20.6	-	-	68	100

Table 6 indicated the challenges encountered by teachers of Mathematics in the use of audio-visual materials while teaching. The result revealed that respondents agreed with the listed challenges. The first three most agreed problems were lack of adequate audio-visual materials teaching mathematics (76.5%), lack of fund to purchase required aids in teaching Mathematics (66.2%) and lack of modern teaching aids (61.8%). While the least were lack of maintenance culture (54.4%) and lack of required skill on use of audio-visual materials in teaching mathematics.

DISCUSSION AND FINDINGS

The findings from the study revealed that male mathematics teachers have higher percentage of 58.8% compared to their female counterparts of 41.6%. In addition, the results show that the highest qualification of mathematics teachers at the senior school level have master degree with

42.6% while 57.4% have bachelor degree/equivalent. The findings associated with research question one revealed that mathematic textbook, chalkboard, calculator, four figure table, graph board, charts, mathematical sets, chalk board and meter ruler were all available in all the schools for the research. This finding agreed with Aina,M.E .and Olutade S.A. (2006) that the chief audio-visual materials used by teachers in the class room are pictorial and graphic materials such as chalk board, textbook, chart, drawing materials and so on

In the same vein, the findings revealed that, the most often used audio-visual materials

An observation was also drawn from the benefits teachers derived from use of audio-visual materials in teaching mathematics shows that, use of teaching aids are of great benefit to teachers as indicated by high level of percentage as it helps the teacher to gain the attention of the students, it saves the time of the teacher spend in teaching, students understands well when teaching aids are applied, students participate in learning actively with the use of audio-visual materials, audio-visual materials help students to retain knowledge permanently and it assists the teacher to present what is been taught practically.

However, despite the benefits derived from use of audio-visual materials while teaching, it become evident that Lack of adequate audio-visual materials in teaching Mathematics, lack of fund to purchase required aids in teaching mathematics, lack of maintenance culture, lack of modern teaching aids, and lack of required skill on the use of teaching aids were among the observed challenges on the use of audio-visual materials in teaching mathematics.

CONCLUSION

It is evident from this study that, availability of audio-visual materials in teaching mathematics among the selected senior secondary schools in South West ILcal Government area in Ibadan, Oyo Nigeria, have inconsistency in the availability and use of audio-visual materials while teaching. This is quite revealing on the fact that some of the audio-visual materials were available in all the schools and used often, some were not available in all the schools at all while some have disparity among the schools. The study also identifies the numerous benefits derived from use of teaching aids, however, there are some challenges associated with it like, lack of fund to purchase required aids in teaching mathematics, lack of maintenance culture among others.

RECOMMENDATIONS

In view of the above, the following recommendations were hereby proffered:

1. Adequate funds should be allocated to the school from the budget of ministry of education to cater for short fall
2. Stakeholders in the educational sectors like the parent teacher association should help to provide some of the audio-visual materials to the school
3. Capacity building of teachers such as seminar, workshop, conferences and in-service training program should be organized periodically for mathematics teachers to update on their skill as well as how to improvise some of these teaching aids to support government efforts

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