



Availability, Adequacy and Utilization of Audio-Visual Materials for teaching and learning of Mathematics in A Local Government Area of Oyo State

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Abstract

This Study investigated the Availability, Adequacy and Utilization of Audio-Visual Materials for Teaching and Learning of Mathematics at the Junior Secondary Schools in Oluyole Local Government Area of Oyo State. A sample of 198 mathematics teachers selected from 20 Junior Secondary Schools participated in the study. Data collection was done using questionnaire tagged Availability, Adequacy and Utilization of Audio-Visual Materials for Mathematics Teaching Questionnaire (AAUAVMTQ). Frequency counts, percentages and mean were employed to analyze the data collected from the study. The results from the study revealed that teachers exhibit willingness towards the use of audio-visual materials in teaching and learning of mathematics at the junior secondary schools in Oluyole Local Government Area, Oyo State. Recommendations made from the study indicated that schools should make audio-visuals aids available and adequate for use during teaching and learning of mathematics as well as other school subjects that are not easily understood by students. It was also recommended that, teachers should be trained on the proper handling and utilizations of audio-visual materials to facilitate the teaching and learning of mathematics especially at the Junior Secondary School level of education.

Keywords: Availability, Adequacy, Utilization, Audio-Visual Materials, Teaching and Learning of Mathematics, Junior Secondary Schools

Introduction

Mathematics is a school subject designed to develop students' creative and numerical abilities as well as to be able to identify problems and being able to solve the problems with related mathematics skills. Tracing back the reports and efforts of Nigerian Educational Research and Development council (NERDC) and the Comparative Education Study and Adaptation Center (CESAC) this led to the formulation of the new curriculum for both the junior and senior secondary schools, designed originally for the then 6-3-3-4 system of education in the nation (NERDC, 2011). Conclusions were reached at

this conference of experts prior to the decision of the Federal Government's introduction of 9-year Basic Education programme which was coupled with the need to attain the Millennium Development Goals (MDGs) by the year 2015. A review of the communiqué with additional and amplified details of the conference was highlighted to accommodate the targeted goals which were unmet as at 2015 hence, giving birth to what is now known as Sustainable Development Goals (SDGs). The conference aimed at reviewing the 9-year Basic Education Curriculum target of the 9-3-4 system of education. This review was in line with the target

of the National Economic Empowerment and Development Strategies (NEEDS) in conjunction with Nigerian Educational Research and Development Council (NERDC). This curriculum aimed at ensuring continuity and flow of topics from basic one class at the primary school level to basic nine at the junior secondary three (JSS3). This resulted to the revised edition of the National Mathematics Curriculum for Basic Education with an emphasis on the affective domain and quantitative reasoning for the purpose of helping pupils' cognitive and psychomotor experiences.

The highlights of the objectives of basic mathematics curriculum are as follows:

- (i) give the children acquired mathematics literacy necessary to function in an information age;
- (ii) cultivate the understanding and application of mathematics skills and concepts necessary to thrive in the ever changing technological world;
- (iii) develop the essential element of problem-solving, communication, reasoning and connection within their study of mathematics; and
- (iv) understand the major ideas of mathematics, bearing in mind that the world has changed and is still changing since the first National Mathematics Curriculum (NERDC, 2011).

However, the content of the mathematics curriculum for Junior Secondary School prepared by Comparative Education Study and Adaptation Center (CESAC) aimed at satisfying the mathematics requirement of the junior secondary school programme in the new National policy on Education (FRN, 2009). Going by the stated objectives of the NERDC, it is imperative to imbibe a strategy that will bring the stated objectives into fusion as well as adopting a method or device that will assist both teachers and learners in mathematics classroom.

Teachers are great assets to human career development. Irrespective of the great policies of any nation especially on education, without the inputs of teachers, such policies can become futile and unachievable or unattainable. The tasks

of implementation of policies on education rest on the shoulders of teachers, since they are the ones to interpret the policy documents and break them into simplified terms for successful implementations at the school levels. In the submission of Omoniyi and Quadri (2013), teachers' ability and willingness to integrate new ideas such as integrating teaching and learning materials which are sometimes referred to as teaching and learning aids into the classroom activities encourage learners to develop interest in the class activity and foster understanding of what they are being taught in the classroom. Moreover, teachers are dependable assessors of methods and skills applied to students' learning techniques and evaluators of students' learning achievements.

Having remarked teachers' roles in giving value judgments on students' activities, teaching and learning activities become interesting when instructional materials are used effectively and efficiently especially in mathematics classroom situations. The use of audio-visual aids by teachers as instructional tools makes teaching to be more interesting and fascinates learners' attention for effective learning. Audio-visual aids refer to instructional materials that could be used to convey meaning without complete dependence upon verbal symbols or language (Anzaku, 2011). Thus according to the above description, a text book or a reference material does not fall within this group of instructional materials but an illustration in a book coupled with an audio records of the proposed activities may sometimes do. Some audio-visual aids like the motion pictures require the use of equipment to release their latent value. It was further expressed that audio-visual aids are considered to be system, or body of content of potential value when put to work, while equipment for instructions are often referred to as hardware components and the means of presenting such content in classroom situations.

The importance of audio-visual aids in the teaching and learning of mathematics are points to reckon with especially at the Junior Secondary level of education. Some roles of audio-visual aids include: basic classroom learning using sense experiences, extended learning which helps

in recall after classroom experiences, participatory learning which stimulate interests, and individualize instructions which serves as a source of information that makes leaning permanent. Stressing the importance of audio-visual aids, Rasul (2011) stated that audio-visual aids are very important and useful in education when they are adequate for learners to gain understanding in terms of multiple impression recorded through the sight, sound, as well as touch senses. This implies that audio-visual aids are the equipment through which those functions can occur and each does not occur in isolation, rather through a balanced pattern from a preceptor mechanism that is stimulated by external occurrences. It is worth noting that human beings learn more easily and faster through audio-visual processes than by verbal explanations alone (Eze, 2005).

In essence, it implies that, ability to arrive at abstract concept through perceptual experience is however a phenomenon not clearly explained and perhaps not explicable without audio-visual aids. In the work of Ibe and Abamu (2019), it was however submitted that audio-visual aids when effectively used have the advantages of making teachers' jobs to be less stressful, as well as cover up for other common human errors in expressions on the subject matter. It also provides interesting approach to new topics and give initial correct impressions, economize time in learning, supply concrete aids needed and stimulate the initiatives of the students. Stating further, non-availability and inadequacy of audio-visual aids can be attributed to causes of poor performance of students in school subjects.

Audio-visual aids are essential and significant tools needed for teaching and learning of school subjects such as mathematics to promote teachers' efficiency and improve students' performance. With audio-visuals, learning becomes more interesting, practical, realistic and appealing. Also, both the teachers and students are motivated to participate actively and effectively in content areas of the lesson. Acquisition of skills and knowledge coupled with development of self-confidence and self-actualization is made easy when audio-visuals accompany teaching and learning. In other words,

audio-visual materials are forms of teaching aids which are objects or devices that appeal to the sense of hearing and seeing used for practical demonstrations in the classroom situations which assist teachers to present lessons to students by aiding clearer explanations of the subject in logical manners (Library & Information Science Academy, 2015).

Stressed the importance of availability of audio-visual aids to achieving effectiveness in educational delivery and supervision in the school system, Sheahan (2018) reiterated that the gross inadequacy and underutilization of audio-visual aids explain the need to upgrade and complement for the inadequacies of sense organs and to reinforce the capacity of dominant organs. Natoli (2011) expressed that basic materials such as essential equipment like computer, projector, television and video are not always readily available in many schools. In a related study, Gopal (2010) submitted that Audio-visual aids are very significant learning and teaching tools, hence, the needs for teachers to find necessary materials for instruction to supplement what textbooks provide in order to widen students' understanding and arouse students' interests in the subject. However, Majumder (2019) attested to the fact that, effective teaching and learning requires a teacher to teach the students with Audio-visual aids and use practical activities to make learning more vivid, logical, realistic and pragmatic thereby supporting the sense organs in the teaching and learning processes.

Despite the fact that audio-visual aids are essential tools that can make learning practical and knowledge acquisition easier, one cannot categorically say whether they are readily available or not in many Nigerian secondary schools and where available, whether they are adequately in use. This could result in low level of performance of learners in many examinations. Afolabi and Adeleke (2010) identified non-availability, inadequacy and non-utilization of learning materials as a result of teacher's poor knowledge as factors responsible for the use of lecture method. It was therefore imperative that teachers should either improvise or procure audio-visual aids for teaching and learning of school subjects.

This study was motivated by the fact that many students develop phobia for mathematics which as a result do affect their mathematics achievement in the schools. Likewise, some students dislike mathematics which is a very important school subject and this can however be traced to the way mathematics is being taught by teachers in many schools. It on this note that this study investigated the Availability, Adequacy and Utilization of Audio-Visual Materials for Teaching and Learning of Mathematics at the Junior Secondary Schools in Oluyole Local Government Area of Oyo State.

The purpose of this study therefore is to investigate the Availability, Adequacy and Utilization of Audio-Visual Materials for Teaching and Learning of Mathematics at the Junior Secondary Schools in Oluyole Local Government Area of Oyo State.

The specific objectives are to:

- i. investigate the availability of audio-visual aids in teaching and learning of mathematics at the Junior Secondary Schools in Oluyole Local Government Area of Oyo State;
- ii. investigate the adequacy of the available audio-visual aids in teaching and learning of mathematics at the Junior Secondary Schools in Oluyole Local Government Area of Oyo State;
- iii. examine whether audio-visual aids are in use during teaching and learning of mathematics at the Junior Secondary Schools in Oluyole Local Government Area of Oyo State; and
- iv. examine the attitudes of mathematics teachers towards the use of audio-visual aids in teaching and learning of mathematics at the Junior Secondary Schools in Oluyole Local Government Area of Oyo State.

Methods

The study adopted a descriptive survey research design to get the required information from the respondents. The target population comprised all mathematics teachers in Junior Secondary Schools in Oluyole Local Government Area, Oyo State. Random sampling technique was used to select One hundred and ninety-eight (198) mathematics teachers from twenty (20) Junior Secondary Schools in Oluyole Local Government

Area, Oyo State. The research instrument for the study was researchers' designed questionnaire entitled Availability, Adequacy and Utilization of Audio-Visual Materials for Mathematics Teaching Questionnaire (AAUAVMTQ). The questionnaire was divided into two (2) sections. Section A was on bio-data of the respondents while Section B focused on items related to the research questions that were earlier stated which was divided into four (4) parts based on the purpose of the study. The instrument used 5-point Likert scales structured as follows: Part I was on Availability of Audio-Visual Aids for Mathematics Teaching and Learning structured as: Available at all classes (AAAC); Available for some classes (AFSC); Available for other purposes (AFOP); Not Available in school (NAIS); and Not Certain (NC). Part II captured information on Adequacy of Audio-Visual Aids for Mathematics Teaching and Learning structured as: Very Adequate (VA); Sometimes Adequate (SA); Rarely Adequate (RA); Not Adequate (NA); and Not Certain (NC). Also, Part III focused on Usage of Audio-Visual Aids for Mathematics Teaching and Learning coined as: Always in use (AIU); Sometimes in use (SIU); Rarely in use (RIU); Never in use (NIU); and Not Certain (NC) while Part IV was based on mathematics teachers' attitudes towards the use of audio-visual aids in teaching and learning at the Junior Secondary Schools in Oluyole Local Government Area of Oyo State which responses were scaled as: Strongly Agree (SA); Agree (A); Disagree (D); Strongly Disagree (SD); and Undecided (UD) scored as 5, 4, 3, 2 and 1 respectively.

The research instrument was considered for face and content validity by five (5) research experts in the field of science education and educational technology for scrutiny and modifications. All necessary corrections were effected based on the satisfactory comments of the experts before the final draft was administered to the respondents. Reliability of the instrument was carried out on a group of the population who did not participate in the main study and Cronbach's Alpha statistics was used to determine the reliability of the instrument with a reliability index of 0.71 obtained from the exercise. Frequency counts and

the mean were employed to answer the research questions raised for the study.

Results

The results obtained from the study are presented as follows:

Table 1: Distribution of the Respondents by Gender

Gender	Frequency	Percentage
Male	90	45.45
Female	108	54.55
Total	198	100.00

Table 1 displays the gender distribution of the respondents, 90 (45.45%) male teachers and 108 (54.55%) female teachers participated in the study. This shows that there were more female respondents than the male respondents who participated in this study.

The analysis of responses of respondents on the availability of audio-visual aids for mathematics teaching and learning at the junior secondary schools in Oluyole Local Government Area, Oyo State is presented in Table 2.

Table 2: Availability of Audio-Visual Aids for Mathematics Teaching and Learning

S/N	ITEM	AAAC	AFSC	AFOP	NAIS	NC	Mean	Decision
1	Multimedia screen	26	45	57	62	8	3.10	Reject
2	Virtual classroom/Zoom	11	15	53	95	24	2.47	Reject
3	Electronic bulletin board	16	62	70	46	4	3.20	Reject
4	VCD/DVD player	45	45	67	41	-	3.38	Accept
5	Flip chart	82	67	23	20	6	4.00	Accept
6	Television	51	56	31	60	-	3.50	Accept
7	Computer set	50	55	34	59	-	3.49	Accept
8	LCD Projector	35	48	89	19	7	3.43	Accept
9	Film Projector	35	46	95	19	3	3.46	Accept
10	Interactive white board	12	26	80	70	10	2.80	Reject
11	Lap top	99	52	34	13	-	4.20	Accept
Grand Mean							3.37	Accept

Key: Available at all classes (AAAC); Available for some classes (AFSC); Available for other purposes (AFOP); Not Available in school (NAIS); Not Certain (NC)

From the table, the calculated mean for all the means of the responses was 3.37 while the mean values of item 4, 5, 6, 7, 8, 9 and 11 were shown to be greater than 3.37 which was the grand mean

computed for table 2 and the decision on each of the items was accepted. However, items 1, 2, 3, and 10 had mean values less than 3.37 and the decisions were rejected. This implies

that audio-visual aids were available for teaching and learning of mathematics at the Junior Secondary Schools in Oluyole Local Government Area, Oyo State.

Also, the analysis of responses of respondents on the adequacy of audio-visual aids for mathematics teaching and learning at the junior secondary schools in Oluyole Local Government Area, Oyo State is presented in table 3 below.

Table 3: Adequacy of Audio-Visual Aids for Mathematics Teaching and Learning

S/N	ITEM	VA	SA	RA	NA	NC	Mean	Decision
1	Multimedia screen	14	33	57	85	9	2.79	Reject
2	Virtual classroom/Zoom	36	47	48	61	6	3.23	Reject
3	Electronic bulletin board	17	36	70	71	4	2.96	Reject
4	VCD/DVD player	69	64	32	33	-	3.51	Accept
5	Flip chart	74	49	50	19	6	3.84	Accept
6	Television	111	41	31	15	-	4.25	Accept
7	Computer set	87	52	24	34	1	3.96	Accept
8	LCD Projector	15	32	66	78	7	2.85	Reject
9	Film Projector	15	34	64	82	3	2.88	Reject
10	Interactive white board	60	64	32	33	9	3.64	Accept
11	Lap top	38	44	48	67	1	3.26	Reject
Grand Mean							3.38	Accept

Key: Very Adequate (VA); Sometimes Adequate (SA); Rarely Adequate (RA); Not Adequate (NA); Not Certain (NC)

As evident from table 3, the calculated mean for the means of the responses was 3.38 while the mean values of item 4, 5, 6, 7 and 10 were shown to be greater than 3.38 which was the grand mean computed for table 3 and the decision on each of the items was accepted. Items 1, 2, 3, 8, 9 and 11 had mean values less than 3.38 and the decisions were rejected. This indicated that there were no adequate audio-visual aids for teaching and

learning of mathematics at the Junior Secondary Schools in Oluyole Local Government Area, Oyo State.

Further, to determine whether audio-visual aids are in use during teaching and learning of mathematics at Junior Secondary Schools in the study area, responses of teachers to Section III of the questionnaire were analyzed. The result is presented in table 4 below.

Table 4: Usage of Audio-Visual Aids for Mathematics Teaching and Learning

S/N	ITEM	AIU	SIU	RIU	NIU	NC	Mean	Decision
1	Multimedia screen	33	14	62	80	9	2.91	Reject
2	Virtual classroom/Zoom	36	47	48	61	6	3.23	Reject
3	Electronic bulletin board	17	36	70	70	5	2.95	Reject

4	VCD/DVD player	69	64	32	29	4	3.83	Accept
5	Flip chart	80	49	50	19	-	3.96	Accept
6	Television	102	32	27	37	-	4.01	Accept
7	Computer set	88	52	24	34	-	3.98	Accept
8	LCD Projector	15	32	66	81	4	2.86	Reject
9	Film Projector	14	35	59	85	5	2.84	Reject
10	Interactive white board	69	61	32	33	3	3.81	Accept
11	Lap top	38	45	48	62	5	3.25	Reject
Grand Mean							3.42	Accept

Key: Always in use (AIU); Sometimes in use (SIU); Rarely in use (RIU); Never in use (NIU); Not Certain (NC)

From Table 4, the calculated mean for the means of the responses was 3.42 while the mean values of item 4, 5, 6, 7 and 10 were shown to be greater than 3.42 which was the grand mean computed for table 4 and the decision on each of the items was accepted. Items 1, 2, 3, 8, 9 and 11

had mean values less than 3.42 and the decisions were rejected. This implied that audio-visual aids were not always in use for teaching and learning of mathematics at the Junior Secondary Schools in Oluyole Local Government Area, Oyo State.

Table 5: Mathematics Teachers' Attitudes towards the Use of Audio-Visual Aids in Teaching and Learning

S/N	ITEM	SA	A	D	SD	UD	Mean	Decision
1	I enjoy teaching with audio-visual aids to help all my Mathematics students to have high grades	51	50	54	38	5	3.53	Reject
2	Using audio-visual aids alone make my students confident in writing exams	12	17	103	60	6	2.84	Reject
3	Teaching with audio-visual aids help my students to work any mathematics problem	61	59	50	23	5	3.75	Reject
4	My students performances improve automatically with the use of audio-visual aids	73	66	34	21	4	3.92	Accept
5	My students can sit for external examinations and still perform well after being taught with audio-visual aids	73	65	35	21	4	3.92	Accept
6	I prefer using audio-visual aids in teaching because my students work independently during exams when exposed to audio-visual aids	86	65	31	11	5	4.09	Accept
7	I enjoy using audio-visual aids to teaching because my students don't develop phobia for mathematics exams when taught with audio-visual aids	98	39	32	25	4	4.02	Accept
8	I have phobia for audio-visual aids because it makes my students to be lazy in working simple calculations, hence I won't opt for it	57	61	49	21	10	3.68	Reject
9	I like using Audio-visual aids because it brings out the genius in all my students in mathematics tests	101	45	30	22	-	4.14	Accept
10	Using audio-visual to teach mathematics is time consuming but showcase my efforts in teaching mathematics	103	44	32	19	-	4.17	Accept
Grand Mean							3.81	Accept

Key: Strongly Agree (SA); Agree (A); Disagree (D); Strongly Disagree (SD); Undecided (UD)

The analysis of responses of mathematics teachers' attitudes towards the use of audio-visual aids in teaching and learning at the junior secondary schools in Oluyole Local Government Area, Oyo State is also presented in Table 5.

Table 5 displays teachers' attitudes towards the use of audio-visual aids in teaching and learning of mathematics at the Junior Secondary schools in Oluyole Local Government Area, Oyo State. The computed total mean for the means of the responses is 3.81 while, mean values of item 3, 4, 5, 6, 7, 9 and 10 were individually greater than 3.81 which was the grand mean obtained for table 5 and were accepted, while item 1, 2 and 8 with mean values less than 3.81 were rejected. The implication of this is that there are positive attitudes of mathematics teachers towards the use of audio-visual materials in Teaching and Learning of mathematics at the Junior Secondary Schools in Oluyole Local Government Area of Oyo State are positive and should be encouraged in teaching and learning by all mathematics teachers.

Discussion

Findings from the study showed that audio-visual materials were available for teaching and learning of mathematics at the junior secondary schools in Oluyole LGA, Oyo State. The result was in line with the submission of Sheahan (2018) that the availability of audio-visual aids encourages its application in classroom situations. The findings also agree with earlier findings of Orodho, Waweru, Ndichu, and Nthiguri (2013) who reiterated that availability of audio-visual materials is a necessity for teaching of school subjects and as learning aids for students in school mathematics. This implies that for teaching and learning to be accompanied by the use of audio-visual aids, it must be readily available in the premises of the citadel of learning such that when it is needed, it will be within reach for the purpose of achieving learning.

The study also revealed that there were no adequate audio-visual materials for teaching and learning of mathematics at the Junior Secondary Schools in Oluyole Local Government Area, Oyo State. This result was in line with Rasul (2011) submission that adequacy of audio-visual aids

assists learners to gain understanding in terms of having enough of the available audio-visual items for all classes especially when different classes are going on concurrently at the same time for mathematics teaching and learning. This finding also agrees with Heward (2009) who posited that availability and adequacy of audio-visual materials can stimulate learning of mathematics.

However, the result also indicated that audio-visual aids were not always utilized for teaching and learning of mathematics at the Junior Secondary Schools in Oluyole Local Government Area, Oyo State. This submission is in line with the report of Afolabi and Adeleke (2010) who identified non-availability, inadequacy and non-utilization of learning materials as a result of teacher's poor knowledge as factors responsible for the use of lecture method. In line with this finding is Yusta (2016) who posited that using audio-visual aids in teaching facilitate learning faster due to the fact that both senses of hearing and seeing are involved in receiving information with clearer imaginative receptors. This could however be corrected with the cooperation of school heads and other school managers when such materials are adequately available and monitored for usage by teachers especially in mathematics classes.

Findings in research question four on teachers' attitudes to the use of audio-visual aids in teaching and learning of mathematics revealed teachers' willingness towards the use of audio-visual aids. These findings support Majumder (2019) submissions as well as that of Afolabi and Adeleke (2010). The findings also align with the findings of Odogwu and Mbah (2015) on teachers' attitudes and competence on the use of ICT in teaching secondary schools' students in Lagos State. This showed that, mathematics teachers exhibit deficiencies in the usage of audio-visual aids in teaching and learning of mathematics at the Junior Secondary School level in Oluyole Local Government Area of Oyo State. It also implied that availability, adequacy and as well as the usage of audio-visual aids by teachers would be welcomed for improvement in teaching and learning of mathematics in order to meet the need for both national and global development in science and technology.

Conclusion

Based on the outcome of this study, it was concluded that audio-visual aids were available but not adequate for teaching and learning of mathematics at the Junior Secondary School in Oluyole Local Government Area of Oyo State. The study also established that audio-visual aids were not adequately utilized for teaching and learning of mathematics at the Junior Secondary School in Oluyole Local Government Area of Oyo State. Furthermore, it was established that teachers exhibited willingness in their attitudes towards the use of audio-visual materials in teaching and learning of mathematics, as it is germane to mathematics teaching and learning at the junior secondary school level of education.

Recommendations

The following recommendations were made based on the study findings.

- ✓ School management boards should fund the provision of audio-visual aids in schools as well as standby power generating plants in case of erratic power supply;
- ✓ Mathematics teachers at the Junior Secondary Schools should attend workshops, seminars and in-service training programmes in order to update their knowledge in handling and utilizations of audio-visual materials;
- ✓ Teachers should also improvise alternative audio-visual materials in place of the procured ones especially when the procured ones are not readily within reach in order to enhance learners' full participation in mathematics classroom; and
- ✓ The government should provide alternative regular power supply for schools for operating the audio-visual facilities.

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