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Assessment of Resources and Instructional Materials Status in the Teaching of Mathematics in Southwestern Nigeria

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Abstract

Instructional materials are vital to teaching-learning process. It is potent in reducing abstraction that characterizes Mathematics concepts. However, research reports have shown that these materials are grossly unavailable in most schools. Few available ones are either inadequate or underutilized. This paper is a case study of availability, adequacy and utilization of Mathematics instructional materials in southwestern Nigeria. Two (2) schools were randomly selected in each of the 3 senatorial districts of each state, making a total of 36 schools. The findings revealed 34.5%, 18.0% and 22.5% availability, adequacy and utilization rates of instructional materials respectively. The teachers know little implications of the use of instructional materials. Various means of improvisations and sourcing for these instructional materials were recommended. It was also recommended that the teachers should be trained in the appropriate use of instructional materials.

Keywords: Instructional materials, Teaching-learning, Resources Adequacy, Resources Utilization

1. Introduction

Recent emphasis on teaching-learning method is on that in which learners are made to have active participation. Active participation of learners will increase motivation and also minimize abstraction associated with Mathematics learning, thus increasing learning experience. This can be facilitated by making use of instructional materials and resources which can minimize abstraction associated with Mathematics. Teaching can only be effective when adequate and relevant instructional materials are used (Afolabi, Adeyanju, Adedapo and Falade, 2006). Many educators and researchers have reported the importance of instructional materials in teaching. Teaching and learning could not be effective without adequate and relevant use of instructional materials (Grant, 1978). Schramn (1977) referred to instructional materials as basic channel of communication (of ideas and concepts) in the classroom for the purpose of bringing about effective teaching and learning. Adebanjo (2004) reported the view of

Abimbade (1997) that instructional resources in teaching and learning make students to learn more and retain better what they have been taught and that it also promotes and sustains students' interest. It also allows the learners to discover themselves and their abilities. Reporting the view of Schramm, (1977) said that instructional materials enrich learners' knowledge and reinforce verbal instruction.

Research reports have shown that availability of instructional materials and ability of Mathematics teachers to use them are vital determinant of teaching methods to be used by the Mathematics teachers (Afolabi, 2008) and consequently, Mathematics achievements. Oyeniran (2003) posited that pupils learn best if they are given the opportunity to see and to make observation of what they are taught. He said a good instructional material might be a substitute for real life objects in the classroom as against the use of exploratory method.

Many research reports abound on the inevitability of instructional materials and resources on Mathematics learning outcomes. Such include the works of Adedayo (2000), Hassan (2000). In spite of this, many of these resources and instructional materials are lacking in our schools. Hassan (2000), on his study of evaluation of Mathematics teaching in Nigeria reported a 100% of his sample from Zamfara state in favour of inadequate resources and instructional materials in the teaching of Mathematics.

2. The Problem

Instructional resources and materials are of immense importance to Mathematics achievements. Incidentally, most research reports have shown gross unavailability of these resources. The concern for making inventory on the availability and use of these instructional materials cannot be termed as overemphasis. It is a worthwhile investigation in as much as teaching and learning of Mathematics continues. The study is guided by these three research questions.

- (1) What are the resources/instructional materials available in the schools for the teaching of Mathematics?
- (2) How adequate are the resources/instructional materials in the schools?
- (3) How are these resources/instructional materials utilized?

3. Methodology

3.1. Population and Sampling Procedure

The population comprises of all secondary school Mathematics teachers in Nigeria. The population was sampled from the six states in the southwestern geopolitical zone of Nigeria. Mathematics teachers from two schools randomly selected from each of the three (3) senatorial districts of each state were used for the study. This gives a total of 117 Mathematics teachers from 36 schools in the six states (with six schools from each state).

3.2. Instrumentation

A self-designed Mathematics Resources and Instructional Material Checklist (MRMIC), which was on a trioctomous scale was used for data collection on resources and instructional materials. The instrument consisted of rating on availability, adequacy and utilization of the instructional materials. Adequacy implies the fitness, quality and the degree of precision in the construction of the materials. The Mathematics teachers in conjunction with the researcher/assistants responded to each of the measures on availability on a 3 point scale thus:

AVE – Available Enough; ANE – Available Not Enough; NA – Not Available. Adequacy measure on a 3 point as: AE- Adequate Enough; NAE-Not Adequate Enough; NAD- Not Adequate. Utilization measure also on a 3 point as: WU –Well utilised; UU–Under Utilised; NU – Not Utilised.

The scoring, rating and validation of IMRAIM is as follows; AVE – Available Enough (2); ANE – Available Not Enough (1); NA – Not Available (0). AE- Adequate Enough (2); NAE-Not Adequate Enough (1); NAD- Not Adequate (0). WU –Well utilised (2); UU–Under Utilised (1); NU – Not Utilised (0). IMRMIC was subjected to face and content validity. Cronbach alpha was used to find the degree of internal consistency and a value of 0.87 was obtained.

3.3. Data Collection and Analysis

The data was collected from the six states of southwestern geopolitical zone by the researchers in conjunction with the support of some research assistants who were well trained and made to know the importance of the study. The responses were coded and analysed using descriptive statistics- frequency count and percentages. In table 1 below is the status of qualifications in Mathematics of the teachers.

Table 1: Qualification in Mathematics of Mathematics teachers

Qualification	Frequency	Percentage (%)
NCE	0	0.0
B.Sc/B.A	17	14.5
B.Sc(Ed)/B.A(Ed)	62	53.0
Higher Degree	6	5.1
None in Mathematics	8	6.8
Total	117	100

4. Findings and Discussions

Table 2: Resources /Instructional Materials for the Teaching of Mathematics.

		AVAILABILITY				ADEQUACY*				UTILIZATION			
		AVE	ANE	NA	\bar{x}	AE	NAE	NAD	\bar{x}	WU	UU	NU	\bar{x}
1.	Trained/ qualified Mathematics teacher	58 (49.6)	37 (31.6)	22 (18.8)	1.3	18 (15.4)	35 (29.9)	64 (54.7)	0.61	48 (41.0)	8 (6.8)	61 (52.1)	0.89
2.	Library (Equipped)	24 (20.5)	48 (41.0)	45 (38.5)	0.82	14 (12.0)	29 (24.8)	74 (63.2)	0.49	20 (17.1)	17 (14.5)	80 (68.4)	0.49
3.	Mathematics laboratory	11 (9.4)	19 (16.2)	87 (74.4)	0.35	8 (6.8)	13 (11.1)	96 (82.1)	0.25	5 (4.3)	12 (10.3)	100 (85.5)	0.19
4.	Graph Board	25 (21.4)	36 (30.9)	56 (47.9)	0.74	7 (6.0)	21 (17.9)	89 (76.1)	0.30	14 (12.0)	18 (15.4)	85 (72.6)	0.39
5.	Sets of mathematical instrument	32 (27.4)	54 (46.2)	31 (26.5)	1.01	12 (10.3)	36 (30.8)	69 (59.0)	0.51	33 (60.0)	13 (28.2)	71 (60.7)	0.68
6.	Meter Rule	27 (23.1)	47 (40.2)	43 (36.8)	0.86	13 (11.1)	28 (23.9)	76 (65.0)	0.46	29 (24.8)	12 (10.3)	76 (65.0)	0.60
7.	Geo Board	10 (8.5)	24 (20.5)	83 (70.9)	0.38	5 (4.3)	17 (14.5)	95 (81.2)	0.23	13 (11.1)	12 (10.3)	92 (78.6)	0.32
8.	Geometric Models and Shapes	24 (20.5)	37 (31.6)	56 (47.9)	0.73	10 (8.5)	20 (17.1)	87 (74.4)	0.34	21 (17.9)	9 (7.7)	87 (74.4)	0.44
9.	Others	0 (0.0)	2 (1.7)	115 (98.3)	0.02	1 (0.9)	0 (0.0)	116 (99.1)	0.02	2 (1.7)	1 (0.9)	114 (97.4)	0.04
	Weighted Ave.		0.69				0.36				0.45		

% in bracket.

* Adequacy here refers to the quality of the material and degree or level of precision in the construction of the material as to produce a desirable result.

Table 2 above shows that most of the basic needed resources and instructional materials are not available in the required quantity. 87 (74.4%) and 83 (70.9 %) of the 117 teachers in the thirty-six

schools reported non-availability of Mathematics laboratory and geoboard respectively. Trained/qualified Mathematics teachers has the highest mean availability rate ($\bar{x} = 1.31$) followed by sets of mathematical instrument with mean = 1.01. Others have availability rate lower than these. Generally, the instructional materials/resources can be rated as available but not enough as reflected by the weighted average of 0.69

The table also shows a high level of inadequacy of most of the materials. The weighted average for the adequacy of those instructional/materials and resources is 0.36. Many of these resources are also not utilized: graph board 85 (72.6%); geoboard 92 (78.6%) and geometrical shapes and models with 87 (74.4%). The weighted average for utilization of the resources/instructional material is 0.45 which generally indicates a very much under utilization rate of the materials. Virtually all the respondents could not find other instructional materials outside the ones listed above as indicated by item 9. Out of the 117 teachers 115, 116 and 114 indicated non-availability, non-adequacy and non-utilization of other instructional materials respectively for the teaching of Mathematics in the schools.

The findings of the study revealed that most of the schools did not have required resources and instructional materials needed for the teaching of Mathematics. In none of the instructional materials on the checklist (equipped library, Mathematics laboratory, graph board, sets of mathematical instrument, meter rule, geoboard, geometrical shapes and models) could one get up to 50% of the teachers who had enough of these materials in the schools. The teachers in addition to those provided on the checklist listed just only two other instructional materials, which are not enough. This is an indication that most of the teachers could not find much material outside the few ones on the checklist. Only trained / qualified teachers with mean ($\bar{x} = 1.31$) and sets of mathematical instrument ($\bar{x} = 1.01$) could be rated as been available but not enough. The weighted average for availability of the instructional resources/material is 0.67, which reflected a very low rate of availability and not enough of these resources. This implies a very low availability of Mathematics instructional materials in our schools. This is in line with the findings of Adedayo (2000), Afolabi et al (2006).

Most of the few available instructional materials were not adequate, as almost above 70% of the teachers recorded that these equipment were not adequate. The Mathematics teachers (mean = 0.61) and sets of mathematical instrument (mean = 0.51) can be termed to be enough but not adequate. This means that the teachers may be numerically enough but not the right caliber in terms of level of their qualification and subject area of specialization. This could be taken to mean that their training in Mathematics could be at lower level and as well as specialization in other subject areas and not in Mathematics. The set of mathematical instruments which is also more adequate than the rest of other materials is not adequate in its precision and degree of accuracy at construction as to give the desirable result when used. Hence it implies that they are of low or bad quality. Other materials are of lower adequacy; hence the low weighted average of 0.36 is an indication of general inadequacy of the instructional materials

In the same vein, above 82 (70%) of the teachers recorded that these resources were not utilized while majority also reported under utilization. The weighted average for unitization of the resources is 0.45. This means that the few available instructional materials were not utilized or to say at a very low level. This could be as a result of inability to use or ignorance of their importance to teaching. However, trained/qualified Mathematics teachers were well utilized as indicated ($\bar{x} = 0.89$) compared with all other resources. This implies that the teachers have not realized the importance of these instructional aids. The findings are in support of Oyeniran(2003) and Afolabi et al (2006).

The implications of these weighted averages might not be trivial as thus used. The availability, adequacy and utilization of instructional resources are each on a 3-point scale rated as 0, 1, 2. The implications of these values of weighted averages become obvious when they are considered as percentages. On this scale the availability rated as weighted average of 0.69 indicates 34.5% availability rate. And that of adequacy of the instructional materials/resources is rated as 0.36 indicates

18.0% adequacy while that of utilization rate of 0.45 is 22.5% utilization rate of the available resources/instructional materials. These have elucidated the low rate as earlier established.

5. Conclusions and Recommendations

The result of this study has revealed that most of the essential resources and instructional materials are lacking, underutilized and few ones are not utilized at all. There are no adequate resources and instructional materials in our schools for the teaching of Mathematics

Research findings have shown that instructional resources and materials are the crucial determinants of methods used in Mathematics teaching. Therefore, should be provided through the following ways: (i) the government, (ii) improvisation by school teachers and students, (iii) request from lovers of Mathematics and (iv) philanthropists, (v) school P.T.A, (vi) setting up a department in NMC to take up the commitment of providing standard instructional materials for the whole nation. Training and re-training of Mathematics teachers on the use of instructional materials. (vii) Teacher education programmes should have at least a course whereby students are taught the construction and improvisation of instructional materials for all courses and subjects. There should be made to be aware of the importance of instructional material

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