

REFOCUSING THE USE OF IMPROVISED EDUCATIONAL MEDIA: A CASE OF MATHEMATICS INSTRUCTION IN IMO STATE

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Abstract

For years, the teaching-learning of Mathematics has been besieged with a lot of constraints, caused partly by inadequate instructional materials and partly by other factors. Herein, lies the need to refocus the improvisation of educational media meant for the enhancement of Mathematics instruction as this is the only way of boosting the instructional materials needed in that area. Thus, this paper attempted to assess the level of improvisation and use of improvised educational media for the teaching-learning of Mathematics, with a special focus on secondary schools in Imo State. The study, among other findings, revealed that leap service is being paid to improvisation of educational media. However, for improvisation to see the light of the day, there should be compulsory retraining of all teachers on improvisation

Introduction

For decades, the fear for Mathematics instruction or what may be termed "Matbemaphobia" has been a cankerworm that has eaten deep into the minds of secondary school children, especially in Imo State. This fear is so great and devastating that it requires God's intervention to prove the simplicity and relevance of Mathematics to sustainable national development. In spite of the dreaded fear of Mathematics, the teaching-learning of the subject has been besieged by innumerable constraints. Prominent among these setbacks is paucity of relevant educational media. There is the difficulty of purchasing the relevant instructional materials in this period of economic recession. Herein, lies the importance of the adages: "when the desirable is not available, the available becomes desirable" and "necessity is the mother of invention". This is the basis for the origin and adoption of improvisation.

Nzeagwu (1994), states, the essence of improvisation is using alternative materials and resources to facilitate instruction wherever there is low or shortage of some specific instructional materials. He goes further to say that, for improvisation to be worthwhile, the improvised material must necessarily satisfy the need for which it is needed.

The mass failure of secondary school students in Mathematics and allied subjects is a matter of concern to all and sundry. The issue is so alarming that any innovation in education that does not take cognizance of falling standard of mathematics education is incomplete. As earlier said what has heightened the constraints associated with the teaching-learning of Mathematics is the paucity of relevant and up-to-date instructional materials. The soaring high cost of these materials can only be abated by looking for alternative methods of sourcing the instructional materials. The ready-made answer to this is improvisation. This is why Ogwo (2004), posits that against the dwindling financial allocations to different segments of the educational sector, improvisation is the panacea for continued effective instruction. As the Nigerian currency is progressively devalued the quantity of imported instructional materials will proportionally fall. Hence, the teacher will be left with no other viable option than to look inward for materials/concepts to aid learning. Ogwo, affirms that, improvisation could either be in the major forms of adaptation or simulation. Adaptation, is when the teacher reconstructs an already made material to suit a new instructional end or reframes an old concept to derive a new meaning or significance. While simulation entails the construction of models, sourcing of local equivalents of imported materials for the purpose of instruction.

However, Oyeyemi (1991), summarized the positive attributes of improvisation. These include:

Materials used are easily available within the environment, can easily be improved upon and can be used efficiently and effectively since they were . designed to meet specific instructional objectives. When learners are involved in the improvisation efforts, it elicits more of their interest on the subject and could be used to attain instructional objectives in all the three educational domains and eight intelligences.(p.56).

Transfer of learning could be enhanced if the students are assisted to discover the relationship between school activities/materials and those found in the "real world".

All these notwithstanding, the non-use of improvisation, according to Ogwo (2004), can be blamed mostly on the teacher's attitude and low morale. He believes that, there are pertinent skills needed to either reconstruct or construct instructional materials. When an already made material is being adapted, the most vital skill is decision-making in order not to ruin the instruction on the pretence of improvisation. Other strategies for successful improvisation include the teaching having clear understanding of the material to improvise, checking his/her capabilities, determining the affordable resources, diagnosing the learner's background experience, etc. More so, relevance of the material, its quality, cost, ease of storage and availability of instructional facilities etc. greatly affect the extent of improvisation by teachers. In view of the fact that these factors that affect the status of improvisation are well known by most teachers who embarked on improvisation, still, improvisation in schools and colleges has not attained prominence. There is need to have a thorough refocus on improvisation of instructional materials. Thus, this study becomes indispensable as it attempted to uncover the level of improvisation in secondary schools in Imo State, with a special focus on Mathematics.

Purpose of the Studies

This study was targeted to x-ray the level of improvisation of instructional materials used for the teaching/learning of Mathematics in Imo State. Efforts were also made to ascertain the quality, quantity and relevance of the improvised instructional materials. The study investigated the extent of using improvised materials.

Hypotheses

For the success of the study, the following null hypothesis were formulated and tested at .05 significance level: HO₁: The means of the frequency counts of the Mathematics teachers who engage in improvisation

and those who do not engaged in improvisation are significantly different.

HO₂ The Means of the frequency counts of the improvised and imported educational media used for Mathematics are significantly different,
The means of frequency counts of the quality improvised and quality imported educational media use for Mathematics are not significantly different.

Methodology

Out of the numerous secondary schools in Imo State, only two senior secondary schools were randomly selected from each of the 27 Local Government Areas of the state. Random sampling technique was adopted to select the 54 senior secondary schools. From each of the selected secondary school, all the Mathematics teachers were selected for the study.

A thirty item structured questionnaire, observation and interview were employed for the collection of relevant data. These instruments enabled the researcher to gather information on the extent of improvisation, quality and use of improvised Mathematics instructional materials.

A pilot study was carried out to ascertain the reliability of the instrument, after which the co-efficient of reliability of the questionnaire was calculated to be .934, using test-retest method. All' the instruments used for the study were criticized and corrected by experts in Measurement and Evaluation and Educational Technology, Federal College of Education, Obudu, Cross River State. These experts established the face validity of the instruments. All the collected data were analysed using Chi-square test, based on the formulated hypotheses.

Method of Data Analysis

All the data collected for the stud were analysed using simple mean relationship and chi-square test, based on the formulated hypotheses. The hypotheses were tested at .05 significant level.

Results

Relevant data were collected and analysed based on the stated hypotheses. Data gathered from

urban and rural schools were compared for authentication.

HO₁: The means of the frequency counts of the Mathematics teachers who engage in improvisation and those who do not engage in improvisation are significantly different.

Table 1: Contingency table on engagement in improvisation

Location	Sum of item frequencies						
		SA	A	y	D	SD	Total
1 Rural	Observed	232	323	47	94	60	756
	Expected	219.38	315.69	51.76	91.15	58.02	
	X ²	0.73	0.17	0.44	0.09	2.16	
Urban	Observed	620	903	154	260	243	2180
	Expected	632.62	910.31	149.2	262.85	224.98	
	X ²	0.25	0.06	0.51	0.03	1.44	
	Total	852	1226	201	354	303	2936

$$X^2 \text{ calculated} = 5.88$$

$$X^2 \text{ critical} = 9.488$$

$$\text{Significance level} = .05$$

$$\text{Degree of freedom} = 4$$

Decision: Null Hypothesis accepted

From Table 1, the calculated X² value is less than the critical X² value, implying that the null hypothesis is accepted. Thus, a significant number of Mathematics teachers does not engage in the improvisation of educational media.

HO₂: The means of the frequency counts of the improvised and imported educational media used for Mathematics are significantly different.

Table 2:

Contingency table on the use of improvised educational media

LOCATION	SUM OF ITEM FREQUENCIES						
		SA	A	U	D	SD	Total
Rural	Observed	51	66	9	85	77	88
	Expected	34.80	63.93	9.59	91.25	90.43	
	X ²	4.45	0.27	0.02	0.43	1.90	
Urban	Observed	76	160	26	248	253	763
	Expected	92.20	164.07	25.41	241.75	239.57	
	X ²	1.30	0.10	0.01	0.16	0.35	
	Total	127	226	35	333	330	1051

$$X^2 \text{ calculated} = 8.99$$

$$X^2 \text{ critical} = 9.488$$

$$\text{Significance level} = .05$$

$$\text{Degree of freedom} = 4$$

Decision: Null Hypothesis accepted

From Table 2, the calculated X² value is less than critical X² value, implying that the null hypothesis is accepted. Therefore, a significant number of the educational media used for the teaching learning of Mathematics is not improvised.

HO₃: The means of the frequency counts of the quality improvised and quality imported educational media used for Mathematics are not significantly different.

Table 3: Contingency Table on the Quality of improvised Materials

Quality	Sum of item frequencies						
		SA	A	U	D	SD	Total
High	Observed	58	145	12	91	54	360
	Expected \hat{E}	77.98	119.63	15.65	79.10	67.64	
	X^2	5.12	5.38	0.85	1.79	2.75	
Low	Observed	208	271	40	178	175	872
	Expected	188.89	289.76	37.97	191.60	163.84	
	X^2	1.93	1.21	0.12	0.97	0.76	
Not sure	Observed	13	12	4	14	13	56
	Expected	12.13	18.61	2.43	12.30	10.52	
	X^2	0.06	0.35	1.01	0.23	0.50	
	Total	279	428	56	283	242	1288

X^2 calculated = 23.03
 X^2 critical = 35.507
 Significance level = .05
 Degree of freedom = 8
 Decision: Null Hypothesis rejected

From Table 3 above it is discovered that the calculated X^2 value is greater than the critical/table value, thus, null hypothesis was rejected. This implies that the quality of improvised Mathematics educational media differs significantly with the quality of the imported ones.

Findings

(a) Use of Questionnaire

The relevant data were collected using a set of structured questionnaire. The analysed data revealed that:

1. Most teachers in Imo State do not engage in the improvisation of instructional materials for the teaching-learning of Mathematics in the secondary schools.
2. Most of the Mathematics teachers do not have the culture of using improvised materials.
3. The very few improvised Mathematics instructional materials do not have comparable quality with the imported ones.

(b) Observation and Interview

1. Use of improvised instructional materials in teaching/learning of Mathematics is not a common feature.
2. Mathematics teachers are not motivated to embark on improvisation of instructional materials.
3. Most of the teachers of Mathematics especially those in private schools do not have adequate skills on improvisation of instructional materials.
4. There is a strong inertia on the use of improvised instructional materials, even if adequately available.
5. Facilities for improvisation are non-existent in most secondary schools.

Discussion

The study made a lot of revelations. Most importantly, it was discovered that improvisation is not a household name in secondary schools in Imo State. This insensitivity to improvisation as it relates to Mathematics should be discouraged. Mathematics is more of an abstract subject, thus the best instructional material for it, should be those produced by the teacher assisted by his students. This is because the abstract concepts in Mathematics are concretized during the design and production of the related, instructional materials. Supportingly, Kanu (1995), observes that, during the preparation of locally sourced instructional materials, both the teacher and his children use their initiative and ingenuity to fabricate them for their own use. In doing this, the teacher discovers and encourages budding artists.

The study exposed the fact that most Mathematics teachers in the state under study, exhibit much inertia on the use of improvised materials, coupled with the fact that they see imported materials to be of greater quality than the improvised ones. These points confirm why the improvisation of instructional materials for the teaching-learning has not received adequate attention and recognition. Ogwo (2004), blames the non-use of improvisation on the teacher's attitude and low morale. Based on this, he advised that, in order to improve on the poor attitude of teacher, they should focus more on the irreparable damage done to their learners when they fail to improvise because of poor working conditions caused by different levels of school administration.

Recommendation

Considering the biting economic crunch which has graduated to high cost of education, improvisation, being a sure way of making the costly but unavailable instructional materials, available and affordable, should be encouraged to assume pre-eminence in the instructional process. This can be a reality if the following recommendations are put into practice:

- (a) Mathematics teachers in both primary and secondary schools should be made to undergo regular retraining on the production and utilization of local or teacher-made instructional materials.
- (b) Instructional materials and equipment production centres should be established in all Local Government Areas to produce simple instructional materials for use in our Nigerian schools.
- (c) There should be incentives for teachers who embarked on local production of science and Mathematics materials. Such incentives should include special hazard allowance, promotions, regular payment of salaries, research grants etc.
- (d) In the absence of motivation by government, teachers should resort to intrinsic motivation for their work which alone can guarantee their persistence in instructional excellence.
- (e) In the design and production of any local material, the students should be greatly involved. For instance, the students should be given the responsibility of sourcing the raw materials from the immediate environment.
- (f) A good knowledge of the students background is essential before embarking on improvisation.
- (g) The teacher should endeavour to assess the durability of the improvised materials. Olumba (2000), believes that it is always wise to spend more money on an apparatus that would be used for a long period.
- (h) The teacher and his children must consider their safety in the course of improvisation, (i) In the use of improvised instructional materials especially for mathematics lessons, the teacher and the learners must be careful. This is why Edigin (1990), argues that improper use of improvisation would produce negative results.
- (j) Improvisation of the scarce materials should be a matter of compulsion for teachers in all levels of education. If possible, it should be made one of the conditions for employment and promotion of teachers.

Conclusion

From the researcher's thinking and observation, Mathematics is the nucleus of all other subjects. This is because, observation has it that most children who perform well in Mathematics always excel in other subject. This strategic role of Mathematics, notwithstanding, most children perform poorly in the subject.

The problems associated with Mathematics education are heightened by inadequate human and non-human resources. As a matter of fact, the only way out is improvisation of the essential educational media, which will definitely result to low cost of educational and production of materials tailored to the needs of Nigerian students. Thus this study on improvisation of Mathematics educational media is paramount

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