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ASSESSMENT OF THE CHALLENGES OF FUNDING THE IMPROVISATION OF INSTRUCTIONAL MATERIALS FOR TEACHING MATHEMATICS IN CHILDHOOD EDUCATION

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Abstract

The study investigated challenges of funding the improvisation of instructional materials for teaching mathematics in early childhood Education. This study was carried out in Imo state. Based on the purpose of the study; one research question and three hypotheses guided the study. The study adopted descriptive research design from a population of 65 Mathematics teacher Educators. A sample of 65 Mathematics teacher educators was used without sampling while purposive sampling technique was used in selecting one college of education and one university with Education Faculty for the study. The instrument used for data collection was self-structured likert type questionnaire titled Challenges of Funding Improvisation of Instructional Materials (CFIIM). The reliability co-efficient (r) of 0.88 was obtained using cronbach alpha method. Data collected were analyzed using Mean, Standard deviation for the research questions while t-test and ANOVA was used to test the hypotheses. The results showed that there are the challenges and prospects of funding tertiary institutions in Nigeria and irrespective of gender and type of tertiary institutions. It was recommended that Government should improve its funding of tertiary institutions to meet the minimum staffing and facilities levels recommended in the minimum academic standards/benchmarks.

KEYWORDS: Challenges, Funding, Improvisation of Instructional Materials, Mathematics

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Introduction

The knowledge of mathematics is paramount in the success of students in their numerous day to day activities in life. Mathematics education holds the potency of making students to relate mathematics knowledge to everyday problem being encountered and hence develop the individuals to a level that they are intellectually and economically stable. Right from the pre-historic days of the early human societies to the present "hitec" age, mathematics has played a fundamental role in the economic development of many countries of the world (Popoola in Unamba, Nwaneri & Ike, 2019). In every country, regardless of the level of economic, scientific and technological development, mathematics has to be taught to a number of scientists, technical specialists, scientific researchers etc. The service of these professionals will be continuously required for the well-being of the students and for the development of the society. Nigeria as a country needs to strive for scientific and technological breakthrough in order to cater for her domestic and international needs to enable her assert her greatness among the United Nations member states. The pertinent virtue of mathematics as well as its contributions to the development of mankind has earned the subject the prominence it enjoys among other school subjects. The importance accorded to mathematics in the school curriculum from primary to secondary levels reflects accurately the vital role played by the subject in contemporary society. It is a core subject in the primary and secondary school certificate curriculum. Also, a credit pass in mathematics at the senior secondary school certificate examination is needed as a pre-requisite for admission into the tertiary institutions in Nigeria. It is in realization of this that many countries resort to making especially comprehensive and well-programmed efforts towards the effective teaching and learning of mathematics at all levels of their educational system through the development and implementation of innovative programmes and projects (Azuka, 2013).

Akinmola (2014) opined that mathematics is an excellent vehicle for the development of person's intellectual competence in logical reasoning, spatial visualization, analysis and abstract thinking. Mathematics is a tool used for solving problems (Leonard, Steve, & Art 2004). Mathematics knowledge and skills provide a key for entry into a rapidly changing technological world (Leonard, Steve, & Art 2004). Ukeje in Lawrence & Kolawole (2007) while acknowledging the importance and contribution of mathematics to the modern culture of science and technology stated that "without mathematics there is no science, without science there is no modern technology and without modern technology there is no modern society. Also, Obodo in Unamba, Obiuwevbi, Irebuisi & Ojediran (2021) opined that mathematics can contribute to the realization of the general aims of education among others, by:

I. Developing good habits for effective critical thinking
II. Providing competence in the basic skills and understanding for dealing with numbers and form.
III. Developing intellectual independence, aesthetic appreciation and expression
IV. Developing the ability to differentiate between relevant and irrelevant data and to make relevant judgment through the discrimination of values.

Akinmola (2014) identify the aims of learning mathematics education in schools as follows. Acquire the necessary mathematical concepts and skills for everyday life and for, continuous learning in mathematics and related disciplines. develop the necessary process skills for the acquisition and application of mathematical skills concepts and skills, develop the mathematical thinking and problem solving skills and apply these skills to formulate and solve problems, recognize and use connections among mathematical ideas and between mathematics and other disciplines, develop positive attitudes towards mathematics, make

effective use of a variety of mathematical tools (including information and communication technology tools) in learning and application of mathematics, Provide imaginative and creative work arising from mathematical ideas, develop the abilities to reason logically, communicate mathematically and learn cooperatively and independently. According to Sidhu (2006), the aim of learning mathematics is not only for knowledge and understanding objectives; it includes skills application, positive attitude, appreciation and interest objectives of which, among other things, the learner should: (i) Acquire and develop skills in the use and understanding of mathematics, (ii) Acquire and develop speed, neatness, accuracy, brevity and precision in mathematical applications. (iii) Learn and develop technique for problem solving (iv) Develop the ability to estimate, check and verify results (v) Develop ability to think correctly, to draw conclusions, generalizations and inferences (vi) Develop appreciate skills in drawing, reading, interpreting graphs and statistical tables. (vii) Develop skill in necessary, weighting and surveying (viii) Develop the ability to apply mathematics in his future vocational life. To achieve its stated objectives and importance in mathematics, its success is dependent on the quality of the teacher's instructional materials (Ajaja, 2009; Ughamadu, 2005).

Effective teaching of mathematics will not only stimulate students' interest in the subject, but also enhances applicability of the concept in real life situations. To achieve effective teaching and learning process in schools where students assimilate based on what they see, there is the need for the use of relevant instructional materials. Instructional materials are teaching resources which teacher employs to facilitate his or her teaching for the attainment of objectives. Instructional materials are materials or tools locally made or imported materials that could enhance the lesson and impact if intelligently used (Isola, 2010). They are objects or devices, which help the teacher to make a lesson much clearer to the learner. Instructional materials are tools used by teachers to aid explanations and make learning of subject matter understandable to students during teaching learning process (Oluwagbohunmi & Abdu-Raheem, 2014). Instructional materials play the role of a first-handstimulant in the teaching and learning process. They introduce a learner to materials and convey a precious quality of intimacy (Amadi, 2002). In furtherance, they help the mind of the learner on what is taught apart from being aids to memory. Moreover, they make learning and teaching more understandable and real. Instructional materials boost teaching and learning as they stimulate thinking and concretize learning (Ige, 2004). Successful implementation of any curriculum is almost fully dependent on the quality and quantity of instructional materials available to teachers and students for use in schools (Usman, & Adewunmi, 2006). Instructional Materials are used as checks to the teachers' knowledge and means of transmission.They give teachers the air of guidance, co-ordination, supervision and more time for correction in the class lesson (Stephen, 2015). Provision of high-quality instruction materials for learning such as geometric boards, fraction board, drawing board, weighting balance and good working space are essential for quality education (Kolawole, & Arikpo, 2001).

Improvised instructional materials are those teaching and learning materials produced using locally available resources with the help of experts (Ahmed, 2019). Improvised instructional materials are teaching materials designed and produced from the available local materials in order to promote effective teaching and learning in schools. They are materials that are used in the absence of the original or the ideal objects to bring about the same learning effect that the standard materials would have brought (Ahmed, 2008). The idea of making use of available local resources for the shortfall to ensure that teaching and learning progress simultaneously without hinges is referred to as improvisation (Eze, 2017). Improvisation is the use of local resources in our environment to assist in the smooth

dissemination and transfer of knowledge from one's improvisation as making of substances from local teachers to students. Improvisation is the act of using alternative materials and resources due to lack first-hand teaching materials to facilitate instruction (Bajah, 2000). Improvisation is an act of using materials and equipment obtainable from local environment, or designed by the teacher or with the help of local resource personnel (local art and crafts experts) to enhance effective instruction. Improvisation appeals to the three educational domains (Cognitive, affective and Psychomotor) (Unamba, ihekwaba & Aunlobi, 2022). Improvisation could be regarded as the act of using alternative materials or equipment accessible from the local environment or created by the teacher or with the help of local personnel to simplify instruction (Shodeind, 2015). Improvisation demands adventures, creativity, curiosity and perseverance on the part of the teacher. Such skills are only realizable through well-planned training programme on improvisation (Onasanya, & Omosewo, 2011).

Instructional materials are the relevant materials utilized by a teacher during instructional process to facilitate teaching and learning and for the purpose of making the contents of the instructions more practical and less vague. Improvised instructional materials according to NTI (Module Two) are of paramount importance in the teaching and learning because of the following functions they perform: they increase the rate of learning and at the same time allow the teacher to use more time on other gainful activities, they effect a reality of experience that stimulates self-activity on the part of the learners, they provide learning experience which are not within the immediate classroom environment, they discourage rote learning by emphasizing realistic learning, They make abstract term, concepts and generalizations more practical and realistic, they help the learners to focus their attention during teaching-learning process, they provide teacher with the means of guiding and controlling the desirable responses of the learners in relation to stimulus materials of the learning situations, they develop in the learners, awareness of problem, open up possibilities for exploration, present meaningful interactions which naturally lead to provision of solutions to learning problems, They help to stimulate purposeful and utilized self-activity and this is much more preferable educationally than a more or less passive and often bored listening and they improve the classroom communication process between the teacher and the learners, with this, the expected improvement in learning output will be accomplished.

Importance of Improvisation Improvised materials help to arouse and sustain learners' optimism and enthusiasm; access expert assistance and technical support; stay informed of innovative strategies to share ideas with other teachers; interpret research and□developments; have con statistical data; diplomatically handle students' resistance; align improvised materials with curriculum guidelines and timelines; and develop materials to cater for individual learner's needs in overcrowded classrooms. The use of improvisation in teaching makes the concept more practical and subsequently reduces abstractions. Locally produced instructional materials encourage creative expression and foster experimentation, sensitive to tactile and visual experience (Balogun, Barth & Tanko, 2000). Again, they are cost effective, because they could be obtained from the local environment. They are generally very safe to use during demonstrations and experiments; it might not be citing injuries, which means it could be hazard free. Improvised instructional materials give teacher/students the pride of using their talents, allows a teacher to reproduce his potentials, in concrete form and increase teacher's knowledge of the subject matter (Shodeind, 2015). In addition, they serve as a motivation to learners in as much as they participate in the activities during the production of the materials and also arouse learners' interest. Moreover, the use of these materials minimizes concerns about breakage, repair and loss since they are readily available in the environment. It informs both students and teachers that alternatives for some of the

conventional teaching materials are possible. It also shows that learners can do science which could lead to the discovery of new knowledge, and students' talents may be discovered. Using improvised instructional materials assist teachers economically and may make students more interactive. Beyond these, it makes students make use of their intellectual ability in the process of teaching and learning (Onasanya, & Omesewo, 2011).

Despite the importance accorded to improvisation of instructional materials, the problems attached to improvisation can be attributed to a number of factors such as lack of skills and strategies for improvisation and large class size. Other factors include time constraint, school location, unavailability of experts and sometime inability to identify local mathematics materials (Aina, 2013). Inadequate training, poor funding, lack of functional mathematics workshops, lack of regular supervision of teachers, poor motivation is among the challenges hindering the funding of improvisation instructional materials (Achimugu & Onojah, 2017). Balogun (2007) identified two main constraints militating against the successful funding of improvisation in teaching and learning process. The constraints are namely human and technical factors. Omosewo (2008) considered the human factors as the teacher's professional commitment, creativity, mechanical skills, initiative and resourcefulness. The human factors relate to the teachers' skills in developing the resources, while the resources provide appropriate learning experience to the learners. They found out that many of the teachers are aware of the possibility of improvisation but many of them exhibited poor attitude toward improvisation.

Very few teachers are prepared to practice improvisation as majority of them depend on imported equipment and complain that improvisation is time-consuming and fund-depleting. On the other hand, the technical factors relate to the question of degree of accuracy and precision that is possible with the improvised equipment. Maduabunnis (2003) is of the opinion that lack of adequate professional training is a major problem affecting the effective use of local resources for teaching. In the same vein, Isola (2010) advocates the need for a definite well-planned training programme of improvisation for teachers to improve and upto-date their competencies. These factors are highlighted and discussed below:

Purpose of the Study

The purpose of this study is to assess various challenges of funding the improvisation of instructional material in mathematics classroom. Specifically, the study seeks:

- **i.** To examine the challenges of funding improvisation of instructional materials for teaching mathematics in childhood education
- **ii.** To find out if there is a significant difference between the mean scores of mathematics teachers in urban and rural schools on the challenges of funding improvisation of instructional materials for teaching mathematics childhood education**.**
- **iii.** To find out if there is a significant difference between the mean scores of male and female mathematics teachers on the challenges of funding improvisation of instructional materials for teaching mathematics in childhood education.

Research Question

One research question guided the study

1. What are the challenges of funding the improvisation of instructional materials for teaching mathematics in childhood education.

Hypotheses

HO1: There is no significant difference between the mean scores of mathematics teachers' educators in colleges of education and university of education schools on funding the improvisation of instructional materials for teaching mathematics in childhood education.

HO2: There is no significant difference between the mean scores of male and female mathematics teachers' educators on funding the improvisation of instructional materials for teaching mathematics in early childhood education.

HO3: There is no significant difference in the mean scores of mathematics teacher educators teaching year two, three and four on challenges of funding the improvisation of instructional materials for teaching mathematics in early childhood.

Methodology

This research work adopted descriptive survey research design, since no variable was manipulated in this study. The population of the study comprise of 103 mathematics teachers' educators in Owerri Imo State. A sample size of 100 mathematics teachers' educators comprising of (37 male and 63 female). The instrument used for the collection of datais a self -structured Questionnaire titled challenges of funding improvisation of instructional materials in mathematics classroom (CFIIMMC). The CFIIMMC questionnaire was made up of two sections, A and B. Section A sought information on personal data (sex and educational qualification) while Section B sought information on objectives of the study. The CFIIMMC was measured on a 4-point scale format of Strongly Agree, Agree, Disagree and Strongly Disagree, which were assigned numerical values, 4, 3, 2, and 1. A total of 100 copies of the questionnaire were distributed and collected personally by the researchers with the help of the research assistance. The face and content validity of the instrument were done by two experts in measurement and evaluation. Cronbach alpha measures of 0.90 were obtained as the reliability index. The schools involved were visited by the researchers and the questionnaires were administered. A copy of the instruments was given to each of the teachers. The instruments were collected on completion. The instrument was administered to the teachers by the researchers with the help of three trained research assistants. The instruments were administered and retrieved on the same day from the teachers. The descriptive statistic of mean and standard deviation was used to answer the research questions while t-test was used to test the hypothesis at 0.05 level of significant.

Results

Research Question one: What are the challenges of funding the improvisation of instructional materials for teaching mathematics in childhood education.

Table 1: Mean and Standard deviation on the challenges of funding improvisation of instructional materials in mathematics classroom.

S/N	Question Items	Mean	Sd	Decision
1	Lack of skills for improvisation	3.36	1.4	Accepted
2	Large class size	3.16	1.1	Accepted
3	School location	3.11	1.0	Accepted
4	Limited budget allocation educational materials	3.23	1.3	Accepted
5	High cost of educational materials	3.21	1.9	Accepted
6	Competing priorities for funding within educational institutions	3.00	1.0	Accepted
7	Lack of awareness about the importance of improvisation materials	3.06	1.6	Accepted
8	Economic challenges facing the institutions	3.00	1.9	Accepted

Results in table 1 shows that all the items scored above 2.50. This implies that Lack of skills for improvisation, large class size, school location, limited budget allocation educational materials, high cost of educational materials competing priorities for funding within educational institutions, lack of awareness about the importance of improvisation materials and economic challenges facing the institutions.

Hypotheses

HO1: There is no significant difference between the mean scores of mathematics teachers' educators in colleges of education and university of education schools on funding the improvisation of instructional materials for teaching mathematics in childhood education.

Table 2: t-test analysis between mean scores of teachers in urban and rural schools

Programme Type	N	X	SD	DF	t-cal	t-tab	Decision
Colleges of Education	**58**	**3.40**	**1. 3**	**148**	**1.76**	**0.08**	
University of Education	**42**	**3.50**	**1.2**				

Testing the hypothesis at $\alpha = 0.05$, df = 148, a t-value of 1.76 which is significant at 0.08 was obtained. Since the significant value of 0.08 is greater than the value of 0.05, then the null hypothesis is retained. This implies that there was no significant difference between the mean scores of mathematics teachers' educators in colleges of education and university of education on funding the improvisation of instructional materials for teaching mathematics in childhood education.

HO2: There is no significant difference between the mean scores of male and female mathematics teachers' educators on funding the improvisation of instructional materials for teaching mathematics in early childhood education.

Table 3: t-test analysis between mean scores of male and female mathematics teachers' educators

Gender	N	X	SD	DF	t-cal	t-tab	Decision
Male	**37**	**3.40**	**1. 3**	**148**	**1.76**	**0.08**	
Female	**63**	**3.50**	**1.2**				

Testing the hypothesis at $\alpha = 0.05$, df = 148, a t-value of 1.76 which is significant at 0.08 was obtained. Since the significant value of 0.08 is greater than the value of 0.05, then the null hypothesis is retained. This implies that there was no significant difference between the mean scores of male and female mathematics teachers' educators on funding the improvisation of instructional materials for teaching mathematics in early childhood education

HO3: There is no significant difference in the mean scores of mathematics teacher educators teaching year two, three and four on challenges of funding the improvisation of instructional materials for teaching mathematics in early childhood.

Table 4. Analysis of variance on mathematics teacher educators teaching year two, three and four on **challenges of funding the improvisation of instructional materials for teaching mathematics in early childhood.**

Source of Variation	Sum of Squares	df	Mean Square	F	Sign	Decision
Between groups	219.077	2	109.503	2.754	0.005	Accept Ho
Within groups	11807.940	97	39.757			
Total	**2026.947**	**99**				

The result of table 4 reveals that F-value is less than the table-value at 0.05 level of significant. The null hypothesis is of no difference is therefore accepted. This implies that there is no significance difference in the mean scores of mathematics teacher educators teaching year two, three and four on challenges of funding the improvisation of instructional materials for teaching mathematics in early childhood.

Discussion of findings

Result showed that Lack of skills for improvisation, large class size, school location, limited budget allocation educational materials, high cost of educational materials competing priorities for funding within educational institutions, lack of awareness about the importance of improvisation materials and economic challenges facing the institutions. This finding is in accordance with the Omosewo (2008) revealed that budget constraints, competing priorities for funding, lack of awareness about the importance of instruction materials and economic challenges facing the school.

The result indicated that there was no significant difference between the mean scores of mathematics teachers' educators in colleges of education and university of education on funding the improvisation of instructional materials for teaching mathematics in childhood education.

Also, the result indicted there was no significant difference between the mean scores of male and female mathematics teachers' educators on funding the improvisation of instructional materials for teaching mathematics in early childhood education.

Finally, there is no significance difference in the mean scores of mathematics teacher educators teaching year two, three and four on challenges of funding the improvisation of instructional materials for teaching mathematics in early childhood.

Conclusion

The numerous challenges confronting the funding of improvisation instructional materials for teaching mathematics in early childhood education have been identified and vividly discussed

in this study. The study concludes that there are challenges hindering funding of improvisation instructional materials for teaching mathematics in childhood education and there is no significant difference among the mathematics teachers' educators irrespective of programme type, gender and level of students teaching in schools,

Recommendations

For Nigeria to attain sustainable growth and development via secondary education, quality education delivery must be the priority of everybody. To tackle the challenges identified in the study, the following were recommended:

1. Politicians should stop recruiting non teachers into the teaching profession but rather put up vibrant in-service training and retraining of teachers.
2. Teacher motivation should be put into the political agenda.
3. Stakeholders in secondary education, wealthy individuals, religious organizations and the private sector should collaborate with government in the provision of basic infrastructural and educational facilities and ICTs to match the students' population.
4. Admission policy into teacher education programmes should be reformed.
5. Parents should ensure proper upbringing of their children. School counselors, teachers and principals should continue to provide moral leadership in school.

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