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AN ASSESSMENT OF MATHEMATICS SKILLS OF JUNIOR SECONDARY SCHOOL STUDENTS IN EDO STATE

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Abstract
In mathematics, there are lots of skills which a secondary school mathematics learner is expected to demonstrate before he or she can be said to be proficient in the subject. Hence, the purpose of this research was to determine the extent of which junior secondary school mathematics learners have acquired the mathematics skills stated in the J.S.S 3 Mathematics Curriculum. A sample of 400 students was randomly selected from 10 junior Secondary School 3 (J.S.S 3) in Edo State. A mathematics test titled "Mathematics test of skills" which covers the two mathematics skills area was administered. The scores obtained in the mathematics test were analyzed using the t-test. The result revealed that there is a significance difference between junior students who have Mathematical problem solving skill and those who do not have. Recommendation was made that teachers should be retrained so as to emphasize the development of basic problem solving and computational skills in mathematics.

Keywords: Assessment, mathematics skills, problem solving skill, computational skills

Introduction
Mathematics is a subject that has been given a place of pride in the Nigerian school curriculum. At the primary, junior secondary and senior secondary school levels, Mathematics is a compulsory subject. This is not unconnected with the recognition of the role of Mathematics in national development. Mathematics as a subject offered in secondary schools happens to be a compulsory subject required to gain admission into tertiary institutions in Nigeria. Students desiring to further their academic pursuit after secondary education are expected to have credit pass in Mathematics, English language and three other subjects in line with their intended course of study. This development could make some students with poor mathematical skills and competence become apprehensive, afraid and tensed when studying Mathematic. Mathematics today is a diverse discipline that deals with data, measurements, and observations from science; with inference, deduction, and proof; and with mathematical models of natural phenomena, of human behaviour, and of social systems (Eravwoke, 2015).

The knowledge of mathematics leads to national development because it prepares its graduate for self-reliance which is one of the aims and objectives of Nigerian education, as stipulated in the National Policy on Education (FRN 2004), which stresses the development of a self-reliant nation. According to Jimo (2009) Science Technology and Mathematics (STM) education should prepare individuals for self-reliance. This according to Matazu (2010), can be achieved by delivering STM education practically in such a way that it enables individuals acquire necessary and vital skills for self employment. It should be noted that achieving self-reliance which is a prelude to self sufficiency and employment generation can best be achieved in Nigeria when STM Education is taught as hands-on and minds-on practical activities in our public schools. This is because the way a subject is taught affects students' conception.
Ihejietdo (2009) identified mathematical skills as the ingredient for the effective articulation of the abstract element of science that impetus to the development of technologies. However, events of the past decades have shown that many Nigeria Junior Secondary students neither perform well in the subject nor show a positive feeling towards the subject due to low acquisition of mathematical skills. The acquisition of

mathematical knowledge through problem-solving has long been considered a crucial instruction strategy to improve the cognitive processing of mathematical word problems and to enhance students' academic achievement (Erbas & Okur, 2012; Pape & Wang, 2003). Problem solving is a skills needed by students so that they can understand and develop more effective classroom activities and tasks.
Learning mathematical facts and contents is important but is not enough, students should learn how to use these facts to develop their thinking and solve problems skills. Adedayo, (2006) stated that mathematics educators have accepted the idea that the development of problem solving ability deserves special attention. Without the ability to solve problems, the usefulness and practice of mathematics ideas, skills and application can be limited. Chakpo and Buchko (2004) are of the view that learning and teaching mathematics concepts form the integral parts of the daily activities of students, since these activities involve exploration, qualitative and quantitative reasoning and problem-solving. These tools equip the students to think logically during mathematics learning experience. It goes a long way to enhance students' interaction with learning experiences and vocabulary in mathematics.

Effective mathematics problem-solving often depend on understanding of key concepts without which the students can be totally lost as to how to carry out a mathematical learning task. Martinez and Martinez (2001) were of the view that students learn to use language to focus and work through problem-solving, to communicate ideas coherently and clearly, to organise ideas and structure arguments, to extend their thinking and knowledge, to encompass other perspective and experiences, to understand their own problem-solving and thinking processes as well as those of others and to develop flexibility in presenting and interpreting ideas. At the same time, they begin to see mathematics, not as an isolated school subject, but as a life subject an integral part of the greater world, with corrections to concepts and knowledge encountered across the curriculum.
Mathematics vocabulary is essential to learning mathematics in problem-solving as it pertains to learning how to read and comprehend meaning to words read. In language arts, mathematical words conjure up graphic representations of the objects they label but when it comes to abstract mathematical concepts, words describes activities or relationship that often lack a concrete item. Thus, the knowledge of vocabulary in problem-solving is critical to helping the students develop the means to solving mathematical problems. A good mathematics programme should involve the use of relevant examples to illustrate mathematics vocabulary in problem-solving as mathematics is a creative discipline which can effectively be used to communicate ideas and become familiar with the characters in which it is written. It is written in mathematical language and the letters are triangles, circles and other geometrical figures without which it is humanly impossible to comprehend a single word (Odu, 2017). This shows that communication is a key factor in everyday interaction of the people. Hence, understanding the meaning of the vocabulary is essential to learning mathematics.

This further shows that computational thinking is an essential concept that is required to enhance performance in any subject especially in mathematics. Computational skills are defined as the abilities to calculate basic addition, subtraction, multiplication, and division problems quickly and accurately using mental methods, paper-and-pencil, and other tools,such as a calculator. Specifically, students with computational skills have the abilities to calculate basic addition, subtraction, multiplication, and division problems quickly and accurately (Varol & Farran, 2007). Even with the continuation of modern technology, however, math computation skills remain an integral part of students' math education because they lay the foundation for success in future math learning such as algebra, geometry, trigonometry and calculus. Van de (2005), who contends that computational skill used by students will provide an insight into their understanding of mathematical concepts, relationships, and number sense. Baroody (2003) ascertained that computational skills enable students to execute the steps to calculate the solution of a mathematical problem. The researchers was motivated to ascertained an assessment of Mathematics skills of junior secondary school students in Edo State

Purpose of Study

The main purpose of the study was to ascertain an assessment of Mathematics skills of junior secondary school students in Edo State. Specially the sought to ascertain an assessment of :

1. To find out the extent to which Junior Secondary School Mathematics learners have acquired the Mathematics problem solving skills stated in JSS Mathematics curriculum.
2. To find out the extent to which Junior Secondary School Mathematics learners have acquired the Mathematics computational skills stated in JSS Mathematics curriculum

Research Hypothesis

Two null hypotheses were tested at 0.05 level of significant

1. There is no significance difference between Mathematical problem solving skill and junior secondary school students.
2. There is no significance difference between Mathematics computational skills and junior secondary school students

METHODOLOGY

The study used a descriptive survey research design. Descriptive survey research is used to find out the opinions of individuals on various trending issues. In this case, it was employed to ascertain assessment of Mathematics skills of junior secondary school students in Edo State.

Population of the Study

The population of this study was all the Junior Secondary School III {JSS III} students in the eighteen Local Government Area of Edo State.

Sample and Sampling Procedure

The sampling procedure that was employed by the researcher was the stratified random sampling. The eighteen Local Government Areas in the State will be stratified into the three senatorial districts and ten junior secondary schools shall be selected from the three senatorial districts. In the selection of students for the study, stratified non proportional random sampling technique was employed. 40 students were selected from each school to make a total of 400 Junior Secondary Mathematics learners that was used for the study. The following ten schools were selected for the study.

Instrument of Study

The researcher developed a 32 item Mathematics test of skills (MTS). The development of the items were based on two areas of Mathematics skills namely, computational skills and problem solving skills.

The test items were generated from some selected topics of the four content areas of the JSS Mathematics curriculum (FME, 2007); Number and Numeration, Algebraic processes, Plane Geometry and Measurement and Everyday statistics.

The items were developed on four levels of cognitive domain of behaviour (knowledge, understanding, application and higher order thinking). The Mathematics test of skill (MTS) was a multiple choice type with five options of four incorrect options and one correct option. See appendix A

Method of Analysis

Independent t- test of difference was used in testing the two null hypotheses at 0.05 level significance

RESULTS

Section A. Test of Research Hypotheses

H_{01}: There is no significance difference between junior students who have Mathematical problem solving skill and those who do not have it.

Table 1: junior students who have Mathematical problem solving skill and those who do not have it

Group	N	Mean	SD	DF	t-calculate	t-critical
Possess Mathematical problem solving skill	**109**	**42.88**	**5.18**			
				398	**8.39**	**1.98**
Do not have Mathematical problem solving skill	**291**	**43.54**	**6.44**			

Source; Field work 2021, ***a*** **= .05**

The result from Table 1 shows that the mean score of students based on their possession of Mathematical problem solving skills. Students who possess Mathematical problem solving skills have a mean score of **42.88** while those who do not possess Mathematical problem solving skills a mean score of have **43.54**. This means students do not possess Mathematical problem solving skills are higher than those who possess Mathematical problem solving skills. Also, there is no significance difference between junior students who have Mathematical problem solving skill and those who do not have it, $t(398) = 8.39$, $p<0.05$, since the p-value is less than the level of significance, 0.05, the hypothesis which states that there is no significance difference between junior students who have Mathematical problem solving skill and those who do not have it, is rejected. Therefore, there is a significance difference between junior students who have Mathematical problem solving skill and those who do not have it.

Ho_2: There is no significance difference between junior students who have Mathematics computational skills and those who do not have.

Table 2: junior students who have Mathematical computational skills and those who do not have it

Group	N	Mean	SD	DF	t-calculate	t-critical
Possess computational skills	**89**	**47.14**	**6.55**			
				398	18.93	**1.98**
Do not have computational skills	**311**	**49.62**	**7.12**			

Source; Field work 2021, ***a*** **= .05**

The result from Table 2 shows that the mean score of students based on their possession of Mathematical computational skills. Students who possess Mathematical computational skills have a mean score of **47.14** while those who do not possess Mathematical computational skills a mean score of have **49.62.** This means students do not possess Mathematical computational skills are higher than those who possess Mathematical computational skills. Also, there is no significance difference between junior students who have computational skills and those who do not have it, $t(398) = 18.93$, $p<0.05$, since the p-value is less than the level of significance, 0.05, the hypothesis which states that there is no significance difference between junior students who have Mathematical computational skills and those who do not have it, is rejected. Therefore, there is a significance difference between junior students who have Mathematical computational skills and those who do not have it.

Discussion of findings

The result of the finding revealed that there is a significance difference between junior students who have Mathematical problem solving skill and those who do not have it. This implies that not all junior students

have the Mathematical problem solving skill, as such this could be one of the reason student perform poorly in Mathematics as a subject. This finding validate the work of Erbas and Okur, (2012) ; Pape and Wang, 2003) that the acquisition of mathematical knowledge through problem-solving has long been considered a crucial instruction strategy to improve the cognitive processing of mathematical word problems and to enhance students' academic achievement. Problem solving is a skills needed by students so that they can understand and develop more effective classroom activities and tasks. Also Adedayo, (2006) supported this finding by stating that t mathematics educators have accepted the idea that the development of problem solving ability deserves special attention. Without the ability to solve problems, the usefulness and practice of mathematics ideas, skills and application can be limited.

The other findings from this study revealed that there is a significance difference between junior students who have Mathematical computational skills and those who do not have it. This . This implies that not all junior students have the Mathematical computational skills, therefore student lacking this essential skill may brand Mathematics as a difficult subject. as such this could be one of the reason student perform poorly in Mathematics as a subject. This findings support the work of Van de (2005) who contends that Computational skills used by students will provide an insight into their understanding of mathematical concepts, relationships, and number sense. Baroody (2003) ascertained that computational skills enable students to execute the steps to calculate the solution of a mathematical problem.

Conclusion

The research has presented a clear picture on the acquisition levels of mathematics skills acquisition in the two basic skill levels needed in the J.SS curriculum. The acquisition levels of the two skill areas is not satisfactory as students performed below average in all the two skill areas showing that students have not acquired the basic skills needed in the J.SS curriculum.

Therefore, efforts to upgrade and thus help students to master and acquire these basic skills should be planned and implemented. It is hoped that the data generated by this research can contribute towards the upgrading of teaching and learning mathematics in Edo State.

Recommendation

Students low performance in all the three basic skills area needed in J.SS curriculum has been identified by this study. Therefore, definite measures should be taken to help students to improve on their acquisition levels in the basic skills areas. Based on the findings of this study, it is recommended that:

1. Teaching and learning mathematics should not only emphasize basic knowledge and skills. Students should be exposed and taught problem solving directly through teaching and learning activities in the classroom.
2. Teachers should be retrained so as to emphasize the development of basic problem solving and computational skills in mathematics.
3. Since the competence in mathematics can be demonstrated by conceptual and procedural knowledge, mathematics teachers should continuously assess students so that they can gain in-depth knowledge of problem solving rather than just selecting from alternatives

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Appendix A

TABLE OF SPECIFICATION FOR CONSTRUCTING THE MATHEMATICS TEST OF SKILLS (MTS).

	CONTENT	**Knowledge**	**Understanding**	**Application**	**Higher order thinking (HOT)**	**Total**
(a)	**COMPUTATIONAL SKILLS**					
	NUMBER AND NUMERATION					
1.	Estimation and Approximation	**1**	1	2	-	4
2.	Addition and subtraction	1	1	-	-	2
3.	Fractions	1	2	1	2	6
4.	Calculation using standard form	-	1	-	-	1
5.	Number Bases	-	1	2	-	3
(b))	**PROBLEM SOLVING SKILLS**					
	ALGEBRAIC PROCESSES					
1	PythagorasRule	-	2	-	2	4
2	Algebraicexpression	-	1	-	-	1
3	Wordproblems	-	2	1	1	4
	GEOMETRY&MEASUREMENTTTTTTtttT &MEASUREMENT &&					
4	Plainshapes	1	1	2	-	4
	EVERYDAY STATISTICS					
5	Statistical averages	-	2	1	1	4
	TOTAL	4	14	9	8	28