

MATHEMATICS TEACHERS' PERCEPTION OF MATHEMATICS LEARNING DIFFICULTIES AMONG JUNIOR SECONDARY SCHOOL STUDENTS IN ADAMAWA STATE, NIGERIA

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ABSTRACT

Mathematics education is the bedrock of scientific and technological development in any country. Mathematics is an important vehicle for the development and improvement of a person's intellectual competence in logical reasoning, spatial visualization, analysis and abstract thought. Despite all these benefits, the problem of poor achievement in mathematics has continued to rear its head, and few students offered mathematics as a course in tertiary institution compared with other subjects. This study sought to determine difficulties encountered by students in the following mathematics contents: vocabulary of mathematics, number properties and arithmetic operation among junior secondary school students in Adamawa state. The study employed descriptive survey research design with a sample subject of 200 mathematics teachers across 110 junior secondary schools in Yola metropolis. Questionnaire was used to gather data from the respondents, the statistical tool for analysing research questions were mean and standard deviation. The result of the study showed that students have moderate level of learning difficulties in all items except on applying the operations to solve word problem which has high level of difficulty. It is recommended that possible ways of teaching these terms should be employed by teacher so as to reduce or overcome the level of students' learning difficulties in mathematics.

KEYWORDS: Learning Difficulties, Mathematics Teachers Perception, Mathematics Vocabulary

INTRODUCTION

Mathematics is one of the core subjects in both junior and senior secondary school curriculum in Nigeria. This is one of the reasons why Carl (2002) referred mathematics as "the queen of the sciences". Also David (2009) reported that mathematics is a conceptual system that possesses internal necessity that involves proof. According to Galileo (1996) that

"The universe cannot be read until we have learned the language and become familiar with the characters in which it is written" And the universe is written in mathematical language and the letters are triangles, circles and other geometrical figures, which means without the knowledge of mathematics, it will be humanly impossible to comprehend a single word and one will be wondering in a darkness. Mathematics occupies a central position in the scientific and technological growth of any country. Of all sciences, Mathematics serves as the rudiment in which the students are taught the spirit of inquiring and reasoning."

Such inclusion justifies the recognition of mathematics as being essential, but the development in mathematics has not been very encouraging. Attempts have been made by researchers in mathematics education to deal with the problem of achievement in Junior secondary school mathematics. The recent debate on the falling standards of students' achievement in mathematics has triggered the growing attention for researchers, parents and education authorities in their quest for the way forward over the last two decades (Orton, 2012). In recent years, it seems there is sudden decrease in students' performance in mathematics especially in junior school certificate examination (J.S.C.E). This poor performance could be traced to different factors including students in ability have good vocabulary of mathematics. One of the basic components in understanding Mathematics is the learning of mathematical vocabulary which is the knowledge of a word and meanings.

In solving mathematics problems, students manipulate numerals and interpret symbols, but an understanding of mathematics requires more than knowledge of numerals and symbols. Mathematics also requires a language- based vocabulary component. Teachers and students use language to teach and learn about mathematics, and this oral and written language is filled with vocabulary terms specific to mathematics terms such as sum and product and vocabulary terms from everyday language that have mathematical meaning like more and quarters (Powell & Nelson, 2017). Furthermore, the majority of standardized mathematics tests require interpretation of written language and accompanying vocabulary terms. That is the notion that mathematics is strictly numerals and symbols is an understatement; students require knowledge of mathematics vocabulary in written and oral forms to demonstrate mathematics competency with concepts and procedures (Dunston & Tyminski, 2013).

This study focuses on mathematics teachers' perceived learning difficulties experienced by students in mathematics. The way teachers perceive learning plays an important role in determining the outcome of any educational endeavour and it is not in doubt that when difficulties are experienced in learning, achievement is frustrated. For this reason, one of the issues that any educational programme should address seriously is the difficult level of a course or subject (Russel, 2009). To achieve the goal of any course or subject, the difficulty level of its contents must match the developmental level of the students involved. Levels of difficulties perceived or experienced by students in mathematics have been addressed by some researchers (Balatti 2011). Students sometimes prejudge their performance to certain activities or topics and categorize them as either easy or difficult based on their perceptions. Test results however do not always confirm these perceptions. This occurrence finds support in the poem about perception cited in the book critical thinking and writing in a diverse world by Rascool and McCarthy (1993) that Expectations, beliefs, attitudes, self-concept and understanding of the concepts, processes and applications greatly influence one's perception of a given stimulus. One perceives only what he or she wants to pay attention to and that which the person is interested in. His or her needs, motives and social situation all affect the manner by which reality is filtered. Marco and Marton (2013) carried out a seminal work in the area of learning

difficulties and found that learning difficulties are influenced significantly by students' perception of the learning environment. Ramdem (1991) reported the influence of teaching characteristics on learning difficulties which includes the teaching methods, teacher enthusiasm and commitment and the pace and level at which information is presented. Furthermore, learning difficulties have been reported to be influenced by factors like overload of work, students' perception of the relevance of the content, poor teaching method, poor student-teacher interpersonal relationship and lack of opportunity for self-management (Marco & Marton, 2013). Muhandiki (1992) also reported that student' difficulties with the concepts of multiple, factor, prime number lead to confusions and misunderstanding of the use of each term and the distinction between them.

This study focuses on mathematics teacher's perception of learning difficulties among junior secondary students in vocabulary of mathematics, arithmetic operations and number properties.

STATEMENT OF THE PROBLEM

Mathematics like all other science and vocational subjects helps tremendously in nation building. The study of the subject is related to what people see, feel and know (Dogo 2000). Mathematics provides an effective way of building mental discipline and encourages logical reasoning and mental rigour. Man's present level of civilization is a product of his ability to develop his potentiality in tapping natural resources through the development of technology and the role that mathematics played in developing the technology for tapping natural resources of this nation cannot be over emphasized. That is why Mathematics serves as a core subject in the curriculum of secondary education in Nigeria. The poor achievement in mathematics has continued to be a major concern to all and particularly those in the main stream of science education. This has also resulted into tension, depression and social maladjustments among junior secondary school students who were not able to attain the desired grade required for admission into senior secondary school. This is as result of students' poor understanding of mathematical vocabulary which is the knowledge of a word and meanings.

Thompson (2010) argued that it is important to study teacher beliefs and perceptions because teachers' frequently treated their beliefs and perceptions as their knowledge and that teachers' beliefs and perceptions had an impact on their experiences and practices in the classrooms. In recent times, there has been considerable interest shown in the affective domain of mathematics education with research findings pointing out that affective variables have profound impact on classroom practices of mathematics teachers (Grootenboer, 2006; Boz, 2008). To achieve the goal of any course or subject, the difficulty level of its contents must match the developmental level of the students involved (Balatti 2011). This study pay attention on areas of difficulties in mathematics namely: vocabulary of mathematics, arithmetic operations and number properties need to be diagnosed and remedied to improved performance in the subject.

PURPOSE OF THE STUDY

The main purpose of this study is to determine the mathematics teacher's perceptions of mathematics learning difficulties among junior secondary students. Specifically, the study is designed to:

1. Determine the level of students learning difficulties in mathematics vocabulary
2. Determine the level of students learning difficulties in arithmetic operations.
3. Determine the level of students learning difficulties in number properties.

Research Questions

1. What is the level of students learning difficulties on vocabulary of mathematics?
2. What is the level of students learning difficulties on arithmetic operations?
3. What the level of students learning difficulties on number properties?

The study adopted a descriptive survey research design because it involves determining mathematics teacher's perception of students' learning difficulties in mathematics word problems (vocabulary, number operation and number properties). The study was carried out in 110 junior secondary schools in Yola education zone of Adamawa state. The population of the study comprised all the 200 mathematics teachers from 110 junior secondary schools within the area of the study. Considering the size of the population, all the 200 teachers from 110 schools were used as sample for the study. A structured questionnaire with four options of Very High (VH), High (H), Moderate (M) and Low (L) was developed by the researcher titled: Mathematics Teachers' Perception on Students' Learning Difficulties in Mathematics (MTPSLDM). The questionnaire was divided into part I and II. Part I contained general information and instructions on how to complete the instrument, while part II solicited information on teachers perception on students learning difficulties in mathematics. The instrument was given to three experts in science and mathematics education for face validation. Their suggestions and criticisms were used in producing the final copy of the questionnaire. The research instrument was pilot tested on 25 mathematics teachers outside the study area. Their responses were subjected Gut man split half reliability and a coefficient of 0.85 was obtained. The questionnaire was administered on the respondents by the researcher with the help of three research assistants. Data collected were analysed using descriptive statistics of mean and standard deviation.

RESULT

Research question 1: What is the level of students learning difficulties on vocabulary of mathematics word problems?

Table 1: Responses of the mathematics teachers on students learning difficulties on vocabulary of mathematics.

S/N	ITEMS	VH	H	M	L	\bar{x}	S.D	REMARK
1	Difficulties students faced in interpreting mathematics word	80	91	21	08	3.22	0.79	M
2	Difficulties in translating Mathematical terms like; product, odd, power, prime, root and field	92	63	25	20	3.10	0.98	M
3	Differentiating statements like between, similar, relations, and gradient in mathematics with ordinary English.	83	110	06	01	3.38	0.57	M
4	Difficulties in the use of specialised language in expression.	60	95	30	15	3.00	0.87	M
5	Difficulties on the use of mathematics terms	103	72	15	10	3.34	0.82	M
	Grand Mean					3.21	0.81	M

The result in table 1 shows that students learning difficulties on vocabulary of mathematics were moderate all items with a mean of 3.33, 3.10, 3.38, 3.00 and 3.34 for item 1, 2, 3, 4 and 5 respectively.

Research question 2: What is the level of students learning difficulties on arithmetic operations in word problems?

Table 2: Responses of the mathematics teachers on the students learning difficulties with arithmetic operations.

S/N	ITEMS	VH	H	M	L	\bar{x}	S.D	REMARK
1	Difficulties on how to apply mathematics operations.	135	65	00	00	3.66	0.47	H
2	Difficult in interpreting Sum as addition.	30	77	63	30	2.54	0.92	M
3	Expressing word problems to equation	61	79	42	18	2.92	0.93	M
4	Interpreting Difference as subtraction.	82	73	30	15	3.07	0.92	M
5	Difficulties in translating Product as	89	86	22	23	3.06	0.98	M

	Multiplication							
6	Difficulties in understanding quotient as division	103	71	19	07	3.35	0.79	M
	Grand Mean					3.08	0.84	M

The result in table 2 shows that students have high level of difficulty on item 1 and moderate difficulties on items 2, 3, 4, 5 and 6 with the mean values of 3.66, 2.54, 2.92, 3.07, 3.06 and 3.35 respectively.

Research question 3: What is the level of students learning difficulties of mathematics on number properties?

Table 3: Responses of the mathematics teachers on students’ difficulties in differentiating number properties.

S/N	Difficulty in differentiating	VH	H	M	L	\bar{x}	S.D	REMARK
1	Multiple	94	56	29	21	3.12	1.00	M
2	Factor	107	53	13	27	3.20	1.05	M
3	Divisor	117	63	17	03	3.47	0.71	M
4	Odd number	96	49	35	20	3.11	1.02	M
5	Even number	72	103	24	01	3.23	0.67	M
6	Prime number	84	106	07	03	3.36	0.62	M
7	Natural number	110	74	16	00	3.47	0.64	M
	Grand Mean					3.29	0.79	M

The result of the analysis in table 3 shows that all items have moderate level of difficulties on number properties with grand mean of 3.29.

DISCUSSION

The study revealed that students have moderate learning difficulties on vocabulary of mathematics in junior secondary school in Yola metropolis with a mean of 3.21. The finding is in agreement with Spencer and Russel (2009) who found that the difficulties in reading mathematics are due to specialised language for expressing fractions, ratios and decimals. Also words which are used in everyday language have different meanings when used in mathematics can be a source of difficulty for students. The findings also revealed that students encountered high difficulties on how to apply the operations to solve word problem with a mean of 3.66.

The findings revealed students moderate learning difficulties on number properties and operation in junior secondary school in Yola metropolis with a grand mean of 3.29 which is in line with that of

Muhandiki (1992) who have reported students' difficulties with the concepts of multiple, factor, prime number. Students' responses to the test items revealed several confusions hence lack of understanding of the use of each term and the distinction between them.

CONCLUSION

Base on the findings for the study it can be concluded that there is moderate students learning difficulties of mathematics vocabulary, number operation and properties of numbers among junior secondary schools in Yola metropolis. Teachers responses indicated students difficulties in differentiating mathematical terms like; product, odd, power, prime, root and field with ordinary English and difficulties on how to apply the operations to solve words problem.

RECOMMENDATIONS

With regard to the findings of the study, it is recommended that:

1. Students should be helped to acquire the vocabulary and correct phraseology of mathematics, appropriate to their age and ability and teachers should use linguistic structures (e.g. quantifiers) in teaching mathematics.
2. Teachers should use different instances of a given term/concept as possible. Thus, after students have understood the colloquial language for a given concept, they should be gradually introduced to other versions of that concept, culminating in the relevant technical term(s). For example, since students will initially tend to associate 'subtraction' with 'taking away', they need to know (at some stage) that the term 'difference' refers to the same concept. Therefore, teachers must always be aware that they can communicate with their students if the package of ideas that is the same as that which the students understand by that word.
3. There is also need to use examples and counter-examples. For instance, after students have learned the concept of even numbers, they should be shown examples of 'non-even numbers.

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