CHALLENGES OF MATHEMATICS LANGUAGE ON PUPILS' PERFORMANCE IN MATHEMATICS AT THE PRIMARY SCHOOL LEVEL IN DELTA STATE -NIGERIA

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ABSTRACT

This paper investigated the challenges of Mathematics language on pupils' performance in mathematics at the primary school. This study adopted the survey design. The population of the study consisted of all the 1,165 public primary school in Delta State. The simple random technique was used to select twelve (12) public primary schools from Ughelli North and Warri South Local Government Area with a sample size of Two hundred (200) pupils. The researchers developed Questionnaires on Mathematics Objective Tests (QMOT) which consists of two (2) section: Section A sought for demographic on sex and locations of the pupils. While section B was the Questionnaire on Mathematics Objective Tests (QMOT) of ten (10) items as instrument of data collection. The two (2) research questions and hypotheses formulated were answered and tested using the mean and t-test at 5% level of significance. The major findings of this research is that pupils in urban and rural area in public primary schools have enormous difficulties in understanding Mathematics problems due to the Mathematics language that was used. And this led to a recommendation that Mathematics educators should develop a handbook on primary Mathematics language.

Keywords: Mathematics Language, Objective Tests, Primary Schools

INTRODUCTION

The importance of Mathematics cannot be over emphasized. It is the basis for all sciences and it plays a major role in the understanding of principles and structure of sciences (Onoshakpokaiye, 2006). Mathematics has been so useful right from the origin of man on earth; it is the most useful and fascinating division of human knowledge. Its' knowledge has prompted studies, especially in Science and Technology (Baddley, 1985). Hence, it is accorded the "key and gate" of all sciences particularly in the physical and engineering sciences (Onoshakpokaiye, 2006). Thus, due to its relevance, it had remained a core subject on both primary and post primary level of Education in Nigeria for more than two decades.

The Primary School Education forms the stepping stone for other levels of Education in Nigeria (Iji, 2007). Thus, this Primary School Level of Education is very paramount to the overall development of the our nation and Mathematics being a core subject in this level with the aim of providing the child/pupil with the necessary basic skills in numerals; exposes the pupils to ways of applying these skills to his/her problems and the provision of the basic manipulative skills useful in ordinary life (Agha, 2003).

This propel the Federal Ministry of Education (2004) to state that the key to the success or failure of the whole Educational goals of the Nigeria child hinges on the level of adequacy of the primary school subjects: Mathematics, English-Language and as well as Social Studies. Aigboman (2002) opined that the performance of pupils in this so important subject-Mathematics would be encouraging but the reverse is the case. In light of this, Agwagah and

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Onwuka(2004) posited that, despite the important role of Mathematics in mankind development, its achievement has been very poor especially in the primary schools and this calls for a great concern because it is detrimental to our national growth and development in Science and Technology.

Based on this premise, Shafi (2000) posited that there are various variables that had been hindering the performance of pupils in Mathematics for such a long time in our education system in Nigeria. In this light, Amoo and Efunbayo (2004), attested to the facts of the various variables and identified these variables to include: instructional materials in teaching and learning of Mathematics; the effects of incompetence in teaching methodology at the primary school level and the various stereotypical attitudes towards Mathematics among primary school pupils.

However, researchers' works in Mathematics were wholistics and have served to achieve a major step in tipping the problems militating against Mathematics at the primary school level. Austin and Howson, (1979) opined that the problems in Mathematics at the primary level of Education are language related problems. Most pupils have little difficulties in Mathematics concepts when Mathematics problems are presented in number form and difficulties arise when familiar words are indistinctly worded in Mathematics problems Ebisine (2010).

Also, Fleming and Marrel (2004) stated that pupils interference between the natural language and the mathematics language used in Mathematics problems at the primary school level: That is, the style of Mathematics writing in non-Mathematical texts have placed demands on the pupils to acquire a special reading skills to update the meaning of words used in Mathematics problems. This issue of language confronting the performance of pupils in Mathematics is of enormous magnitude. This prompted (Ojerinde, 1999) to contend that language of Mathematics is very specific and pupils need to identify correct meaning of those non-Mathematics texts to effectively communicate and construct appropriate meanings to Mathematics problems. So, if there's no emphasize on the meaning of words used in Mathematics problems during the teaching and learning of Mathematics concepts at the primary school level, pupils will encounter enormous difficulties in understanding the non-Mathematical texts and the Mathematics problems in general.

According to Cecilian (2001), who propounded that pupils give different meaning from that intended in Mathematics and this makes pupils to have poor performance in Mathematics at the primary school level thereby making them to loose interest and curiosity in the classroom during the subject-Mathematics discourse. Thus, due to lack of proper understanding of the non-mathematics text in mathematics problem at the primary school level, their teachers are often entertained by their shouts and frowning during the teaching and learning of Mathematics. Thus, it becomes imperative and a matter of urgency to investigate the challenges of Mathematics language on pupils' performance in Mathematics at the primary school level of education.

PURPOSE OF STUDY

The research work was carried out to reveal the challenges which Mathematics language is proliferating on pupils' performance in Mathematics Essays and Mathematics Objectives Tests at the primary level of education. Thus, it is to:

a. Determine the effects of Mathematics language on pupils' performance in Mathematics base on their location in Mathematics Objective Tests.

b. Ascertain the effects of Mathematics language on pupils' performance in Mathematics base on their gender in Mathematics Objective Tests.

HYPOTHESES

The following hypotheses are formulated for the study:

1. There is no significant relationship between Mathematics Language and pupils' performance in Mathematics based on their locations in Mathematics Objective Test.

2. There is no significant relationship between Mathematics Language and pupils' performance in Mathematics based on their gender in Mathematics Objective Tests.

RESEARCH METHODOLOGY

Design

The research is a survey research. Nworgu (2006) conceived that a survey research is one in which a group of people or items are studied by collecting and analyzing data from only a few people or items considered to be representative of the entire group. The survey design specifies how such data will be gathered (collected) and analyzed.

Population and Sample

The population for this study comprises of all the one thousand one hundred and sixty five (1,165) public primary schools in the twenty five (25) Local Government Areas of Delta State, Nigeria. The simple random sampling technique was adopted to select twelve (12) public primary schools from two Local Government Areas: Ughelli North and Warri South. A total of two hundred (200) pupils were chosen from the two (2) Local Government Areas.

Research Instrument/Validity

Data collection was made with researcher developed Questionnaire on Mathematics Objectives Tests (QMOT) prepared by the researchers. The QMOT was validated by three expects in the department of Mathematics and English-Language and a primary school mathematics head teacher in College of Education, Warri, Delta State. They were trial tested on a sample of fifty pupils (50) each from public primary schools in Warri South and Isoko North Local Government Areas of Delta State to ascertain the material consistency and reliability of the QMOT. An estimate of internal consistency was established using the Kuder-Richardson formula (KR-20) for the Mathematics Objectives Test. The reliability coefficient obtained was 0.60.

Method of Data Analysis

The data obtained by the researcher based on the respondents responses were subject to a statistical analysis. In analyzing, the researchers used the mean and standard deviation to answer the research questions and a mean of 0.65 was adopted as the agreement point, while the t-test statistics was used to test the hypotheses formulated for this study at 0.05 significance level.

DATA ANALYSIS AND FINDINGS

The following are the findings from this study.

Research Question 1

Does Mathematics language affect pupils' performance in Mathematics based on their location in Mathematics Objective Test?

Table 1. Pupils Locations Mean and Standard Deviation Analysis

S/N	Non-Mathematical Text Items	Locations		Location		y-test	$D=d^2_1$
		Urban (Mean) $\overline{x}$	Urban (SD)	Rural Mean	Rural (SD)		
1.	Index	0.40*	0.004	0.60*	0.006	0.0020	0.000004
2.	Difference	0.13*	0.001	0.88**	0.008	0.0444	0.00197
3.	Decimal	0.44*	0.005	0.56*	0.005	-0.0028	0.0001
4.	Plane	0.86**	0.010	0.14*	0.001	-0.0532	0.00283
5.	Commission	0.18*	0.002	0.83**	0.008	0.0384	0.00148
6.	Cost price	0.58*	0.006	0.43*	0.004	-0.0096	0.00009
7.	Profit	0.59*	0.007	0.42*	0.004	-0.0108	0.00012
8.	Weight	0.28*	0.003	0.72**	0.007	0.0164	0.00027
9.	Bisect	0.82**	0.009	0.18*	0.002	-0.0484	0.00234
10.	Descending	0.37*	0.004	0.63*	0.006	0.0056	0.00003

Grand mean $(\overline{x})$: **0.46, 0.54**

Grand SD (δ) : **0.004, 0.006**

Decision Key: *-Relevant; ** - Irrelevant

Result and Discussion

The table 1.0 above presents the mean and standard (δ) of pupils from two (2) locations; urban and rural area in Mathematics Objective Test. The mean scores of the pupils' in each item from the two areas were compared to the agreed point mean of 0.65. And any item mean score that falls below the agreement point is relevant to this study and any one above is irrelevant. Thus, item 1, 2, 3, 5, 6, 8 and 10 Mathematics languages are difficulty to the pupils from urban public primary schools, while items 1, 3, 4, 6, 7, 9 and 10 Mathematics languages are difficulty to the pupils' public primary schools.

Research Question 2

What are the effects of Mathematics language on pupils' performance in Mathematics based on their gender in Mathematics Objective Tests?

Result and Discussions

The table 2.0 above presents the mean and standard deviation of pupils based on their gender: male and female in Mathematics language Objective Tests. The mean scores of the pupils in each item were compared to the agreed point mean of 0.65. And any item mean score that falls below the agreement point is considered relevant to this study and any one above is irrelevant. Thus, items 1, 3, 4, 5, 6, 7, 8, 9 and 10 Mathematics language texts are difficult for the male pupils in Mathematics Objective Tests in public primary school, while items 2, 3, 4,

5, 6, 7, 8 and 9 Mathematics languages are difficult for the female pupils in Mathematics Objective Tests in public primary schools.

Table 2. Pupils Gender Mean and Standard Deviation Analysis

S/N	Non-mathematical text items	Gender		Gender		y_{est}	$D=d^2{}_1$
		Male (Mean) $\overline{x}$	Male (SD) δ	Female Mean $\overline{x}$	Female (SD) δ		
1.	Index	0.25*	0.002	0.76**	0.008	0.47	0.2209
2.	Difference	0.72**	0.007	0.29*	0.003	-0.50	0.25
3.	Decimal	0.54*	0.005	0.46*	0.005	-0.15	0.0225
4.	Plane	0.43*	0.004	0.57*	0.006	0.07	0.0049
5.	Commission	0.44*	0.004	0.52*	0.006	0.01	0.0001
6.	Cost price	0.33*	0.003	0.68**	0.007	0.28	0.0784
7.	Profit	0.64*	0.006	0.36*	0.004	-0.35	0.1225
8.	Weight	0.45*	0.004	0.55*	0.006	0.03	0.0009
9.	Bisect	0.55*	0.005	0.46*	0.005	-0.16	0.0256
10.	Descending	0.30*	0.003	0.70**	0.007	0.33	0.1089

Grand Mean $\overline{(x)}$: **0.47, 0.54**

Grand SD (δ) : **0.002, 0.008**

Decision Key: * Relevant; ** Irrelevant

T-test Analysis

Ho₁: There is no significant relationship between Mathematics Language and pupils' performance in Mathematics based on their locations in Mathematics Objective Tests.

Table 3. Pupils Locations t-test analysis

S/N	Pupils Locations	Grand Mea $\overline{(x)}$	Grand (SD) δ	Number of Pupils	Df	Std Error	t_{-Cal}	t_{-Crit}	Remark
1.	Urban	0.46	0.004	90	198	0.012	-8.04	1.960	Not significant
2.	Rural	0.54	0.006	110					

From the table 3.0 above, the t_{cal} value of -8.04 is less than the t_{crit} value of 1.960 at 0.05 level of significance. Thus, we accept the null hypothesis. And it implies that there is no significant difference between pupils understanding of Mathematics language from urban area and rural area in Mathematics Objective Tests in public primary schools.

Ho₂: There is no significant relationship between Mathematics Language and male/female pupils' performance in Mathematics based on their gender in Mathematics Objective Tests.

Table 4.

S/N	Pupils Gender	Grand Mea $\overline{(x)}$	Grand (SD) δ	Number of Pupils	Df	Std Error	t_{-Cal}	t_{-Crit}	Remark
1.	Male	0.47	0.002	105					
2.	Female	0.54	0.008	95	198	0.011	-6.099	1.960	Not significant

From the table 4.0 above, the t_{cal} value of -6.099 is less than the t_{crit} value of 1.960 at 0.05 level of significant. Thus, we accept the null hypothesis. And it implies that there is no significant difference between male and female pupils understanding of Mathematics language in Mathematics Objective Tests.

DISCUSSION OF RESULTS

The foregoing analysis of Mathematics language in Mathematics Objective Test among pupils in public primary schools from urban and rural area showed that there are many terms or language of Mathematics used in Mathematics Objective Tests that pupils' from these areas are not familiar with. The least mean score of these pupils ranges from 0.13 to 0.63. These low mean scores in primary Mathematics is worrisome because performance in higher mean achievement at this level should have been better (Agwagah & Onwuka, 2009).

The pupils' poor performance was a negative phenomenon that affected both male and female pupils in Mathematics Objectives Tests. Some of the mean score of male and female pupils' in the Test are: 0.54, 0.46, 0.44, 0.52, 0.55 and so on as shown in table 2.0 above. They have a lower mean achievement scores which means that they encounter great difficulties in understanding Mathematics language words during examinations. Thus, the study of academic subject sometimes poses problems for learners when the terms (non-Mathematics Text) used in Mathematics problem posed difficulties to pupils as the terms are unfamiliar to them (Ojetunde, 2001). The findings of this study is in resonance with Ebisine (2010) that posited that both male and female experienced the same level of difficulty in understanding Mathematics language.

IMPLICATIONS FOR MATHEMATICS EDUCATORS

The finding of this research work has worthwhile implications for Mathematics educators. And they as follows:

1. Pupils at the primary school level of education are encountering language problem in Mathematics during the teaching and learning discourse. So concrete effort should be made to make pupils to be familiar to the words.

2. The performance of pupils in Mathematics at this primary level is not quite encouraging for them to develop a solid foundation in the subject (Mathematics) due to the use of unavoidable Mathematic language terms/texts in mathematics problems.

RECOMMENDATIONS

Based on the findings of this research work, the researchers recommends as follows:

1. Mathematics educators at the primary school should emphasize all the meaning of Mathematics terms used in any Mathematics discourse to foster their total understanding in the teaching and learning of Mathematics.

2. Mathematics educators or authors should develop Mathematics handbook to explain all primary Mathematics language meaning to facilitate their understanding of the subject and concept called "Primary Mathematics Dictionary".

3. Mathematics educators at the primary schools should be authority in the subject with wealth experience of giving distinct meaning of Mathematics language during the teaching and learning of Mathematics concepts.

4. In-service training should be organized for Mathematics teachers at the primary level on how to use and explain Mathematics language to the pupils.

5. The various tertiary institutions in the state that train Mathematics teachers should include Mathematics language as a course so that the newly breed Mathematics teachers can be equipped with Mathematics languages before vying for teaching profession.

CONCLUSION

The primary school level subjects are the bedrocks of the pupils' success in any of his/her academic pursuit in life. So, Mathematics educators at this level should ensure they guide and give our amiable primary pupils the correct meaning and how to proceed in the solving skill of those Mathematics problems with Mathematics language to pupils at the primary school.

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