

Effect of Mother Tongue and Mathematical Language on Primary School Pupils Performance in Mathematics

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Abstract

The study evaluated the use of mother tongue and mathematical language on assessment of Nigerian's Primary School pupils in mathematics. The purpose was to examine the effect of the use of mother tongue and mathematical language on Primary School pupils in mathematics. It investigated whether any difference existed in the use of three major Nigerian languages including mathematical language on the assessment of Primary School mathematics. It also examined which one will be more effective in enhancing primary school pupils' performance in mathematics. The study adopted a pre-test, post test control group quasi experimental design. 240 students drawn from primary schools in Osun state, Nigeria were sampled and used for the study. Mathematics teachers were trained in each of the Nigerian languages on how to use mother tongue and mathematics language. A unified syllabus was used for the study. Mathematics Achievement Test (MAT) was the instrument used to collect data from the subjects. The scores were collated and scored in percentages, mean and standard deviation for descriptive statistics and t-test, Analysis of Variances (ANOVA) and Post -Hoc Analysis for the inferential statistics. Findings revealed a significant difference in performance scores among the groups. The study would be beneficial to the pupils, parents, mathematics teachers, government and policy makers on the need to incorporate mother tongue into the teaching and learning of mathematics for simplifying and better performance in mathematics. Based on the findings it was recommended among other things that mother tongue should be employed in the teaching of mathematics at primary schools level in order to internalise mathematics language and make the pupils mathematics friendly at their tender age.

Keywords: assessments evaluation, mother tongue, mathematical language, primary, spatial

INTRODUCTION

Language is central to or pervasive in the realm of human. Language forms the basis of whatever social cohesion we can attain, determine our worldview. Language intimately links the past with the present and the present with the future. We cannot escape its influences even by silence. Human beings need language to grasp things intellectually and to get others to do so, to a large extent, language defines humanity. Zhang (1997) stated that language is the key to the heart of people if we lose the key, we lose the people. If treasure the key and keep it safe, it will unlock the door to untold riches, riches that cannot be guessed at from other side of the door. David (2006) opined that language is undoubtedly one of the most important areas of the curriculum. They are both means to an end and an end in themselves. That is, they provide a child with the tools to communicate and at the same time an integral part of the creative process that results from this communication when the language arts are taught with awareness, as well as enjoyment, students gain competence of their language and confidence in themselves. They learn to integrate the components of language into all aspects of their lives. Clenfield (1998) opined that children learn language through all the language experiences they have, such as discussion, conversation, lectures, scolding, stories, reading, reporting trips, parties,

songs and games. They learn by participating in the language itself.

Unfortunately, the uses of mother tongue in teaching mathematics have not been encouraged in the Nigeria school system. Formal education was introduced to most African countries with little or no attention devoted to the teaching of indigenous language in their educational institution for quite a long time. According to Jannina & Mark (2004) mother tongue was christened as vernacular which means language spoken by the barbarians. The introduction of education by colonial administrators was to impart knowledge that suited not the interest and the purpose of the African pupils, but those of the foreign educators. The local languages were regarded as inferior to that of the colonial rulers' language, and where any attention was paid to African language at all, emphasis was placed on reading the Holy Bible in their own tongue..

The imperial language is the focus and it serves as the medium of communication for other aspects of the school curriculum. In fact it is regarded as 'lingua franca' in Nigeria. This suited the colonial administrators in trading, it enables them to use the products of such a system as clerk and messengers. The significance of peoples own native language in their psycho-social development was completely

ignored. Ajayi (2005) stated that the native languages were de-emphasised. In contrast to the imperial that the African themselves were reportedly sometimes not interested in. Indeed, official policy was often opposed to the teaching of African language. In final analysis, no foreign language can take the place of the mother tongue and no system of education can afford to regard it without serious detriment to the mental development of the child. Thought and language are together as an entity. One is dependent on the other for its existence. They grow and decay together, the child thinks and dreams in the language through which he acquires the firsthand experience of life. This naturally happens to be the mother tongue and for this reason the mother tongue becomes the first conditions of schooling and for intellectual development of children.

The National Policy on Education (NPE) affirmed that Government recognizes the importance of language as a means of promoting social interaction, national cohesion and preservation of our culture. The policy endorsed the need for every child to learn the language of the immediate environment. In the interest of national unity, it is expedient that every child shall be required to learn one of the three major Nigerian languages Hausa, Igbo or Yoruba. It is not surprising that many children cannot speak any of the indigenous languages including their mother tongue. The challenges of teaching in mother tongue may remain unattainable unless Nigeria education system is decolonised, English may remain the official language since it is our colonial heritage (Adekunle, 2008). Fafunwa (1998) attributed the continued retention of English as our official language to colonial mentality. Fafunwa stressed that children should be given early education in mother tongue, because it will last longer in their memory than any other tongue. Even The United Nation Education Scientific and Cultural Organisation (UNESCO, 1953) found out that children will excel more when taught in local language. Fafunwa faulted the school of thought that Yoruba or other native language have no numerals, scientific formulas and terms. Since English used Arabic numeral successfully, any Nigerian languages could as well borrow numeral and others from other region of the world. All great, highly developed countries of the world speak their own languages, including the newly emerging economic and industrial powers of South East Asia, even though they were colonised by Britain that had colonised Nigeria

There is need for mathematics experts in Nigeria to shrug off colonial mentality by discarding English and developing a curriculum and textbooks in mathematics that will meet up the cultural, ethnic and linguistic diversity of the three major Nigerian languages In Yoruba, Igbo or Hausa speaking areas, the child starts with the mother tongue as a medium

of instruction in the first two or three years. The medium switches to English in the third or fourth year abruptly in most schools. In some areas, where there are many linguistic groups, English is introduced actively from the first year.

From experience, education administrators who insisted that the medium of instructions in the senior classes in primary schools in Nigeria should be English are either ignorant of the great national suicide implied as they are committed to dragging the nation backward and are not informed about the secrets of how the developed nations got there .

Kolawole (2005) discovered that students in Owo local government area of Ondo State perform better whenever they are taught some basic concept in Yoruba. Abiri (1990) stated that Mathematics taught in a child's mother tongue has a lot advantages, such as overcoming limited knowledge of foreign mathematical vocabulary,. Teaching in mother tongue also bring closer to children mathematics example and concepts, it helps the children to develop a mathematical vocabulary in the mother tongue. It equally helps adults who are not literate in English to understand and appreciate mathematics.

Mathematics language is the collection of signs or symbols, abbreviations, axioms, lemma, methods, formulae, and units that are necessary in mathematics teaching and learning. Understanding of its usage is imperative and cannot be underestimated. Obodo(1997) affirmed that failure of the learners to master the mathematical language lead to poor performance in the subject. Hoffman (1988) remarked that mathematics has often been described as "arithmetic with letter, however notations used in mathematics such as +, -, or ÷—are symbols while other mathematicians believed that mathematics language are special emblem that guided the learners on steps to take.

The uniqueness of mathematics language has distinguished mathematics from other subjects. Anyone that cannot cope with imperial and native language which is based on verbal reasoning may likely get lost easily in quantitative reasoning where the use of mathematics language is necessary. Spatial and mathematical reasoning will help students to generate, retain, retrieve and transform well structured visual images into mathematics appreciation with the aid of mathematics language.(Lohman,2005)

Basic arithmetic operations (addition, subtraction, multiplication and division) are commonly use in occupational and educational settings where it is essential. Yet, the knowledge of arithmetic is not enough for the learners to think reflectively and creatively. There is need for the mastery of

mathematical language and verbal ability which might be helpful for spatially gifted learners in multiple domains. (Lohman,2005)

STATEMENT OF THE PROBLEM

The researchers observed that Nigerians indigenous languages have been rendered unimportant in the comity of nations as a means of communicating ideas, particularly in the teaching of the subjects that seems to be abstract in nature like mathematics .Which had eventually led many pupils to develop negative attitude towards the subject. It has been noted that some of the primary school pupils cannot interpret mathematical language correctly thereby increases poor performance in mathematics

PURPOSE OF THE STUDY

The purpose of the study was to examine the effectiveness of mother tongue and mathematical language on the performance of the primary school pupils in mathematics, and to find out if there will be significant difference in the performance of the students when exposed to the mother tongue and mathematical language

RESEARCH QUESTIONS

Is there any difference in the performance of the students’ expose to the use of mother tongue in mathematics?

Is there any difference in the performance of the students expose to mathematics language?

RESEARCH HYPOTHESES

- 1; There is no significant difference in the performance of the students’ expose to the use of mother tongue in mathematics
- 2 There is no significant difference in the performance of the students expose to mathematics language.

RESEARCH DESIGN

The pre-test, post test control group quasi experimental design was adopted for this study. This design was considered appropriate because it carefully marked and recorded students’ scores at different stages of the study.

POPULATION

The population of this study comprises all the primary schools pupils in Ilesa East Local Government Area of Osun State Nigeria

Sample and Sampling Techniques

Eighty pupils were selected from each tribe after thorough screening by the research assistance. Ten primary schools were selected by simple random sampling from the thirty-six public primary schools in the local government. 240 pupils were randomly selected which consisting of Hausa, Igbo and Yoruba pupils in their respective schools

Research Instrument

The instrument used for this study was Mathematics Achievement Test designed by the researchers; First section consisted of the students’ bio-data, while the second part consisted of the test items. The instrument was validated by seasoned mathematics teachers in primary schools as well as the curriculum experts for face and content validity. Reliability of the instrument was ascertained by using split half method and later subjected to Pearson Product Moment Correlation analyses; the reliability coefficient of 0.69 was obtained.

Administration of the Instrument

The instrument was administered by the researchers with the help of research assistances that went through an induction course on mother tongue and mathematical language by the researchers.

Testing of Hypotheses

Data obtained were analysed using Analysis of Variance (ANOVA), t-test analysis, mean and Standard deviation as well as Post –Hoc Analysis

RESULTS

- 1; There is no significant difference in the performance of the students’ expose to the use of mother tongue in mathematics

Table1: Summary of ANOVA on the Pre-test Score of the Students exposed to lingua franca

Source	Sum of Squares	Df	Mean square	F-cal	F-table	Result
Between group	102.432	2	51.217	.295	2.99	NS
Within groups	41045.790	237	173.189			
Total	41147.49	239	224.406			

P<0.05

Table 1 shows that F- calculated (0.295) is less than F- table (2,99) at 0.05 level of significance. Therefore the null hypothesis is not rejected; this implies that there is no significant difference in the performance of the Students in the three Nigerian languages prior treatment By implication, all the tribes HAUSA, IGBO & YORUBA students have homogenous academic standard in mathematics before treatment.

Table 2; Summary of ANOVA on the Post-test of the Students exposed to mother tongues .

Sources	Sum of squares	Df	Mean square	F-cal	F-table	Result
Between group	3058.900	2	1529.4	52.021	2.99	Sig
Within groups	6966.100	237	29.29			
Total	10025.000	239	39212.1558800			

p≤ 0.05

Table 2 shows that F- calculated (52.021) is greater than F table (2.99) at 0.05 level of significance.

Therefore the null hypothesis is rejected; this implies that there is significant difference in the performance of the pupils in the three Nigerian languages after treatment. By implication, the treatment given to the entire three Nigerian tribes' pupils really affect their performance in mathematics.

2 There is no significant difference in the performance of the students expose to mathematics language.

Table 3: Summary of ANOVA on the Pre-test Score of the Students exposed to mathematics language

Sources	Sum of squares	Df	Mean square	F-cal	F-table	Result
Between group	152.900	2	76.450	0.188	2.99	NS
Within groups	96421.10	23	406.84			
Total	96573.30	23	483.29			

$p \leq 0.05$

Table 3 shows that F- calculated (0.188) is less than F- table (2.99) at 0.05 level of significance. Therefore the null hypothesis is not rejected; this implies that there is no significant difference in the performance of the Students knowledge of mathematics language prior treatment By implication, all the tribes HAUSA, IGBO & YORUBA students have homogenous mathematics language understanding before treatment.

Table4: Summary of ANOVA on the Post-test Score of the Students exposed to mathematics language

Sources	Sum of squares	Df	Mean square	F-cal	F-table	Result
Between group	1231.40	2	615.45	29.29	2.99	S
Within groups	5135.100	237	21.009			
Total	6366.5	239	636.419			

$p \leq 0.05$

Table 4 shows that F- calculated (29.29) is greater than F table (2.99) at 0.05 level of significance. Therefore the null hypothesis is rejected; this implies that there is significant difference in the performance of the Students exposed to mathematics language in the three Nigerian languages after treatment. By implication, mathematics language influences their performance in mathematics positively.

Table 5 Summary of Post-Hoc Analysis on Mother Tongue (*) and Mathematical Language(^)

Group	HAUSA	IGBO	YORUBA
HAUSA	^	*	
IGBO		• ^	
YORUBA			• ^

This implies that the performance of pupils in the three Nigerian languages with use of mother tongue favoured the IGBO's better than the other two tribes, while in mathematical language, there is no significant difference in the pupils performance. It

appears that Igbo pupils performed better than the rest of the two as a result of the closeness of their tongue to English language.

LIMITATION TO THE STUDY

There are several constraints encountered during the study. Firstly, the issue of language barrier made it difficult in locating mathematics teachers in the three languages. Secondly, identifying the schools where certain tribe concentrated was very tasking.

RECOMMENDATIONS

With the above findings, it is therefore recommended that, indigenous language must not be only taught and use but taught properly at all level of educational ladder both by utilizing the outcome on research with these language and by ensuring adequate and suitable training for the teachers concerned..The National Mathematical Centre (NMC) Abuja should address the mode of instruction to depend solely on the mother tongues. Specialist in the mother tongue in this lexical committee should be involved. The use of mother tongue and mathematical language should be prioritized so as to improve the nations technological basis since Kolawole & Oginni (2009) affirmed that neglect of mathematics teaching by any nation works injury to all knowledge, and eventually lead to ignoramus and poverty. Teaching of mathematics strictly in English should be de-emphasis to enable the mathematics teachers explain in the mother tongue whenever they are teaching..The use of the national language in our primary schools should be encouraged: this will help to preserve our national culture and heritage. Textbooks writers, Publishers and Curriculum planners should work together with experts in mathematics, so as to produce standard texts in mathematics for the pupils' mother tongues to gain its pride of place in schools for better understanding of the subject..Society and groups should be educated on the need to support mother tongue initiatives in the teaching of mathematics..Mother tongue in the teaching of mathematics should be extended to post primary and tertiary institution so as to increase the numbers of mathematics learners in schools

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