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RELATIVE EFFECT OF BILINGUAL INSTRUCTIONAL MODE (YORUBA-ENGLISH) ON PERCEIVED DIFFICULT TOPIC IN MATHEMATICS AT THE S.S.S LEVEL.

BY

Adetunji Abiola OLAOYE (Ph.D.)
adetunji-abiola@yahoo.com
DEPARTMENT OF CURRICULUM STUDIES
LAGOS STATE UNIVERSITY, OJO

ABSTRACT

The study was designed to examine the relative effect of bilingual instructional mode on a perceived difficult topic in Mathematics at the S.S.S level. As an empirical study it consisted of three research questions and one hypothesis tested at $\propto = .10$ level.

Population for the study included secondary school students in Oyo state of which seventy-five students were stratifiedly sampled into three groups of twenty-five in each, within Oyo state. Two instruments were developed validated and used included achievement test in Mathematics and classroom observation guide as used by Flander (1970). The study lasted for six weeks.

Data collected were analyzed through one way Analysis of variance (ANOVA) and scheffe test. The findings revealed that experimental groups performed better than the control groups with F- ratio $F_{(2,72)}(.10) = F_{(2,80)}(.10) = 2.4$. Scheffe test confirmed that experimental group's performance was due to use of bilingual instructional mode in Mathematics which allowed students mastery understanding of problem solving than control group with Fcal = 2.5> F ratio = 2.40. The study recommended the use of bilingual instruction for the teaching of Mathematics in secondary schools in order to attain meaningful learning.

INTRODUCTION

Teaching and learning take place in a conducive environment where mode of passing knowledge to the learners is understandable. Language plays a prominent role in the learning environment since, it constitutes the vital medium of instruction through which learning process takes place. Nowadays that most countries of the world are matching towards technological advancement, science education has been acclaimed to be the solution to the state of under development (Olaoye, 2004). To achieve this, mode of sustaining science education depends on the quality and quantity of science subjects like Mathematics, Physics, and Chemistry to mention few. Of all these subjects Mathematics seems to have cut across all due to its wide application in all areas of human endeavours. No wonder Mathematics is given premium place in the National Policy on Education (1998) that it should be made compulsory for students. The belief is that Mathematics, apart from its wide application in all fields of human endeavours, makes the society functional and its citizenship's to be-self-reliant. The use of Global System of Telecommunication is a pointer to this view, since one needs the application of numerals (0-9) to operate its minimal function.

Inspite of these and various incentives from different educational stakeholders in terms of personnel, materials and others to ensure its learning much of under achievement of students in it still persists. Various studies have shown that the exalted position accorded Mathematics among other school subjects has not been justified with the students' dismal performance, and various reasons advanced for this failure syndrome included insufficient number of highly qualified and motivated mathematics teachers (Olaoye, 2004), non-availability of instructional materials (Olaoye, 1998; Akinsola, 1999), perceived topics difficult by students or teachers (Oyedeji, 1996), out-dated teacher education curricula (Adeye-oluwa, 2003), knowledge of subject-matters (Okpala, 1985), deficiencies in teacher preparation (Obemeata, 1996;

Adegoke, 2004), gender (Odubunmi,1998; Adeoye,1999) and students' attitude towards mathematics (Olaoye,1998; Sangodoyin, 1998).

In scope, all these studies have focussed on the improvement of learning mathematics via solution to the factors identified without looking at effect of instructional mode through which the knowledge of mathematics was imparted to students. In fact, reduction of anxiety in learners is reduced in the course of learning when the mode of instruction is done through the language in which he understands most. This assertion was supported by different scholars (Ande, 1990; Udokang, 1991).

In view of these coupled with different factors militating against academic excellence of students in Mathematics, Ande (1990) was of the opinion that combination of two languages as medium of instruction at the primary school level is inevitable. Hence, the study of relative effect of bilingual instruction on the perceived difficult topics in mathematics at the S.S.S. levels.

Theoretical Framework: Mode of instruction could be in different form such as signals, language and demonstration. Language plays a vital role in instruction and it constitutes a subject like other components of any formal education Programme. But the understanding of any concept in the teaching and learning environment depends on the nature or mode of instruction being adopted by the prospective teacher. This is why situation becomes complex when the learning is done in two or more languages as observed in the Nigerian classroom (Fafunwa, 1978).
Mother tongue in the mode of teaching and learning has been attributed to the mastery understanding of the concept in a prevailing situation. The phelpstokes commission report of 1922 as quoted by Ige (2001) gave credence to the teaching and learning via the local language, specifically the mother tongue. The UNESCO meeting of specialists in 1951 on 'the use in Education

of African languages in relation to English' serves as blueprint towards promoting the indigenous language which in turn brings about the smooth learning situation.

Moreso, the meeting of the UNESCO Advisory Group of Consultants on 'The role of linguistics and socio-linguistics in language Education and Policy', 1972 testified to the need of adopting the indigenous language in order to enrich learning. Furthermore, the outcome of the meeting of the Nigerian National Curriculum Conference, held in Nigeria, in 1969 posited the need to embrace the local language as mode of instruction in the school; and more importantly was the result of the six-year primary project at the University of Ife, where the emphasis was placed on the use of mother tongue as mode of instruction in the classroom. This, according to the study, would bring about clear understanding and mastery of the concept being taught.

Apart from these, various scholars like Bamgbose (1976), Awoniyi (1976, 1978) and Fafunwa (1978) had on different for a called for the adoption of the mother tongue/indigenous language as an effective tool of teaching in the schools based on their findings as separate studies.

Based on the aforementioned parameters the study was conducted to find out the relative effect of the use of bilingual instructional mode (Yoruba-English) on the perceived difficult topics in mathematics at the SSS level.

Problem

The study was designed to examine the relative' effect of bilingual instructional mode on the perceived difficult topic in mathematics at the S.S.S level. Specifically, it sought answer to questions:

(1) What is the performance in mathematics of students in the topics perceived to be difficult?

(2) What are the performances in mathematics of the experimental and control groups after the use of bilingual instruction in the topic perceived to be difficult?

(3) Would there be difference in the performances of the experimental and control groups as a result of bilingual instruction?

In view of these, hypothesis generated for the study was.
Ho: There is no significant difference in the performance of the topic perceived to be difficult in mathematics of the experimental and control groups.

METHODOLOGY

Research Design

An empirical research design of pretest and post test analysis was adopted for the study with independent variables of bilingual mode of instruction and dependent variable of students' performance in the topic perceived to be difficult in mathematics.

Population

All the secondary school students in Nigeria were the target population for the study, but two hundred students of the SSII in Oyo State were used.
Seventy-five students of S.S. 2 classes were used via an even number selection into three groups: Yoruba (I), Yoruba-English (II) and English (III) so that twenty-five students were chosen in each from three different schools in order to minimize interference of response among the students.

Instruments

Two instruments developed, validated and used included achievement test in mathematics (r = .65) and classroom observation guides (r =.72). The achievement test in mathematics consisted of five multiple choice questions and theory question on the perceived difficult topics in mathematics and classroom

observation guides which ensured adequate use of spelt out procedures of teaching difficult topic to the students.

Validity of Instruments

The content validity of classroom observation guide was done by an experts before used to rate some mathematics teachers outside the scope of the study in interval of two weeks while the same procedure was done to achievement test in mathematics through students, using test-retest method.

Reliability of Instruments

With the aid of KR - 21 formula the instruments had reliability values of .65 and .72 for achievement test in mathematics and classroom observation guides respectively.

Procedures

Prior to the main fieldwork students' questionnaires numbering 200 were sent out to mathematics students requesting to state one most difficult topics to learn by them.

Table 1: Order of Selection of Difficult & Most Difficult Topics in Mathematics.

Difficult topic	Menstruation	Angles & Intercept on a parallelogram	Loci	prob abili ties	Vectors & Transfor mation	Total 5
	20	30	50	30	70	200
Most difficult topic	Logical Reasoning	Menstruation	Constr uction s	Bear ings	Probabilit ies	5
	20	40	30	20	90	200

From their responses questions on the difficult topic were combined to make-up the achievement test numbered five multiple choice and one theory questions (See Appendix I). The study lasted for six weeks with first week used to train the mathematics teachers while the remaining five weeks were used by these teachers to teach the students there after administered the test

These teachers were closely watched by one mathematics teacher of S.S. 3 outside the scope of the study. The school Yoruba's teacher was used to ensure the use of the given procedure.

Data Collection

The administered test was collected by the researcher through the assistance of the trained mathematics teachers in the pre and post-tests analysis.

Data Coding and Analysis

Every correct and wrong answer of the achievement test attracted one and zero marks respectively. The statistical tools employed were one way analysis of variance (ANOVA) and Scheffe test at alpha level of .10.

Findings

Table 1: Pretest Score of Data

Scores (x)	0	1	2	3	Sum	Sum sq.	Mean (x)
Yoruba (I)	6	11	5	3	30	58	1.2
Yoruba-English (II)	4	10	7	4	36	74	1.4
English (III)	9	4	7	5	33	77	1.3

Table 2: Post test Score of Data

Score (x)	0	1	2	3	4	Sum	Sum sq	Mean (x)
Yoruba (I)	2	8	3	8	4	54	156	2.2
Yoruba-English (II)	1	6	6	9	3	57	159	2.3
English (III)	5	9	5	4	2	39	97	1.6

Table 3: Analysis of Variance (ANOVA) of Post test (I-III)

Source	Df	Ss	Ms	Fcal	P<.10
SS between	2	7.4	3.7	2.6	
SS within	72	104.6	1.5		
Total	74				

$F_{(2,72)}(.10) \cong F_{(2.80)}(.10) = 2.4 \leq$ F ratio and F cal = 2.6 > F ratio.

Scheffe test: - $F = \frac{(X_{II} - X_{III})^2}{MSw\left[\frac{1}{n_{II}} + \frac{1}{n_{III}}\right](k-1)}$

Between Groups II and III

$F = \frac{(2.3 - 1.6)^2}{1.5\,(1/25 + 1/25)} = .5/.2 = 2.5$

F cal > F ratio

On research question one table I showed the performances in mathematics of the experimental groups with the means of 12 and 1.4 for group I and II respectively and 1.3 for the control group (III). These marks showed that the chosen topic was difficult one among the mathematics topics at the ordinary level as attested to by the mathematics students.

On research question two, table 2 showed the experimental groups I and II having mean marks of 2.2 and 2.3 respectively, and performed better than group III with mean marks 1.6.

On research question three it was found that experimental group II performed better than the other two groups, which showed the enhanced status of the bilingual instructional mode over conventional one.

On the hypothesis raised it was observed that there is a significant difference in the performance in mathematics of the experimental and control groups with F cal = 2.6 > F ratio = 2.4 at alpha level of .10. This is shown in table 3 above. As a result a scheffe test was

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carried out to show if the significance was due to treatment or not. It was confirmed that bilingual instruction group performed better than conventional group with Scheffe F cal = 2.5 > F ratio = 2.4. Hence it was found that students taught with bilingual instruction had a mastery knowledge of the topic and performed better than the control group. This is in line with study of Ande (1990) that observed the excellent performance of primary school children taught in bilingual instruction over those taught with English Language.

Conclusion and Recommendation

From the foregoing the study inferred that bilingual instruction is better than the use of English Language in the teaching of difficult topics in mathematics, and it should be encouraged to be adapted by the teachers in order to reduce anxiety and Maths-phobia among the students. Apart from this, it should be made compulsory in the National Policy on Education that teaching of mathematics in our secondary school should be in the combination of students' mothers-tongue and English in order to enrich their knowledge and allowed them a mastery of the topic in particular.

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APPENDIX I
MULTIPLE CHOICE QUESTIONS

1. An unbiased die is rolled 100 times and the out come is tabulated as follows:

Number	1	2	3	4	5	6
Frequency	13	15	22	14	20	16

What is the probability of obtaining 5?
(A) 1/5 (b) ½ (c) 1/6 (d) ¼

2. A container has 30 gold-medals, 22 silver medals and 18 bronze medals. If one medal is selected at random from the container, what is the probability that it is not a gold medal?
(A) 9/35 (B) 11/35 (C) 4/7 (D) 3/7

3. If two dice are tossed together what is the probability of obtaining a sum of 9?
(A) 1/9 (B) 8/.9 (C) 35/36 (D) 1/36

4. A box contains 5 blue balls, 3 black and 2 red balls of the same size. If a ball is selected at random from the box without replacement and second ball is then selected. The probability of obtaining two rd balls is:
(A) 1/9 (B) 2/45 (C) 1/45 (D) 3/70

5. Probability hat one has chicken for lunch is 1/3 and that of fish is ½. The probability that on has both chicken and fish for lunch is:
(A) 2/5 (B) 1/6 (C) 5/6 (D) 1/3.

THEORY PARTS

1. A random sample of 60 students sat for part one and two of banking examination as shown in the table below of students that passed or failed each part.

Table

Examination		Part I		Total
		Pass	Fail	
Part II	Pass	-	-	-
	Fail	-	20	35
Total		24	-	60

(I) Copy and complete the table
(II) If a candidate is chosen at random from the sample use the table to find the probability that the candidate
(a) Passed part II (b) Passed parts I and II
(c) Passed part II

but failed part I.

(III) If a candidate is chosen at random from the sub-group of those that failed part I, find the probability that the candidate passed part II.

APPENDIX II
LAGOS STATE UNIVERSITY
FACULTY OF EDUCATION
CURRICULUM STUDIES
STUDENTS QUESTIONNAIRE

Dear Respondent,

This questionnaire is designed to elicit some vital information on some topics considered difficult in SSS mathematics syllabus and it is hoped the your response will be treated with great confidentiality .It is how ever divided into two parts A and B as shown below.

Thank you.

Yours sincerely,
The researcher.

PART A

NAME OF SCHOOL OF RESPONDENT _ _ _ _ _ _ _ _ _ _ _ _ _

SEX: MALE ☐ FEMALE ☐

CLASS: SS I SS II SS III

PART B

This contains list of mathematics topics for the senior secondary school out of which you expected to select one most difficult topic to learn for you

TOPICS	DIFFICULT	MOST DIFFICULT
Number and numeration		
Number Bases		
Fractions, decimals and approx.		
Indices and logarithms		
Sequenees		
Sets		
Logical reasoning		
Positive and Negative integers		
Surds		
Ratio, Proportion and rates		
Variation		
Percentages		
Algebraic Processes		
Algebraic Expressions		
Simple operation on Alg. Exp.		
Solution of Linear equation		
Change of subject of formula		
Quadratic equation		
Graphs of lin. and Quad. Eq.		
Linear inequalities		
Relations and functions		
Algebraic function		
Mensuration		
Length and perimeter		
Areas of solid object		
Volume of solid object		
Plane geometry		
Angles at a point		
Angles and intercepts on par. line		
Triangles and other polygons		
Circles		
Constructions		

Loci		
Trigonometry		
Sin, cosine and tangent of angles		
Angles of elevation and dep.		
Bearings		
Statistics and probability		
Statistics		
Probabilities		
Vectors and Trans. In a plane		
Vectors in a plane		
Trans in the Cartesian cord. Plane		