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The Effect of Bilingual Mode of Instruction on Pupils' Academic Achievement in Basic Science in Oyo State Basic Schools

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Abstract

It adopted quasi- experimental approach. A multistage sampling technique was used to draw a sample of 200 basic six (6) pupils from four schools. The instrument used for the data collection was Basic Science achievement Test (BSAT). It was developed by the researchers. Trial test of the instrument was done using Kuder Richardson 21. The reliability coefficient is 0.80. The result of the study shows that the bilingual mode of instruction had significant effect on Basic Science $F(1,191) = 57.10, p < 0.05$ Partial Eta Square = .230. Therefore the effect size (23%) is moderate. The bilingual mode of instruction also has significant main effect on gender in achievement of pupils in Basic Science $F(1,191) = 9.76, p = .002$ partial eta squared = .049. However the effect size (4.9%) is low. Therefore, it was recommended that policy makers should include the use of bilingual mode of instruction in policy formulation for basic schools.

Keyword: Bilingual mode of instruction, Basic Science, Achievement, and Gender

Introduction

Basic education is the form of education provided for children between the ages of six and eleven years in an educational institution. Cullingford (1986) noted that the essential character of people, attitude and motivation are formed in the early years. Basic schools form the foundation on which other levels of education are built. It is imperative that pupils understand the various concepts they are exposed to at that level of education. The quality of basic education in Nigeria has severally been criticized by stakeholders in education. This criticism is borne out of the poor academic performance of pupils at that level of education.

However, the poor performance of pupils at that level of education is suspected to be a fall out of the language of instruction, which is English language. English language as second language to the Nigeria child, and as mostly the language of instruction in schools in basic school is suspected to be hindering the understanding of instructions, especially some subject concepts in schools. Akinoso in George (2011) observed that there are reports of a positive correlation between medium of instruction and cognitive and academic achievement.

Language is an aspect of child's development that can be singled out as principal to a child's educational development. A major tool of learning is language of instruction. Evans (1975) observed that there is relationship of interdependence between language and other main educational objectives such as: sensory, cognition, motor skills, academic content and social emotional development. Fafunwa (1976) observed that it is traumatic for a child to learn skills in a language unfamiliar with mother tongue. Hence the researcher postulated the use of mother tongue as medium of instruction. Banjo (2005) also noted that while the Nigerian child is busy struggling, learning a foreign language during the greater part of primary education, the European child acquires new skills during the early years of education. Hassana et al (2006) observed in some class room observation studies carried out, that in countries or schools where languages familiar to the pupils are used as language of instruction, the teachers and learners communicate better. However the multiplicity of languages in Nigeria and the fact that few of the languages are standardized makes the use of indigenous language as a mode of in education seem unrealistic ; As such, it may be an enormous task for the languages to be functional in education . According to the National Policy on Education (NPE) (2004), the medium of instruction at early stage of basic education should *be* mother tongue or language of immediate community and English language at later stage. However despite the policy on language of instruction, many primary schools have refused to adopt the policy as they use only English as medium of instruction in basic schools. Okebukola (2002) observed that teachers and schools tend to struggle through the use of English.

Bilingual mode of instruction is a system that affords pupils the opportunity of receiving formal instruction in two languages. Dutcher (1994) observed that in many parts of the world, bilingualism or multilingualism are innovative approaches to education that involve the use of two or more languages. The existence of a government policy, enabling social environment and availability of facilities are factors that are pertinent to the implementation of bilingual mode of instruction. Oladejo (1991) noted that aspects of sociology, psychology, linguistic and pedagogy must be in favour of the existence of bilingualism for it to succeed. Paulstine (1988) observed that the current educational system in Nigeria must be mother tongue based bilingual. It is viewed that the lack of the adequate emphasis on use of mother tongue in basic education in Nigeria, has constituted the ineffectiveness of the current basic education. Ademowo (2010) is of the opinion that both officially approved foreign language and the indigenous languages be developed, and adopted accordingly, as classroom medium of instruction with consequential provision of scientific books in both languages. Ademowo (2010) noted that the use of indigenous languages enhances

cognition and removes pedagogical barriers in learning, hence should also be allowed equal substantial right in the African education. It was further contended that it should also be employed as a medium of instruction in higher primary, secondary as well as adult basic schools all over Africa in teaching science-based subjects.

The findings of Hassana et al (2006) on the relationship between language of instruction and teaching and learning in Africa suggests that an effective teacher is one that has mastery of the local language, knowledge and respect for the child's culture, loving and caring. Moreover Clegg and Afitska (2011) observed that in Sub-Saharan Africa, education conducted in European language is associated with low school achievement. They supported interchanging use of two languages (switch) in the classroom. The researchers noted learners more often interact in mother tongue when working in groups in the school. Cummins (2010) also viewed that the use of the home language should be encouraged because pupils benefit from using their strong linguistic skills in the language they feel confident in. The researchers also observed that allowing pupils to converse in the indigenous language to discuss new concepts or creating new ideas can free pupils up to think and talk quickly. Pupils can consequently then slow down as they process the information and report back in English. The researcher is of the view that the children's first language skills must become well developed to ensure that their academic and linguistic performance in the second language is maximized.

Awoniyi (1978) on his part noted that Yoruba language is spoken in West Africa by about 20 million speakers and more so closely related to Itsekiri spoken in Niger-Delta and Igala in the central Nigeria. Yoruba language is one of the few standardized languages in Nigeria. It is one of the three major languages in Nigeria. It is also taught as a subject from basic school to the University level. The language is used to conduct the business of the house of assembly in some Western States of Nigeria. It has gained international acceptance as foreign students come to the country to learn the language. Fafunwa (2006) has postulated the use of the language in the Western Region as language of instruction. However, there has also been opposing view that the standard of the language cannot accommodate its use in schools, especially basic schools for science based subjects. More so, the other ethnic groups may feel uncomfortable; their language may be threatened and put to extinction.

Basic science is one of the subjects taught at the basic level. It is designed to impact basic concepts of science on pupils. It undergoes periodic review like other subjects to accommodate new developments or discoveries such as HIV/AIDS. Pupils take entrance examination on the subject among others to qualify for admission into Federal and State Government Schools.

The curriculum and materials are frequently reviewed to meet the changing environment in the world. The teachers are also taken through different workshops to facilitate teaching and learning. According to Agulana & Nwachukwu (2004), the strategy for teaching science should focus on meaning-making and knowledge construction and not mere memorization. In this approach the learner learns by personally and uniquely developing an understanding and making sense of information.

Statement of the Problem

Basic school education is the foundation of a child's education. Stakeholders in education have criticized the situation. This is borne out of the poor academic performance of pupils at that level of education. However, the poor performance of pupils at that level of education is suspected to be a fall out of the language of instruction, which is English language. English language as second language to the Nigeria child, and as mostly the language of instruction in basic school is suspected to be hindering understanding of instructions, especially some subject concepts in schools. Therefore, the study is designed to find out the effect of the use of Yoruba and English language as medium of instruction on pupils academic achievement in basic science

Hypotheses

- H₀₁: There is no significant main effect of treatment on Basic Science achievement
- H₀₂: There is no significant main effect of gender on Basic Science achievement
- H₀₃: There is no significant interaction effect of treatment and gender on Basic Science achievement

Research Methodology

Research Design

This study is a quasi-experimental research. It is a 2 x 2 x 2 factorial design. It is a post-test, treatment and control group design.

Variable in the study

1. Bilingual mode of instruction (Independent Variable)
2. Pupils achievement in Basic Science (Dependent variable)
3. Gender (Moderator variable)

Table 1: 2 x 2 x 2 FACTORIAL DESIGN FOR BASIC SCIENCE

Language of Instruction		Basic Science	
		School	Boys
Yoruba & English (Treatment)	Rural		
	Urban		
English (control)	Rural		
	Urban		

Population

All basic six (6) in Oyo State constitute the population of the study.

Sampling Procedure and Sample

Multistage Sampling technique was used to select a senatorial district. In the next stage, a local government was randomly selected. The schools in the local government selected were divided into two groups (rural and urban). Then, two schools were randomly selected (one experimental and one control) from both groups. A sample of two hundred pupils (males: 87, females (113) were used for the study.

Research Instrument

The researcher developed Basic Science achievement Test (BSAT). The instruments were developed by the researchers based on the scheme of work for primary six Basic Science for the term used for the research. BSAT was given to experts in the field of Basic Science for construct and content validity. The items were modified based on their criticism and suggestion. Trial test was conducted using BSAT collect data. The data collected was subjected to Kuder Richardson 21. There reliability coefficient for BSAT was 0.80

Data Collection

The researcher trained four field assistants to master the technicalities of the use of instrument to collect the required data. The data collection took five weeks. Data was collected on each participant using BSAT immediately after the treatments were administered. This was done during the normal (official) lesson period scheduled for Basic Science.

Data Collection Procedure

1. Teacher introduces the topic

Control Group: Teacher use only English language as mode of instruction

Experimental Group: Teacher use both English and Yoruba as mode of instruction

2. Teacher copies note on the chalk board
3. Teacher explains topic by applying treatment:

Control Group: Teacher use only English language as mode of instruction

Experimental Group: Teacher use both English and Yoruba as mode of instruction

4. Teacher and pupil interact to ask and answer question and give answers and clarifications by applying the appropriate treatment.
5. Apply instrument to collect data.

Treatment

Control Group: The topic was introduced to the pupils in English Language. The notes were written on the board in English. The teacher then reads the note to the pupils asks them to read and explains the topic in English Language. The teacher asks questions and also responds to questions from pupils in English Language. Pupils ask questions, respond to questions and contribute to discussion in English Language. The teacher then distributes the instrument to pupils to collect data.

Experimental Group: The topic was introduced to the pupils in English Language. The note was written on the board in English. The teacher then reads the note to the pupils asks them to read and explains the topic in English Language and Yoruba. The teacher asks questions and also responds to questions from pupils in English Language and Yoruba. Pupils ask questions, respond to questions and contribute to discussion in English Language and Yoruba. The teacher then distributes the instrument to pupils to collect data.

Data Analysis

Analysis of covariance (ANCOVA) was used to analyze the data collected to establish both the main effect and interaction effect of the dependent and independent variables for this study. Adjustment for multiple comparison: The magnitude of differences among the groups with significant difference was examined. Cohen (1988) is used to interpret the effect size. The analysis of the data was carried out at 0.05 level of significance.

Results and Findings

The data were analyzed based on the hypothesis tested in the study.

Table 2: ANCOVA Comparison for Achievement Test in Basic Science

Tests of Between-Subjects Effects

Dependent Variable: Postbsc

Source	Sum of Squares	Df	Mean Square	F	Sig.	Eta Squared
Corrected Model	1522.076 ^a	8	190.259	12.523	.000	.344
Intercept	13062.845	1	13062.845	859.776	.000	.818
Prebsc	21.600	1	21.600	1.422	.235	.007
Treatment	867.528	1	867.528	57.099	.000	.230
Sch_location	46.107	1	46.107	3.035	.083	.016
Sex	148.248	1	148.248	9.757	.002	.049
Treatment * Sch_location	215.152	1	215.152	14.161	.000	.069
Treatment * Sex	29.748	1	29.748	1.958	.163	.010
Sch_location * Sex	.009	1	.009	.001	.980	.000
Treatment * Sch_location * Sex	17.119	1	17.119	1.127	.290	.006
Error	2901.924	191	15.193			
Total	103882.000	200				
Corrected Total	4424.000	199				

a. R Squared = .344 (Adjusted R Squared = .317)

Table shows that, there was significant difference in the main effect of bilingual mode of instruction on achievement of pupils in Basic Science $F_{(1,191)} = 57.10, p < 0.05$ Partial Eta Square = .230. Therefore the effect size (23%) is moderate. Hence, mode of instruction accounted for 23% of the total variance in the pupils' achievement in Basic Science. Therefore the null hypothesis that there is no significant main effect of treatment on achievement in Basic Science was rejected. As a result, Adjustment for multiple comparison: Sidak was carried out.

Table 3: Pairwise Comparison on Achievement Test in Basic Science

(I) Treatment (J) Treatment	Mean Difference (I-J)	Std. Error	Sig. ^a	95% Confidence Interval for Difference ^a	
				Lower Bound	Upper Bound
Control Exp	-4.229 [*]	.560	.000	-5.333	-3.125
Exp control	4.229 [*]	.560	.000	3.125	5.333

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

a. Adjustment for multiple comparisons: Sidak.

Table 4: Estimate on Effect of Gender on Pupils' Achievement in Basic Science

Dependent Variable: Postbsc

Sex	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Female	21.543 ^a	.367	20.820	22.267
Male	23.281 ^a	.418	22.456	24.106

a. Covariates appearing in the model are evaluated at the following values: Prebsc = 6.5850.

Table 5: The Effect of Gender on Pupils' Achievement in Basic Science

Dependent Variable: Postbsc

	Sum of Squares	Df	Mean Square	F	Sig.	Partial Squared	Eta Squared
Contrast	148.248	1	148.248	9.757	.002		.049
Error	2901.924	191	15.193				

The F tests the effect of Sex. This test is based on the linearly independent pairwise comparisons among the estimated marginal means.

The F tests the effect of Sex. This test is based on the linearly independent pairwise comparisons among the estimated marginal means.

Table shows that the difference in means based on gender as shown in table 4.1 brought about a significant main effect on achievement of pupils in Basic Science $F_{(1,191)} = 9.76, p = .002$ partial eta squared = .049. However the effect size (4.9%) is low. Therefore, the null hypothesis that there is no significant main effect of gender on Basic Science Achievement was rejected.

Table 6: Pair wise Comparison of the Effect of Gender on Pupils' Achievement in Basic Science

Dependent Variable: Postbsc

(I) Sex	(J) Sex	Mean Difference (I-J)	95% Confidence Interval for Difference ^a			
			Std. Error	Sig. ^a	Lower Bound	Upper Bound
Female	Male	-1.738 [*]	.556	.002	-2.835	-.640
Male	Female	1.738 [*]	.556	.002	.640	2.835

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

a. Adjustment for multiple comparisons: Sidak.

The Adjusted mean difference for urban and rural is ($M = -1.738$). The table shows that the difference is statistically significant ($p = .002$). This is graphically represented in the profile below

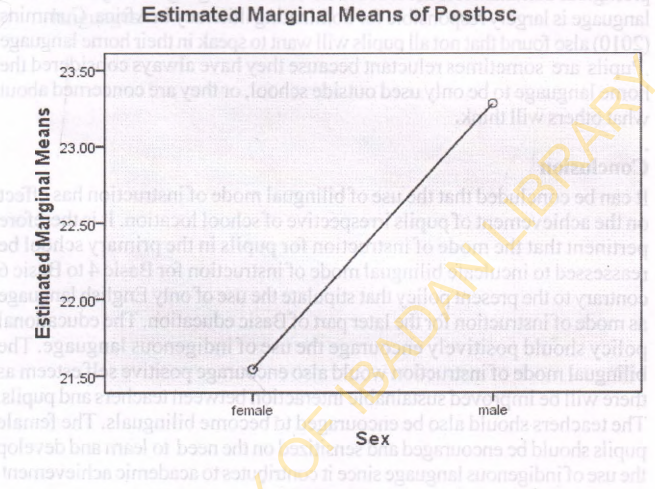


Fig. 1

Discussion

The result of the test shows evidence of gender differences in achievement in Basic Science. This confirms the assertion by Fraser, *et al.*, (2001) that there is evidence of gender difference from the national evaluation of the Early Intervention Programme (EIP) that females had higher attainment in reading at age 6-7 and the observation of Scottish Executive (2000) that girls perform consistently better than boys in reading and writing at the Primary 4, Primary 7 and Secondary 2 stages. Sammons (1995) also noted similar gender differences in reading at various age-stages; that females had higher attainment in inner-London junior schools. However the mean of the test scores for boys in this study is higher which means they contributed more to the test scores. However, some researchers are of the opinion that stating a particular gender as high achiever could be a discouragement to the other sex. However the female pupils though more in population could be encouraged to do better since they are expected to be better users of the

indigenous language. The boys might have had higher achievement than the girls because of the status accorded to English language may have affected their use of the indigenous language. As a result their competence might not have been good enough to cause a higher positive effect on their achievement. This is in accordance with Bamigbose in George (2011) who found that the prestigious dominant role accorded to ex-colonial language or major dominant language is largely responsible for dominating illiteracy in Africa. Cummins (2010) also found that not all pupils will want to speak in their home language. Pupils are sometimes reluctant because they have always considered the home language to be only used outside school, or they are concerned about what others will think.

Conclusion

It can be concluded that the use of bilingual mode of instruction has effect on the achievement of pupils irrespective of school location. It is therefore pertinent that the mode of instruction for pupils in the primary school be reassessed to inculcate bilingual mode of instruction for Basic 4 to Basic 6 contrary to the present policy that stipulate the use of only English language as mode of instruction for the later part of Basic education. The educational policy should positively encourage the use of indigenous language. The bilingual mode of instruction would also encourage positive self esteem as there will be improved sustainable interaction between teachers and pupils. The teachers should also be encouraged to become bilinguals. The female pupils should be encouraged and sensitized on the need to learn and develop the use of indigenous language since it contributes to academic achievement

Educational Implications

Findings in this study have implications for teachers, pupils and parents.

Teachers: Teachers training should include bilingual training to facilitate bilingual acquisition skill for higher pupils' achievement.

Pupils: Skill of teachers for bilingual mode of instruction will be highly useful as this can facilitate learning if such knowledge of pupils in the classroom.

Parents: Parents will be encouraged to facilitate their wards to learn and use their indigenous languages.

Recommendations

- Policy makers should revise the policy on the medium of instruction for Basic School to reflect a bilingual mode of instruction. The mother tongue or language of immediate community should be used together with the English Language as medium of instruction in the primary school.

- The training of teachers for Basic School should include bilingual skill acquisition.
- The female pupils should be encouraged to make full use of indigenous language.hil
- Parents should ensure that their children are proficient in their indigenous languages.

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