

Domestic Linguistics and Pupils Achievement in Basic Science and Technology in Basic Schools

Bebenimibo, Job. (Ph.D.)¹ and Kuyenum, Chukumah²

¹Post Primary Education Board, Asaba, Delta State Nigeria.

²Department of Educational Evaluation and Counselling Psychology
University of Benin, Benin city

Abstract: This study has certified that domestic linguistics is an effective instructional medium for Basic Science and Technology (BST) in the first three years of basic education in Delta State. The theoretical framework on which the study was anchored is Vygotsky's Social Development Theory. The study employed a pre-test post-test quasi-experimental design. Two (2) research questions and two null hypotheses were tested at 0.05 level of significance. A sample size of four hundred and seventy-six (476) Basic I – III basic science and technology pupils in public primary schools in Delta State was involved. They were taught BST concepts using Domestic linguistics in the intervention groups. The instruments used were Basic Science and Technology Achievement Test-I (BSTAT-I) and Basic Science and Technology Achievement Test-II (BSTAT-II). The tools were validated by Basic Science and Technology, and Domestic linguistics experts, with reliability indices of 0.78 for BSTAT-I and 0.74 for BSTAT-II. The data received were analyzed using Mean, Independent t-test and Analysis of Covariance (ANCOVA). The results discovered that domestic linguistics has an affirmative effect on students' achievement in BST. The study specified that utilizing Domestic linguistics in teaching BST in Basic I-III is appropriate; due to the positive effect on achievement it offers the BST pupils.

Keywords: Domestic linguistics, English language, achievement and Basic Science and Technology (BST).

Introduction

Background to the Study

The development of scientific knowledge among people is a dynamic instrument for economic, social and individual advancement in any nation. Thus, the Federal Government of Nigeria highlighted the introduction of BST subject at the lower basic level also known as the Primary School System. This is to enable learners obtain required knowledge on their environment, develop problem solving skills, develop desirable scientific attitudes, as well as increase their understanding of the role and functions of science in everyday life (NCCE, 2012). Though BST is functioning as singular subject, it is a group of related science subjects including environment and mathematics; it is concern with the study of number, quantity, shapes and process involved in the solution of a problem (Adodo and Gbore, 2012).

In the words of Akinbote, et al. (2010), BST is called basic education because it is the first level of education where formal instructional and knowledge acquiring activities take place. National Policy of Education FGN (2013) stated that basic education is the one provided by institutions of learning for children of age 6 to 11 plus and every other educational arrangement is built upon it. This basic educational stage is pivotal to the determination of the expectation of the entire educational arrangement.

The objective of primary education as stipulated in the policy is to:

- i. inculcate enduring literateness and proficiency and skill to interact successfully;
- ii. provide nationality teaching as the basic for active contribution in and influence to the life of the society;
- iii. mold personality and advance sound attitude and morals in the child;
- iv. develop in the child the capability to acclimatize to the child varying environment;
- v. gives the child opportunity for developing manipulative skills that will enable the child function effectively in the society within the limit of the child's capacity;
- vi. provide the child with tools for further educational advancement including preparation for trades and craft of the locality.

The instruction and knowledge acquisition in BST provides the citizens opportunity to explore, interpret and manage their environment. It is dynamic and essentially concerned with the search and explanation of both regularities and irregularities in nature. It entails the expedition for activities and responses, reasons and concerns in the environment. The knowledge of science is generally to alter out surrounding including the atmosphere with aim of refining the entire value for existence, thereby ensuring a better habitable world for its habitants. Science is primarily concerned with the intellectualization of facts and values in an unbiased manner (Ulferts, 2019).

The desired advancement of any society depends upon the people's activities resulting in social, economic, and political progress of their natural habitat. These activities are based on science and technological applications (Famakinwa, 2014). BST is a required initiative for every society to progress technologically. It is getting the required attention in primary education due to its relevance to life and culture. It is the basis of sciences and the requirement for many fields of learning, contributing immensely to society and scientific and technological growth. Its contribution comprises engineering, medicine, forestry, agriculture, biotechnology, and nursing. The teaching and learning of BST in lower primary school prepares pupils with valuable skills, concepts, principles, and theories to face the challenges of science subjects for subsequent learning opportunities. BST learning is towards

creating proficient persons who solve their challenges and that of their society. Such persons have the capability in becoming autonomous, confident, and self-reliant. Science and Technology constitute the basis of advancement in most human endeavours.

Domestic linguistics is the basic lingua-franca for the indigenous inhabitant of a specified environment; domestic linguistics is the medium for their daily communication and business transaction. The largest populace in Nigeria expresses themselves in their varying domestic linguistics. Nigeria was a British colony. Accordingly, the Nigerian Government made English as the authorized means of interaction in numerous areas, including education. English is a language of influence since expertise in English made such person to be at advantage in obtaining lucrative positions in government and other sectors. The high status with respect to English is reflected in the Nigerian educational system, which aims to produce graduates proficient in particularly English (Makinde, 2007).

It is no longer tenable to posit that the English usage in instructing science and technology has solved the problems of equal access to knowledge and underdevelopment. Conversely, English instructional medium in schools is formidable and virtually impenetrable barrier to access knowledge and information to a large segment of Nigerian society by ostracizing the languages of the environment and disengaging them from the business of education. This singular act of omission has effectively undermined and stunted the growth and development of Nigeria's languages. Every segment of Nigerian society has yet to acculturate modern knowledge to its cultural and environmental context. Even in the South West geopolitical zone, which has produced the most significant number of professors on the African continent, knowledge remains an imported foreign commodity accessible to only those baptized with the English language (Attahiru, 2010).

Every traditional society possesses one or more indigenous form of language. Domestic Linguistics in this study means Izon, Urhobo, Itsekiri and Ukwuani languages spoken in Delta State, Nigeria. The domestic linguistics is useful even in the face of modern science and technological advancements. Instead of rendering them obsolete in modern society, domestic linguistics should be used in instructing and learning of BST in the first three years of learning in the primary school since, this domestic linguistics constitutes direct medium of communication with pupils and their immediate environment while enabling the learners to understand the natural world (Bebenimibo, 2012).

In the realization for utilizing domestic linguistics in facilitating meaningful teaching/learning; the Federal Government in the National Policy on Education document (FGN, 2013) emphasized that indigenous language instructional medium in the first three years of primary education encouraged, and that from primary four, the instructional medium shall be English. Fernando (2020) notes that the practice of introducing the foreign language too early to the Nigerian child and weaning them on the mother tongue too early in school, it alienates the children from their domestic linguistics and the indigenous culture. Such alienation according to him leads to confusion of thought and language and adoption of non - discriminatory attitude towards foreign cultural influences. This restriction of the application concerning domestic linguistics instructional medium to the lower educational stage has been described as being rather unfortunate and basically a perpetuation of the colonial spirit by the ruling elite (Elumelu, 2017).

Even though it is contained in the National Policy on Education that in the first three years of the child's primary education, the teachers should instruct the pupils in their domestic linguistics, there seems to be a great neglect of this policy in some states of Nigeria. In affected States, English is used by teachers in instructing pupils' instead of the pupils' indigenous language, which, to a great extent, has lowered the effectiveness of the teaching/learning of science at this basic educational level (Olaoye, 2013).

In Nigeria, using domestic linguistics instructional medium is very rare, particularly in Delta State. The nonuse of domestic linguistics in instruction could result from the different domestic linguistics spoken by the people in the state and English usage in instruction undermined the policy that encouraged domestic linguistic in instruction for the first three years of the pupils' primary science education, as stated in the National Policy on Education (FGN, 2013).

Research Problem

The controversies concerning an effective instructional medium and poor pupils' achievement for BST has become a multi-dimensional issue with its significant influence on pupils not interested in the sciences in subsequent years for learning. This study observed the English Language usage in instruction as an essential contributory factor in the poor achievement of pupils for BST in the first three years of primary education. Thus, this study addresses the following: Is there any effect of domestic linguistics instructional medium on pupils' achievement in BST in the first three years of basic education?

Research Questions

These have been raised to pilot this investigation.

1. Is there any difference in the achievement mean scores of pupils taught BST in domestic linguistics and English language?
2. Is there any difference in the achievement mean scores of pupils taught BST using Izon, Urhobo, Itsekiri and Ukwuani languages?

Hypotheses

The following null hypotheses were tested at 0.05 level of significance.

Ho1. There is no significant difference in the achievement mean scores of pupils taught BST in domestic linguistics (DL) and English language (EL)

Ho2. There is no significant difference in the achievement mean scores of pupils taught BST using Izon, Urhobo, Itsekiri and Ukwuani languages

Methodology

A non-equivalent pre-test and post-test quasi-experimental design was applied in this study. It examined Domestic Linguistics effect on Achievement in BST. The study only involved four experimental groups, consisting of primary one to Primary three Basic Science and Technology students. A pre-test was administered to the groups before the treatment and ensured the groups 'comparative effects of the experimental groups on achievement in BST. The pupils in the experimental groups were taught BST concepts utilizing Domestic Linguistics (Izon, Urhobo, Itsekiri, and Ukwuani) languages. A post-test was administered to the experimental and control groups after the treatment period of six (6) weeks to establish the effect of the treatment on the dependent variable.

Population and Sampling Technique

This study's population involved One Thousand One Hundred and thirteen (1,113) Public Primary Schools in Delta State. The study utilized one hundred and seventy-six (176) Basic 1-3 Basic Science and Technology pupils public basic schools that were randomly selected. The study utilized basic one-three (1-3) whole classes of basic school I-III pupils from the four (4) designated schools. Simple random sampling technique was equally applied at every stage of selection. At the first stage, a simple random sampling was applied to designate a locality where domestic linguistic was predominant in a Local Government Area from each senatorial district with additional school from Delta South. Secondly, simple random sampling was utilized to designate one (1) senior school from each of the Local Government Areas designated. Thirdly, designated basic school 1-III classes as the intact (whole) classes among the designated schools, and were assigned as the experimental groups through "hat and draw" method. This method was randomly applied and eradicated any form of bias in the selection.

Validity and Reliability

The study utilized two (2) research instruments including Basic Science and Technology Achievement Test-I (BSTAT-I) and Basic Science and Technology Achievement Test-II (BSTAT-II). The BSTAT-I was used to retrieve response from Domestic linguistics (intervention classes) classes and BSTAT-II was used to retrieve responses from English Language (control group) classes respectively. The Instruments were validated through face validity, content validity and construct validity. Reliability Indices of 0.78 for BSTAT-I and 0.74 for BSTAT-II were obtained through Kuder-Richardson formula 21.

Treatment Procedure

1. Training of Research Assistants for Intervention Groups

Four Basic Science & Technology teachers used as Research Assistants were trained on the techniques of using Domestic linguistics. This lasted for five days. Day one involved the researcher to request for the approval from the designated schools Headmasters to allow their Basic Teachers and pupils to participate in the study. On the second day, the researcher exposed to the four basic science and technology instructors to the theories, origin and features of Gagne's Learning Hierarchy. On the third day, the teachers were trained using the training manuals prepared by the researchers on Domestic linguistics. The fourth day was spent on practice and generation of ideas regarding application of Domestic linguistics in instructing Basic Science and Technology concepts. The trained Research Assistants were evaluated and were seen to have accurate understanding on how to apply Domestic linguistics in Basic Science and Technology contents.

2. The Step by Step Treatment Procedure of Domestic linguistics was applied as the treatment.

The treatment lasted for six weeks. A week before the start of treatment the researchers distributed the instructional units to the 12 research assistants. The instructional units contained Basic Science and Technology contents which includes: For Primary (Basic) One: (1) Revision of First Term Work (2) Air: Existence of air and Creation of air (3) Demonstrating Air in Space (4) Soil – Discover soil as other part of the surrounding (5) Soil – Things found in the soil and importance of soil (6) Light – Light Energy: Uses of Light and Colour; For Primary (Basic) Two (1) Revision of First Term Work (2) Loamy Soil – Meaning, Organism in the sample of the soil and Properties of Sandy soil (3) Clay Soil – Meaning, Organism in the sample of the soil and Properties of clay soil (4) Clay Soil – Meaning, Materials and procedures and Uses of clay molding (5) Clay – Practical by Molding with clay (6) Plants - Features of plants and Groups of plants based on features, and for Primary (Basic) Three (1) Revision of First Term Work (2) Air in Motion I – Wind, Meaning of Wind and Effects of Wind (3) Air in Motion II – Harmful Effects of Wind and Bad effects of wind (4) Water – Uses of water, Sources of water and Composition of water (5) Water – Qualities of water, Meaning of water, Qualities of good/pure water, Contamination of water and Dangers of drinking bad water (6) Water – Purifying water, Reasons for purifying water and Methods of purifications correspondingly as contained in Delta State Primary (Basic) Basic Science and Technology plan of action. Intervention materials which were circulated earlier were based on these two reasons: (i) to familiarize research assistants with contents of the lessons and (ii) to ensure unbiased instructional presentation by following the endorsed medium for the designated classes. Two days before the start of treatment, the intervention groups were pretested with the 25 items of the Basic Science and Technology Achievement Test (BSTAT-). This was done for the groups before treatment, so that any

noticed change should be as a result of the applied treatment. The application of Domestic linguistics as instructional medium provides accommodating environment for learning on the part of the pupils. The pupils were tested during the next lesson's period after the treatment with 25 items of the Basic Science and Technology Achievement Tests (BSTAT-I and BSTAT-II) after reshuffling the items.

Data Analysis

The data retrieved from the administered Basic Science and Technology Achievement Tests (BSTAT-I and BSTAT-II) were analyzed utilizing mean, independent sample t-test was used to test hypothesis one and Analysis of Covariance (ANCOVA) were used for hypothesis two. The significant level to which a hypothesis is rejected or not rejected is at 0.05.

Hypothesis (HO₁)

There is no significant difference in the achievement mean scores of pupils taught BST through Domestic linguistics (DL) and English language (EL).

Table 1

Independent t-test on the Significant Difference in the Achievement mean scores of pupils taught BST in domestic linguistics (DL) and English language (EL)

Groups	N	Mean	mean diff.	SD	t	df	sig (2-tailed)	Remark
DL	238	61.20		6.89				Significant
			18.54		0.00	474	0.00	
EL	238	42.66		8.67				

P < 0.05

Table 1, revealed that the mean difference is 18.54 in the achievement mean scores of pupils taught BST through Domestic linguistics and English language. The posttest t-value of 0.00 and p-value of 0.00 was less than the alpha value of 0.05. This implied that the posttest mean scores of the pupils exposed to Domestic linguistics and English language has a significant difference in their achievement. Hence the hypothesis which states that "There is no significant difference in the achievement means scores of pupils taught BST through Domestic linguistics (DL) and English language (EL)" is hereby rejected.

Hypothesis (HO₂)

There is no significant difference in the achievement mean scores of pupils taught BST using Izon, Urhobo, Itsekiri and Ukwuani Domestic Linguistics as instructional medium.

Table 2

ANCOVA Comparison of Posttest Achievement Scores of Pupils Taught BST Using Izon, Urhobo, Itsekiri and Ukwuani Domestic linguistics as instructional medium of

Source	Types of III Sum of Squares	df	Mean Square	F	Sig	Remark
Corrected Model	474.381 ^a	4	118.595	2.563	0,394	Not Significant
Intercept	149389.102	1	149389.102	3228.331	0.000	
Pretest	143.683	1	143.683	3.105	0.792	
Group	359.427	3	119.809	2.589	0.548	
Error	10781.938	233	46.274			
Total	902720.000	238				
Corrected Total	11256.319	237				

P > 0.05

Table 2, a non –significant difference was found between the mean achievement posttest scores of pupils’ taught BST using Izon, Urhobo, Itsekiri and Ukwuani domestic linguistics. As shown in the table 2, F-value of 2.589 and p-value of 0.589 is greater than the alpha value of 0.05. As a result, the hypothesis which states that “There is no significant difference in the achievement means scores of pupils taught BST using Izon, Urhobo, Itsekiri and Ukwuani Domestic Linguistics as instructional medium” is hereby not rejected.

Discussion

The outcome for hypothesis one (HO1) shows the significant difference between pupils taught BST using Domestic linguistics and the English language. The observed difference in achievement by the pupils taught BST satisfies those exposed to domestic linguistics. One possible explanation for this finding is that the Domestic linguistics medium of instruction holds the potential to enable pupils to comprehend, arouse and sustain learners' participation in learning and help them understand BST concepts because domestic linguistics has bridged the language barrier between school and home (Adeleye, and Ogunremi 2017). Domestic linguistics allowed pupils to participate effectively in the teaching-learning situation, and it has encouraged them to build self-confidence in relating BST concepts to what is happening in their surroundings. The English language, being used as medium of instruction in a Domestic linguistics dominated locality, usually creates a language barrier in their learning and results in poor achievement. The findings of this study concerning the effectiveness of Domestic linguistics on pupils' achievement in BST agree with the work of Bebenimibo (2012), who conducted a quasi-experiment on Izon language and Pupils' Achievement in Basic Science. His study observed that pupils exposed to domestic linguistics achieved higher learning outcomes in basic science than those taught using the English language. This study supports the study of Nworgu and Nworgu (2013), who agreed that pupils exposed to an indigenous language instructional medium performed significantly better concerning BST. The current finding also supports the investigations by Jekayinfa (2014), who noted that the indigenous language instructional medium used in teaching BST had shown an advanced interactive effect of BST concepts with recorded better achievement in the subject. The finding of this study reaffirmed that the achievement means scores of pupils taught BST in Domestic linguistics were much higher than their counterparts taught BST in the English language.

The result of this study, concerning hypothesis two (HO₂), demonstrates the presence of no significant difference among pupils taught BST using the Domestic different linguistics (Izon, Urhobo, Itsekiri, and Ukwuani). The observed insignificant difference in achievement for the pupils taught BST using domestic linguistics could be attributed to the localization of teaching and learning of BST. While acknowledging and utilizing domestic linguistics instructional medium is paramount to effective achievement for those pupils that learned through Domestic linguistics. The influence of language on achievement is more substantial when pupils learn in the language of their immediate environment (Ricablanca, 2014). Another conceivable clarification to this finding should be that the Domestic linguistics medium of instruction holds the potential to enable pupils to comprehend, arouse and sustain their participation in learning. Domestic linguistics has helped them understand BST concepts because the language barrier between school and home was bridged and cut various individual domestic linguistic peculiarities to a defined locality. The findings of this study on the effectiveness of Domestic linguistics on pupils' achievement in BST agree with the work of Bebenimibo (2012), who carried out a quasi-experiment on Izon language and Pupils' Achievement in Basic Science. His study observed that pupils exposed to Izon language achieved higher learning outcomes in basic science than those taught using English. This study's finding is with accordance with Sumbalan, Caterial, Jimeno and Balane, (2017), who agreed that pupils exposed to a native or home language

instructional medium performed significantly better in BST. The current finding also supports the investigations by Attwood (2014), who argued that appropriate teaching strategies employed a profound increase in understanding of Mathematics. The determination of this study reiterated that the achievement means scores of pupils taught BST in Domestic linguistics (Izon, Urhobo, Itsekiri, and Ukwuani) were much higher in their achievement. While among the various domestic linguistics, significant difference in their achievement was not observed. The privilege of pupils to participate in classroom interaction and participation by native linguistics may have also contributed. The observed profound achievement may be because the use of the mother tongue permits young learners to directly construct and clarify without fear of making errors, eloquent their thoughts, and add new ideas to what they have known previously, Malone (2010).

Conclusions

In accordance with this study, the findings have uncovered that Domestic linguistics instructional medium is an effective one in instructing BST in basic learning for the first three years in achievement. Since it has feasible empirical support and can facilitate pupils' effective learning and organized knowledge content in a meaningful way. Consequently, this study has revealed that BST contents taught using domestic linguistics (Izon, Urhobo, Itsekiri, and Ukwuani) improved the pupils' knowledge of BST concepts. Domestic linguistics ensured a smooth transition from home school in terms of means of communication, which has removed the traditional barrier in teaching and learning in BST at this level of Basic Education.

Recommendations

Based on the findings of this study it was recommended that:

1. Government should monitor and make sure that pupils in Basic 1- III are taught using domestic linguistics rather than English language in accordance with Nigerian Policy in Education (NPE).
2. Teachers of the various domestic linguistics backgrounds should continue to ensure the use of domestic language during teaching-learning process and guarantee effective learning among the pupils achievement.

REFERENCES

- Adeleye, I. A., & Ogunremi, P. (2017). Promoting Nigerian languages for sustainable development in Nigeria, (eds). Further thoughts on language, education and the curriculum nexus for sustainable development in Nigeria. A festschrift in honour of Professor Clement Olusegun Olaniran Kolawole.
- Adodo, S.O & Gbore, L.O (2012), Prediction of Attitude and Interest of Science students of Different Ability on their Academic Performance in Basic Science.
- Akinbote, O, Alhassan, A B, Salawu, I.O. & Johnson ,H I (2010). Issue in early child hood and primary education. A national open university course guide (ECE410) Noun Publisher.
- Bebenimibo, J. (2022). Izon Language and Pupils Achievement in Basic Science in Primary Schools in Delta State Nigeria. A Master of Education Thesis, Faculty of Education, University of Port-Harcourt, Port-Harcourt.
- Elumelu, E. (2017). Indigenous language of instruction for sustainable education development in Nigeria (eds). Further thoughts on language, education and the curriculum nexus for sustainable development in Nigeria. A festschrift in honour of Professor Clement Olusegun Olaniran Kolawole.
- Famakinwa, A. (2014). Comparative Effects of Generative and "Predict-Observe-Explain" Instructional Strategies on Basic Science Practical Skills of Lower Primary School Pupils in Ondo State. Unpublished Ph.D. Thesis, Institute of Education, Obafemi Awolowo University, Ile-Ife, Osun State, Nigeria.
- Federal Republic of Nigeria (2013). National Policy on Education. Lagos: NERDC Press.
- Fernando, E. R. (2020). Effect of mother tongue-based education (Waray-Waray) in teaching mathematics subjects among elementary grade pupils. *International Journal of Linguistics, Literature and Translation (IJLLT)*, 3(7), 23-29.
- Jekayinfa, A. A. (2014). Urban/Rural Differences in Learners' Perceived Difficult Topics in Secondary School Social Studies. <https://www.unilorin.edu.ng/publications/jekayinoluwa>
- Makinde, S. O. (2007). (Ed.) The Language Factor in the Education of the Nigerian Child. *Pakistan Journal of Social Sciences* 4 (2), 186 - 190.
- Malone, S. (2010). Planning mother tongue-based education program in minority language communities [resource manual]. SIL International Asia.
- NCCE (2012). Curriculum implementation framework for National Certificate in Education. Abuja. 2102 Edition
- Olaoye, A. A. (2013). Language and youth empowerment: A linguistic strategy for achieving Nigeria's millennium development goals. *Theory and Practice in Language Studies*, 3(11), 1946-1951
- Sumbalan, E. B., Caterial, D., Jimeno, N., & Balane, C. T. (2017). The utilization of mother tongue in teaching young learners: Its implications to pre-service teachers. *Journal of Educational and Human Resource Development*, 5, 15-22

Ulferts, H. (2019). "The relevance of general pedagogical knowledge for successful teaching: Systematic review and meta-analysis of the international evidence from primary to tertiary education", OECD Education Working Papers, No. 212, OECD Publishing, Paris, <https://dx.doi.org/10.1787/ede8feb6-en>.

Ricablanca, J. D. (2014). Effectiveness of mother tongue-based instruction on pupils' achievement in mathematics. A Master project of the Central Mindanao University, Philippines.

Vygotsky, L.S. (1962). Thought and language. Cambridge, MA: MIT Press.