

Effects of Hausa Language of Instruction on Secondary School Biology Students' Academic Performance in Sokoto State, Nigeria

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ABSTRACT

This study investigated the effects of Hausa Language as a medium of instruction on academic performance of secondary school Biology Students in Sokoto State, Nigeria. The design used was experimental design, precisely, pretest posttest control group design. The population of the study was 21,367 SSII Students. Stratified random sampling technique was used in selecting the sample of schools used. 370 students were used as sample for the study. One hundred and eighty six (186) students consisting of 109 male and 77 female students were randomly selected for the experimental groups while One hundred and eighty four (184) students consisting of 102 male and 82 female were randomly selected for the control groups. Two hypotheses were formulated and tested at 0.05 level of Significance. The results revealed that there was significant difference between the experimental and control groups. There was no significant difference found between male and female students taught Biology in Hausa Language. It was concluded that the use of Hausa Language as a medium of instruction in Biology enhances performance among students. It was recommended among others that Hausa Language should be recommended for use by the government as a medium of instruction in Biology most especially in schools that are in the Hausa speaking states in Nigeria.

Keywords: Biology, SSII, Hausa Language, NECO, WAEC

I. INTRODUCTION

Science and technology have become integral part of the world culture and any country that overlooks such significant altruism does so at the risk of remaining backward in a technologically fast moving world (katto, 2004). Science and its application (technology) have contributed immensely to the world's material progress. The correlation between a country's economic development and the level of scientific activity is high and positive (thomas & collier, 2002). It is generally accepted that the cultivation of a scientific frame of mind is a pre-requisite for development (uwaisu, 2009). Thus, the growth of any nation is highly dependent on the level of development of its science and technology (ahmed &abimbola, 2011).

Science provides humanity with the knowledge of the environment and social solutions to global problems (abajah, 2005). That is why schools are increasingly interested in encouraging students to take science and science-related courses (andrew, 2009). The importance of science is no longer in dispute anywhere in the world.

Owing to the importance of science in daily life and the need for everyone to be scientifically literate, the study of science has been pursued vigorously at all levels of nigeria's education system (andrew, 2009).

In spite of the importance of science to man and national development, the study of science seems to be faced with numerous problems in nigeria. Students are

increasingly becoming unable to cope with the understanding of scientific concepts because of lack of application of innovative teaching strategies (koroka, 2004).

Consequently, the performance of students in science and science related examinations are on the decline (esiobu, 2000). Many reasons have been attributed this problem. Some of which are the abstractness of science concepts (nkadi, 2000), inadequate equipment, inefficient instructional materials, inappropriate application of teaching methods and inadequate qualified teachers (bamgbose, 2004).

Biology is one of the core science subjects offered at the senior secondary school level of nigerian's education system. It is one of the subjects that a student must pass in order to study courses such as medicine, agricultural science, pharmacy, engineering, nursing, science education and other science related courses at the tertiary level. The importance of this subject, therefore, as a requirement for the development of nigerian's technological base cannot be overemphasized.

As a result of its numerous importances, biology is the most popular choice among science students in sokoto state, nigerian. It is offered by candidates sitting for the senior secondary school certificate examinations (sscce) (waec, 2009). Despite the popularity of biology, results of research studies conducted by experts always revealed the preponderance of poor performance of students in the subject (ahmed & abimbola, 2011).

Some of these research efforts have revealed that there are considerable language difficulties in the learning of biology (fatima, 2006). Language is an important tool for communication in every society of the world. According to silzer (2004) language is the systematic convention of sound, signs or written symbol in a human society for communication and self-expression.

African countries seem to be the only ones insisting on using a foreign language as lingua franca and language of instruction at all levels of their educational system. But it is interesting to note that north african countries are using their native language, "arabic" as the lingua franca and also the language of the curriculum, even though, they too were also colonized. In east africa,

the swahili language is one of such lingua franca used by the people of east african region for wider communication and also as the language of instruction in schools (uwaisu, 2009). Linguistic scholars are unanimous in their agreement that there is a strong link between communicative behaviour and educational success.

A prerequisite for academic success is a good mastery of basic communicative skills in the language of education. This is why the importance of language in the business of communication, interaction and educational development of individual or a group of people in the society has been stressed for long in nigerian (esiobu, 2000).

It may be true to say that, so many countries around the world and even in africa use their own indigenous language to formulate educational policies and systems for example, egypt, china, bulgaria, germany and so on. In these countries, science subjects are taught in their local languages. It is for this reason that most of those who go to these countries for studies have to spend some times learning the language of the country before going into his chosen field of studies (usman, 2004).

There is a growing support for the use of mother tongue or language of the immediate community as a medium of instruction in the first three years of primary education in nigerian. This position has been spelt out clearly in the national policy on education in nigerian (usman, 2004). Since biology contains a number of concepts that appear difficult to understand, explaining them in a second language creates its own problem, hence, using a first language "the mother-tongue" that is appropriately developed for that purpose could provide some solutions aimed at improving verbal communication in schools (samuel & ardo, 2006). The use of mother tongue in science instruction could promote function, resourcefulness and high level thinking which are central to scientific breakthrough. In view of the above, this study was designed to determine the effects of hausa language (mother tongue) of instruction on secondary school students' academic performance in biology in sokoto state, nigerian.

II. METHODS AND MATERIAL

1. Statement of the Problem

Over the years, there has been general out cry on declining or poor performance in Biology in Nigerian Secondary Schools Certificate Examinations (WAEC, 2010-2013). Several efforts have been put in place to identify the causes and proffer solutions.

There are a lot of reasons attributed to this problem among which include the problem of adoption of appropriate language of instruction in school, poor application of teaching methods and as well as abstract nature of the subject (Uwaisu, 2009). However, studies by Odili (2006) have been yielding positive results on the use of mother tongue or indigenous language as medium of instruction in both arts and science in Nigeria. This study therefore, attempted to investigate the effectiveness of Hausa language as a medium of instruction in Biology in secondary schools in Sokoto state in order to find out whether it would help in solving the outstanding poor performance in Biology among secondary school students in the Hausa speaking states of Nigeria.

2. Aim and Objectives of the Study

The aim of this study is to investigate the effects of Hausa Language of Instruction on Secondary School Biology Students' performance in Sokoto State, Nigeria. The study specifically attempted to achieve the following objectives to:

- ✓ Determine whether there is difference in the performance of students taught Biology concepts in Hausa language and the performance of those taught in English language.
- ✓ Investigate whether there is any difference between the performance of male and female students taught Biology concepts in Hausa language.

3. Research Questions

The study pursued answers to the following research questions:

- ✓ Is there any difference in the performance of students taught Biology concepts in Hausa language and the performance of those taught in English language?

- ✓ Is there any difference between the performance of male and female students taught Biology concepts in Hausa language?

4. Null Hypotheses

HO_1 : There is no significant difference in the performance of students taught Biology concepts in Hausa language and the performance of those taught in English language.

HO_2 : There is no significant difference between the performance of male and female students taught Biology concepts in Hausa language.

5. Significance of the study

The findings of this study will be of benefit to students, teachers, parents, school administrators, researchers, publishers and examination bodies. To the students, it will expose them to a better learning that makes them keep track of their performance in Biology as well as having fruitful interaction with the teacher and fellow students, thus making it easier for them to understand abstract concepts through the language they understand most fluently.

For teachers, the study will equipped them with effective skills of teaching and assessment as well as providing remediation option for students. The finding of the study will empower the teacher to have full control of the classroom and ensure smooth understanding and retention of Biology concepts by the students. It will also afford the teachers the opportunities to use appropriate medium of passing knowledge to students while ensuring effective feedback to parents on their children/wards' progress in School.

The findings of the study will also assist examination bodies such WAEC and NECO in understanding and assessing the difficult concepts in Biology and help them to design syllabus to simplify those difficult concepts thereby making the concept simple to teach and understand by the teachers.

To school administrators, the result of findings from this study will make it easier for them to identify difficult areas in teaching and learning of Biology concept thereby making it easy for them to provide adequate

instructional materials that will ease the teaching and learning process in Biology.

6. Scope of the Study

The study was limited to Sokoto State, Nigeria. The state consists of Twenty Three local government areas. It covered the Six (6) educational zones of the state and there are eighty-eight (88) senior secondary schools under these zones. It was also restricted to the Concepts of fruits, Nutrition (photosynthesis) and Evolution. It involved both male and female senior secondary school class II students the state.

7. Research Design

The design used for this study was experimental design, precisely, pretest posttest control group design. According to Kurumeh (2007), this design is often adopted when Pretests are administered before the application of the Experimental and Control treatments. Posttests are also administered at the end of the treatment period. The sketch of the design is shown below:

Table 1: A Sketch Representation of the Research Design

R ₁	O ₁	X	O ₂
R ₂	O ₃	X	O ₄

KEY:

- R₁ = Randomised Experimental group.
- R₂ = Randomised Control group.
- O₁ = Pretest for the experimental group.
- O₃ = Pretest for the control group.
- X = Treatment
- O₂ = Posttest for the experimental group.
- O₄ = Posttest for the control group.

8. Population of the Study

There is total number of 88 Senior Secondary Schools spread across the six (6) educational zones as population of schools in Sokoto State. There are 21,367 SS II Students as the population of subjects for the study in these schools. (Statistics Division, Ministry of Education, Sokoto, 2014).

Sample and Sampling Techniques

The sample of the study is three hundred and seventy (370) SSII students' drawn from twelve (12) secondary schools in Sokoto State.

The figure (370) was arrived at using the Researcher Advisors (2006) table for selecting required sample size from a given population. Stratified proportionate random sampling technique was used in selecting the Twelve (12) schools from the six (6) educational zones.

Simple random sampling was adopted in selecting two schools from each zone. From the sampled schools, six schools were further assigned randomly into the experimental groups and six other schools as the control groups.

One hundred and eighty six (186) students consisting of 109 male and 77 female students were randomly selected for the experimental groups while One hundred and eighty four (184) students consisting of 102 male and 82 female were randomly selected for the control groups.

9. Research Instruments

There were two instruments used for this study. They are:

✓ **Biology Performance Test in English Language (BIPTIEL)**

The BIPTIEL is a self-constructed test to measure the respondents (control group) knowledge about the difficult concepts in Biology after been taught in English Language. The topics covered include nutrition (Photosynthesis), evolution and fruits. It contains 25-items with each item containing five options. Only one of the five options is correct. Each correct answer was scored four marks. The total marks scored by the respondents determined their level of performance in Biology.

✓ **Biology Performance Test in Hausa Language (BIPTIHAL)**

The BIPTIHAL is the translated version of Biology Achievement Test in English Language. It is a self-designed test to measure the respondents (experimental

group) knowledge about difficult concepts in Biology after been taught in Hausa Language. The topics covered include nutrition (Photosynthesis), evolution and fruits and contains 25-items with each item containing five options (A-E). Only one of the five options is correct. Each correct answer was scored four marks. The total marks scored by the respondents determined their level of performance in Biology

Validity of the Instruments

- ✓ The BIPTIEL was developed by the researcher and it consists of forty (40) items, covering Evolution, Fruits, and Nutrition (Photosynthesis). The instrument was validated by experts from the Department of Science Education, Federal University of Technology, Minna. The original 40 items submitted to the experts were corrected and reduced to only 25 items. These 25 items were finally ascertained and certified to have content and face validity.
- ✓ The BIPTIHAL was the translated version of BIPTIEL. The English version of the instrument after been validated by experts from the Department of Science Education Federal University of Technology, Minna. It was translated by Two experts from Hausa Language Department of Usmanu Danfodio University, Sokoto and Shehu Shagari College of Education, Sokoto, respectively. The translated version of the instrument was also validated by Biology experts who are native speakers of Hausa language from the department of Biology, Usmanu Danfodiyo University, Sokoto. They certified that the BIPTIHAL has content validity.

Reliability of the Instruments

The two instruments were pilot tested using sample of the same characteristics outside the sampled schools. For the BIPTIEL and Instruments, alternate or parallel form reliability was established using Pearson Product Moment Correlation formula. The BIPTIEL yielded $r = 0.88$, while the BIPTIHAL yielded $r = 0.86$ using split-half methods in which spearman brown formula was applied respectively. All these results indicated that there are evidences of reliability of the instruments.

10. Method of Data Collection

Research assistants were trained. These are some of the Biology teachers in the schools selected for the study. They helped in the treatment exercises of the research. The Experimental groups were taught Biology in Hausa Language of instruction while the control groups were instructed in English Language throughout the period of the research. Teaching and learning activities lasted for eight weeks. Finally, posttest was administered to the two groups; scripts were collected and scored accordingly after the exercise. The scores served as data for the research.

11. Method of Data Analysis

Data obtained from the pretest and the hypotheses were analysed using independent sampled t-test. This was done with the aid of Statistical Package for Social Sciences (SPSS) Version 20.0.

III. RESULT AND DISCUSSION

Table 2: t-test Analysis for the pretest scores between Experimental and Control Groups

Groups	N	Df	\bar{X}	SD	Sig t-cal
Experimental	186	368	4.125	8.13	1.206 0.916 ^(ns)
Control	184		4.111	7.19	

NS= Not Significant at 0.05 Level of Significance

Table 2 above revealed that $t\text{-cal}=1.206$ at 368 degree of freedom with $p= 0.916$ which is not insignificant at 0.05 level of significance. Hence, the respondents in the two groups have fairly the same entry behaviour.

Hypothesis One (HO_1): There is no significant difference in the performance of students taught Biology concepts in Hausa language and the performance of those taught in English language.

Table 3: t- test Analysis of the Posttests Scores of the Experimental and Control groups.

Grou p	N	df	SD	\bar{X}	t-cal	Sig
Experiment al	186	368	15.12	58.16	1.098	0.027
Contr ol	184		13.26	43.70		

Significant at 0.05 Level of Significance

Table 3 showed the t-test analysis of the scores of the students taught Biology in Hausa language and those taught in English Language. The mean achievement scores were 58.16 and 43.70 respectively. The results revealed that $t = 1.098$ at 368 degree of freedom with $p = 0.027$ which is significant at 0.05 alpha level. Therefore, the hypothesis was rejected. This implies that the use of mother tongue as language of instruction enhanced better understanding of the subject matter by the students much more than English language does.

Hypothesis Two (H_02): There is no significant difference between the performance of male and female students taught Biology concepts in Hausa language.

Table 4: t- test Analysis of the Posttests Score of Male and Female Students taught Biology Concepts in Hausa Language

Groups	N	Df	\bar{X}	SD	t-cal	Sig(2 tailed)
Male	109	184	53.12	14.14	0.279	0.780(ns)
Female	77		52.72	13.55		

ns = not Significant at 0.05 level of significance.

From table 4 above, it can be seen that $t\text{-cal} = 0.279$ at 184 degree of freedom with $p = 0.780$ which is greater than 0.05 level of significance. Hence, the hypothesis was not rejected. This indicates that there was no gender difference in the students' performance after been taught Biology Concepts in Hausa Language.

Summary of Findings

The following submissions are the findings for this research.

- There was significant difference in the performance of students taught Biology concepts in Hausa language and the performance of those taught in English language.
- There was no significant difference between the performance of male and female students taught Biology concepts in Hausa language.

1. Discussion of findings

The findings revealed that there is a better performance by the students taught Biology concepts in Hausa language than those taught in English language. This is in agreement with the studies of Garba (2006) whose result revealed that teaching science in the mother tongue increases students' academic achievement in school. The result is also in line with the findings of Ife Six Year Primary Project, which showed that pupils taught in mother tongue (Yoruba) not only excelled but also out performed pupils who were taught in English language in all primary school subjects at the end of their primary education. This is also corroborated by the findings of Samuel and Ardo (2006) who opined that communication is a very important tool in an effort to communicate science and technology to a learner. Hence, they noted that the importance of language in the development of science and scientific thinking cannot be over-emphasized.

Furthermore, in the study of Usman (2004), it was made known that language is an important ingredient in the development of scientific thinking, consequently, if the background of the child imposes linguistic handicap on him, the development of thinking will certainly be retarded. There is a growing support for the use of mother tongue or language of the immediate community as a medium of instruction in the first three years of primary education in Nigeria. This position has been spelt out clearly in the National Policy on Education FRN, 2004) in (Usman, 2004). Since, Biology contains a number of concepts that appear difficult to understand; explaining them in a second language creates its own problem, hence, using a first language "Hausa" that is appropriately developed for that purpose could provide

some solutions aimed at improving verbal communication in schools (Samuel and Ardo, 2006).

There was no significant difference between the performance of male and female students taught Biology concepts in Hausa language. This was not in conformity with the outcome in the work of Jacinta (2011) who identified the use of mother tongue in teaching method as advantageous to the male more than the female in Biology performance. He argued that male schools performed better than female schools and in co-educational schools, boys generally performed better than girls when teaching classes using mother tongue. He attributed the success to a number of reasons such as; most authors of Biology textbooks use masculine form of pronouns as sex neutral. Also, illustrative diagrams and pictures in science books use male characters more than female as well as male role models than female by this the female students consider science to be the exclusively preserved of male. He also recommended that the textbooks should not be gender biased in terms of their use of pronouns, illustrative pictures and diagrams and role models etc. He concluded that, to improve interest and participation of girls in science there is need to adopt science books that represent male and female characters on equal bases.

IV. CONCLUSION

From the outcomes of the study, it could be concluded that the Experimental groups performed better than the Control Group. One of the possible reasons for the performance could be attributed to the medium of instruction. Simply put, the use of the Hausa language placed the Hausa experimental students at an advantage over the English language Control Group. There were no gender differences among those taught biology in Hausa language. The use of indigenous language as a medium of instruction could go a long way in enhancing learning of science among Nigerian secondary school students.

V. RECOMMENDATIONS

The following recommendations were made:

1. The Federal Government of Nigeria should encourage the use of native language in the teaching and learning of Biology and other science subjects

in secondary schools as practiced by some African countries.

2. Government and non-governmental agencies should help in the development of Hausa literatures and textbooks in Biology using the appropriate scientific words, terms and phrases, such literatures and textbooks should be gender sensitive and not gender bias.
3. Policy makers, educational administrators, science educators, science teachers, and authors should join hands in order to teach and learn science in Hausa language this will reduce the difficulties in learning Biology.
4. Secondary School curriculum and syllabus should be developed by experts in Biological sciences using Hausa language.

VI. REFERENCES

- [1] Ahmed, M. A & Abimbola, I. O (2011) Influence of teaching experience and school location on Biology teachers ratings of the difficulty levels of nutrition concepts in Ilorin, Nigeria, Journal of Science, Technology, Mathematics and Education (JOSTMED) 7(2), 52-53.
- [2] Andrew, S. O. (2009) Relationships among Secondary School Students performances in Science Subjects and English language in Okene, Kogi State, Nigeria
- [3] Samuel, A. D & Ardo, G. V (2006). The effect of mother tongue in learning of integrated science concept: A case study of children in Nigeria. Sokoto Educational Review 8(2), 84 – 85.
- [4] Bajah, S. T. (2005). Teaching Science for Scientific development. A key-note Address at national commission of colleges of education, Zaria.
- [5] Bamgbose, A. (2004). Language of Instruction Policy and Practice in Africa. Retrieved on 25th of June 2014 from http://www.unesco.org/education/languages_2004/languageinstruction_africa.pdf
- [6] Esiobu, G. O. (2000) Biology Teacher's Awareness and Level of use of Mental Analogies in Teaching Difficult Concepts Biology. Science Teachers Association of Nigeria. 41st annual conference proceedings, 116-119.
- [7] Fatima, Y. I. (2006). Effect of using Computer Assisted Instruction in Learning Statistics in

- Selected Senior Secondary Schools in Minna Niger State. Unpublished M.TECH thesis Federal University of Technology Minna, Nigeria.
- [8] FRN, (2004). National Policy on Education, (Revised), Federal Republic of Nigeria. Lagos: Federal Ministry of Education.
- [9] Garba, A., 2006. Continuing education: an essential tool for teacher empowerment in an era of universal basic education in Nigeria. International Journal of Lifelong Learning, 23(2): 191–203. [S-OR]
- [10] Jacinta, O. A (2011) American-Eurasian Journal of Scientific Research 6 (1): 28-31, 2011ISSN 1818-6785© IDOSI Publications, 2011
- [11] Katto, O. D (2004) Investigation into the conceptions of Genetics and Evolution in Secondary School Biology Students in Minna, Niger State, Nigeria. Unpublished M. TECH Thesis, Federal University of Technology Minna, Nigeria.
- [12] Koroka, M.U.S (2004). Effects of Metaphor on the understanding of some Selected Science concepts among Secondary School Students in Minna, Niger State, Nigeria. Unpublished M. TECH Thesis, Federal University of Technology, Minna, Nigeria.
- [13] Kurumeh, M. S. (2007). Effect of Ethno Mathematics approach on students' interest in Geometry and Menstruation. ABACUS: The Journal of Mathematical Association of Nigeria (MAN), 32(1), 103-112.
- [14] Nkadi, O. (2000) Audio-Rolliograph as an effective resource for Biology teaching. Teachers Association of Nigeria, 41st Annual conference proceedings, 112-115.
- [15] Odili G. A (2006). Mathematics in Nigeria Secondary School -A teaching Perspectives.
- [16] Lagos rex Charles and Patric limited.
- [17] Silzer, P. (2004) Working with Language (an interactive Guide to Understanding) School of Intercultural Studies, Biola University Retrieved on 6th of August 2014 on
- [18] Hyperlink "<https://www.scribd.com/doc/221324642/Working-With-Language>"
- [19] Thomas, W. & Collier, V. (2002) A National Study of School Effectiveness for Language Minority Students' Long-term Academic Achievement. Santa Cruz CA: Center for Research on Education, Diversity and Excellence.
- [20] Retrieved on 6th of August, 2014. Website address: Hyperlink "http://www.crede.ucsc.edu/research/liaa/1.1_final.html"
- [21] Usman, A. (2004). The Effect of Mother Tongue on the Teaching of Science among Biology students in Some Selected Secondary Schools in Zamfara State. Unpublished M. Sc Thesis Usman Danfodio University Sokoto, Nigeria.
- [22] Uwaisu, A. A (2009). The impact of mother tongue on academic achievement in physics on Senior Secondary School Students in Sokoto Metropolis.
- [23] West African Examination Council (WAEC), (2009). The chief examiner reports for SSCE Biology
- [23] West African Examination Council (WAEC), (2010-2013). The chief examiner reports for SSCE Biology