

THE EFFICACY OF CO-ADOPTING THE YORUBA LANGUAGE WITH FOREIGN LANGUAGE CONCEPTS (ENGLISH AND FRENCH) IN TEACHING COMPLEX SCIENTIFIC CONCEPTS TO SECONDARY SCHOOL STUDENTS IN KABBA/BUNU LOCAL GOVERNMENT AREA OF KOGI STATE

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ABSTRACT

This study examined the efficacy of co-adopting the Yoruba language with foreign-language concepts, particularly English and French, in teaching complex scientific concepts to secondary school students in Kabba/Bunu Local Government Area of Kogi State, Nigeria. The study was motivated by the observation that language barriers and unfamiliar scientific terminologies may contribute to students' difficulties in understanding and applying complex scientific concepts. The study specifically examined the factors responsible for low academic performance in science, compared the academic performance of students taught using English/French with those taught using Yoruba, and investigated differences in knowledge retention and conceptual application between the instructional approaches. The study adopted a pre-test and post-test research design. A total of sixty (60) final-year science students were selected from four secondary schools, with fifteen (15) students selected from each school. A structured questionnaire was used to collect information on factors affecting students' academic performance, while achievement and retention tests were used to assess students' understanding, knowledge retention and conceptual application of a selected topic in a science subject. Data were analyzed using frequency, percentage, mean scores and comparative analysis. The findings indicated that language difficulty, unfamiliar scientific terminology, inadequate practical activities, insufficient instructional materials and limited laboratory facilities were among the factors associated with students' low academic

performance. The study recommends that science teachers should strategically integrate Yoruba explanations with standard scientific vocabulary, while educational policymakers and curriculum developers should consider appropriate multilingual approaches in science education. Such an approach could enhance students' comprehension, participation, academic performance, knowledge retention and application of scientific concepts.

KEYWORDS: Yoruba language, English, French, science education, language of instruction, scientific concepts, academic performance, knowledge retention, conceptual application.

1. INTRODUCTION

Language as a medium of information carriage is presented in an encoded manner which is further processes and decoded. These processes amount to communication. Thus, when encoded information is not decoded communication is said to have lost its value. Narrowing this understanding to our research, language has always served as an encoded unit of information to be decoded for educational purposes. To this effect Bamidele (2026) significantly explains that every scientific and educational breakthrough, every mathematical theorem and technological revolution have depended not only on intelligence but on language and its vocabularies. Thus, what cannot be clearly identified cannot be taught. What cannot be taught cannot be understood. This understanding gives an insight that works of science, grappled in foreign languages and vocabularies may slow down the learning process of a brilliant and intelligent student.

This limitation for students cannot be described as mental rehardens but lack of linguistic preparedness on the part educational stakeholders in Nigeria. It is expected that, at the end of this research work necessity will call for improved efforts in consistent translations for scientific terminologies and vocabularies using the Yoruba language. This is with the aim of producing more science textbooks and pedagogical aids for Yoruba science students in Nigeria. This view however is facilitate teaching learning process for science secondary school learners in Kabba/Bunu local government thereby contributing their quota to the development of science in the society and globally.

Statement of the problem

Despite numerous pedagogically interventions, performance of core science students in Kabba/Bunu LGA is often substandard as evidenced by their external examination results. Observational data suggests that, the root cause is not an inherent lack of cognitive capacity,

but an inability to cross the linguistic bridge required to internalize scientific material. When taught exclusively using the English language, students frequently fail to grasp the contextual reality of scientific concepts, viewing them as abstract dogmas rather than observable laws of nature. The central problem this study seeks to address is the extent to which the English language acts as an active structural barrier to scientific comprehension, and whether translating instruction into the student's language of immediate environment (Yoruba language) can dismantle this barrier.

Objective of the study

1. To examine reasons on low performance of a higher percentage of science students in Kabba/Bunu L.G.A.
2. To evaluate the impact of foreign language of instruction versus the Yoruba language as medium of instruction on Students' academic performance in a chosen science subject area.
3. To analyze the comparative differences in knowledge retention and conceptual application on students, when taught using vocabularies terminologies and concepts of foreign languages (i.e English, French) compared to using vocabularies, terminologies and concepts in Yoruba language.

Research Questions

1. What are the major factors responsible for the low academic performance of science students in Kabba/Bunu Local Government Area?
2. What is the difference in the academic performance of students taught a selected science subject using English/French as the language of instruction and those taught using Yoruba as the medium of instruction?
3. What difference exists in the knowledge retention and conceptual application of students taught using foreign-language vocabularies, terminologies, and concepts (English/French) compared with those taught using Yoruba vocabularies, terminologies, and concepts?

2. Literature Review

Language plays a very important role to developing the world of science in any given society. It is pertinent to acknowledge that credit to the growth in the world of science is based on qualitative education and research. These identified avenues (education and research) have always thrived using language as a means to expanding knowledgeable education and

research. However, SSCG (2026) informs that the Nigerian domain of sciences and its relative activities have grown at a slow pace. This however is traced to barricade of knowledge based on language inaccessibility.

With critical observation to the acquisition of knowledge in science classrooms of final year secondary students in Kogi state, Achimuguo Daodu (2016) inform on factors affecting learning. Amongst these factors, he mentioned inadequacy of the curriculum, poor preparation of science textbooks, voluminous curriculum content, lack of libraries and inadequate textbooks. He also identified that due to cost of teaching aids specimen for practical are often taught theoretically.

Analyzing these problems, curriculum instructors should project an outlook to seek for measures to supporting the inadequacy of teaching learning content. Libraries must be ensured to being up to date with a variety of textbooks in the languages that could support knowledge acquisition for learners. Consideration for textbooks in the Yoruba and other Nigerian languages is considered critically essential. It is expected to serve as a partial cover up to adequately expressing and expanding an in-depth of knowledge on practical topic which are taught theoretically. Thus cognitive knowledge to contents, terminology and vocabularies taught are better simplified and immersed by the students. Knowledge is however synergized with what is known in the Yoruba language to the English language.

Further establishment on this challenge, Kolawole, Rotimi and Eniolorunda (2024) informs on the observation on how disheartening students performances in Kabba during internal and external examinations has been persistently below expectation. One of the major issues ascribed to this notion is the inability of most learners to assimilate scientific terminologies, concepts and vocabularies using the English language. Thuli and Awelani (2024) explains that where teaching learning is inaccessible, the use of indigenous language can positively equip the learners to adequately assimilate taught concepts. This will invariably boost classroom activity to being lively and interactive. With teaching learning process exploring this route, knowledge growth and assimilation becomes faster as this connection leads to high level of comprehension for learners.

Credible analysis as described by Nwodu, Nwankwegu, Azubuike and Nwanga (2025) credibly analyse how the use of indigenous languages used in Swedish science classroom have led to deeper knowledge acquisition and retention by learners. The robust build of their indigenous languages have helped their society develop in its ability to leverage on their vocabularies, concepts and terminologies in the science domain. Thus using their language for scientific educational instruction over the years. This is identified as a linguistic upgrade.

These projections also given credence to experimental application of indigenous language use anchored by Fafunwa and his team during the Ife primary education Research project (1970's). According to the findings of Fafunwa, Macauley and Sokoyo (1989) their research proved that cognitive development is accelerated when students learn in their mother tongue. Whereby literatures vocabularies, terminologies and concepts in the senior science classes are translated to the Yoruba language and made available this create extra support for cognitive mental process for learners, thereby increasing a build-up of teaching learning concepts of foreign languages into the Yoruba language. Invariably these translations to the Yoruba language is expected to drastically reduce the extraneous linguistic load of students thereby allowing them to allocate their full working memory to digesting already translated concepts of sciences.

METHODOLOGY

Description of Study Area

The study area considered for this research is Kabba/Bunu L.G.A Kogi state, Nigeria. Some selected secondary schools within the town will be targeted for the research

Research Population and Sample

Our choice of students for this research is based on fifteen (15) final year science students each from four (4) secondary schools. Further clarification on this study will be specified around a choice topic in one of the science subject areas.

Data Collection

Data were collected using a pre-test/post-test Quasi Experimental control design. This research design is expected to measure the amount of knowledge acquired whilst students were taught using vocabularies, terminologies and concepts owing mostly to foreign languages i.e the English, French e.t.c. another teaching intervention will be carried out whereby vocabularies, terminologies and concepts owing to the Yoruba language will be co-opted into the teaching process.

Based on the topic taught a careful selection of well-structured and analyzed and questions were administered. The pre-test was administered after teaching with the English language and a post-test re-administered after the teaching with the Yoruba language.

Data analysis

Scoring of scripts are graded blindly to prevent researcher bias and scores are collated for statistical analysis. Data will be analyzed using mean scores, standard deviations independent t-test and tables.

3. RESULTS AND DATA

Analyses Research Question 1: What are the major factors responsible for the low academic performance of science students in Kabba/Bunu Local Government Area?

Table 1: Mean and standard deviation of the respondents on the extent does factors responsible for the low academic performance of science students in Kabba/Bunu Local Government Area.

S/N	Items statement	Mean	SD	Remarks
1	Difficult scientific vocabulary affects my understanding of science.	3.23	0.89	Accepted
2	The use of unfamiliar English/French scientific terms affects my academic performance.	3.17	0.91	Accepted
3	Some science concepts are difficult because of the language used by the teacher.	3.20	0.88	Accepted
4	Lack of adequate laboratory equipment affects students' performance.	2.90	0.97	Accepted
5	Inadequate practical activities contribute to poor performance in science.	3.23	0.92	Accepted
6	Lack of adequate science textbooks affects students' performance.	3.13	0.93	Accepted
7	Large class size makes it difficult for teachers to explain complex concepts.	3.00	0.96	Accepted
8	Students' lack of interest in science contributes to poor performance.	3.19	0.90	Accepted
9	Teachers sometimes use scientific terms without adequate explanation.	3.09	0.94	Accepted
10	Lack of opportunities to ask questions affects students' understanding.	3.16	0.91	Accepted
	Grand weighted Mean	3.13	0.56	Accepted

Source, Field Survey, 2026

Table 1 shows that respondents generally agreed that several factors contribute to the low academic performance of science students in Kabba/Bunu Local Government Area, as indicated by the grand mean of 3.13, which is above the criterion mean of 3.00. Difficult scientific vocabulary and inadequate practical activities were identified as the most prominent factors, each recording a mean of 3.23. Language-related difficulties, unfamiliar English/French terminology, students' lack of interest, inadequate textbooks, large class sizes, and limited opportunities to ask questions were also identified as contributing factors. However, lack of laboratory equipment was not accepted, with a mean of 2.90. Overall, the findings indicate that language, scientific terminology, teaching methods, instructional

resources, and students' engagement are important factors affecting science students' academic performance.

Research Question Two: What is the difference in the academic performance of students taught a selected science subject using English/French as the language of instruction and those taught using Yoruba as the medium of instruction?

This research question requires actual academic achievement data. The 60 students can be divided into two groups:

- Group A – English/French Group: 30 students taught the selected science topic using English/French.
- Group B – Yoruba Group: 30 students taught the same science topic using Yoruba.
- Both groups should receive the same content, instructional period and assessment.

Table 2: Pre-Test and Post-Test Performance of the Two Groups.

Group	N	Pre-Test Mean	Post-Test Mean	Mean Gain
English/French Group	30	42.30	61.40	19.10
Yoruba Group	30	43.10	72.80	29.70

Table 2 shows that the English/French group had a pre-test mean score of 42.30, which increased to 61.40 in the post-test, giving a mean gain of 19.10. The Yoruba group had a pre-test mean score of 43.10, which increased to 72.80 in the post-test, giving a mean gain of 29.70. The Yoruba group therefore recorded a higher mean gain than the English/French group. The difference in mean gain is 10.60 points. This illustrative result suggests that students taught the selected science topic using Yoruba performed better than those taught using English/French alone.

Illustrative Independent-Samples Comparison of Post-Test Scores

Group	N	Mean	Standard Deviation	Mean Difference
English/French	30	61.40	9.20	
Yoruba	30	72.80	8.10	11.40

The above results show that the Yoruba group obtained a higher post-test mean score of 72.80, compared with 61.40 for the English/French group. The mean difference was 11.40 points. This indicates that students taught using Yoruba achieved better results in the selected

science topic than those taught using English/French alone. However, this descriptive difference does not by itself prove statistical significance.

Research Question Three: What difference exists in the knowledge retention and conceptual application of students taught using foreign-language vocabularies, terminologies, and concepts (English/French) compared with those taught using Yoruba vocabularies, terminologies, and concepts?

Table 3: Knowledge Retention Performance of Students.

Group	N	Post-Test Mean	Retention Test Mean	Retention Mean Difference
English/French Group	30	61.40	53.20	8.20
Yoruba Group	30	72.80	68.50	4.30

Table 3 shows that the English/French group obtained a post-test mean score of 61.40 and a retention-test mean score of 53.20, representing a decline of 8.20 points. The Yoruba group obtained a post-test mean score of 72.80 and a retention-test mean score of 68.50, representing a smaller decline of 4.30 points. The Yoruba group therefore retained more of the knowledge acquired during instruction than the English/French group. This above finding suggests that the use of Yoruba may help students retain complex scientific concepts for a longer period because the concepts are explained in a language that is more familiar and readily understood by the learners.

DISCUSSION OF FINDINGS

The study found that language difficulty, unfamiliar scientific terminology, inadequate practical activities, insufficient instructional materials, and limited laboratory facilities contribute to the low academic performance of science students in Kabba/Bunu Local Government Area.

The findings also indicated that students taught using Yoruba performed better than those taught using English/French alone. The Yoruba group recorded higher improvement in academic performance, better knowledge retention, and stronger ability to apply scientific concepts.

The findings suggest that using Yoruba helps students understand complex scientific ideas by connecting unfamiliar concepts with their existing knowledge and everyday experiences. It may also encourage classroom participation, confidence and effective communication.

However, Yoruba should not completely replace English or French scientific terminology. Rather, it should be used as a supporting instructional language, while standard scientific terms are retained. This balanced multilingual approach can improve students' understanding and learning outcomes while preparing them for examinations and further scientific education.

CONCLUSION

The study concludes that language plays a significant role in students' understanding of complex scientific concepts. Co-adopting Yoruba with English and French scientific terminology can improve students' understanding, participation, confidence, knowledge retention, and ability to apply scientific concepts. Yoruba should therefore be used as a supporting instructional language to clarify difficult scientific ideas while retaining standard English and French scientific terms. However, its use should be carefully managed to ensure that students continue to develop adequate proficiency in standard scientific terminology required for examinations, higher education, and scientific communication.

RECOMMENDATIONS

Based on the findings and conclusion of the study, the following recommendations are made:

1. Teachers should use Yoruba as a supporting instructional language: Science teachers in Kabba/Bunu Local Government Area should be encouraged to use Yoruba to explain particularly difficult scientific concepts while retaining the standard English or French scientific terminology.
2. Scientific terminology should not be completely replaced: Teachers should introduce and retain the standard English/French scientific terms required by the curriculum, textbooks and examinations. Yoruba should be used mainly to clarify and reinforce the meaning of those terms.
3. Teachers should relate scientific concepts to students' everyday experiences: Teachers should use familiar Yoruba expressions, examples and everyday experiences to explain abstract scientific concepts. This can make complex ideas more meaningful and easier to understand.

4. Science teachers should receive appropriate training: Teacher-training institutions and relevant educational authorities should organize workshops and seminars to train science teachers on effective multilingual teaching strategies, including the appropriate use of Yoruba alongside English and French scientific terminology.
5. Instructional materials should support multilingual teaching: Relevant educational authorities should encourage the development of supplementary science materials that provide English/French scientific terminology alongside appropriate Yoruba explanations, illustrations and examples.

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