

An Assessment of the Language of Instruction in Selected Senior Secondary Two Science Classrooms in Osun State, Nigeria

Mary Temiloluwa OSO

P.G Student, Department of English, Obafemi Awolowo University, Ile-Ife, Nigeria.

*Corresponding Author's mail: gbengamoso@gmail.com

Abstract

The role of language in education cannot be overemphasized because it is through this vehicle that instruction and information is passed from the teachers to the learners and without language, the act of educating learners would be a mirage. This justifies the reason why many studies have been conducted in examining the appropriate language of instruction in teaching pupils and students. The purpose of this study is to examine and discuss the appropriateness of complementing English with indigenous language(s) as languages of instruction in the dissemination of knowledge in English as Second language (ESL) classrooms. The study employed responses from two sets of questionnaires that were administered to 400 Senior Secondary School II students and 35 teachers who taught Mathematics, Biology and Chemistry. The teachers and student respondents were selected randomly from 12 Secondary Schools in 6 Local Government Areas of Osun State, Nigeria. The research design is self-constructed and explorative. The data were analysed using Statistical Package for Social Sciences (SPSS). The results revealed that students understood and performed better in their Science subjects when English language is complemented with their mother tongue. It was concluded that the bilingual medium of instruction is highly beneficial to the educational progress of Nigeria, therefore, the English language should be complemented with the Mother tongue in ESL classrooms. Though English is the official language in Nigeria, complementing it with the indigenous languages in ESL classrooms should not be seen as an unmodern and uncivilised practice, but seen as a way of creating a more comprehensive and effective language of instruction which employs the students' knowledge of their mother tongue to facilitate their knowledge in English. This study is limited to examining language of instruction in senior secondary science classrooms; therefore, further studies can examine the language of instruction in universities, polytechnics, colleges of education, technical colleges and other educational institutions.

Key Words: Language of Instruction, Appropriateness of Language, Science Subjects, Mother tongue, Bilingual Medium of Instruction

DOI: 10.7176/JEP/15-10-02

Publication date: September 30th 2024

1. INTRODUCTION

The issue of language of instruction has become a dicey and debatable issue especially among nations that have English language as their second language. This is because in the act of educating, the language used to convey knowledge to the students matters because that is the vehicle that conveys information from the teachers to the students. In Nigeria, the National Policy of Education [1] states that "the medium of instruction in the primary school should be the mother tongue or the language of the environment for the first three years and from the fourth year, English". Also, at the secondary school level, English medium of instruction is expected to be used. However, it has been discovered that the use of the mother tongue as a medium of instruction has been discovered to be of tremendous benefit to the students' academic performance.

Knowing the importance of language of instruction, it is imperative to find out if English as a language of instruction at the senior secondary school level is appropriate and effective in enhancing the teaching and learning of Science subjects considering its complexity in terms, concepts and nature. The term "appropriate" according to Olagbaju and Akinsowon [2] refers to the language that effectively captures and interprets all the aspirations of the teacher to the learner in a way that the learner best understands. Therefore, this study discusses the language of instruction that is appropriate and effective in dissemination of knowledge in ESL classrooms.

2. LANGUAGE IN EDUCATION

The importance of language in the human world cannot be overstressed because it is the vehicle through which people of diverse beliefs, culture and tribe communicate and interact. Simons and Fennig [3] confirmed it that “there are 7097 living languages in the world. In Nigeria, there are 527 languages which make it the most linguistically diversified country in Africa. Therefore, because of the linguistic diversity in Nigeria, there arises a need to assign some roles to various languages for selected languages to perform some specific functions at the local, state and national levels. Through the assignment of roles, the official language, national language, trade language, religious language and educational language are being selected. Among the various languages spoken in Nigeria, the three major national languages include Hausa, Yoruba and Igbo and the official languages are English and French.

In the aspect of education in Nigeria, the English language has been assigned the role of language of instruction from a later stage in primary education to tertiary education. At the primary level, the National Policy on Education [1] clearly states that “the medium of instruction in the primary school shall be the mother tongue or the language of the environment for the first three years and from the fourth year, English.” At the secondary and tertiary levels, though it was not explicitly stated what the medium of instruction should be, one can still deduce that the intention of the government is that English should be the medium of instruction considering the provisions of the National Policy on Education.

3. DEBATABLE ISSUE OF LANGUAGE OF INSTRUCTION

The fact that the language of instruction has been a debatable issue among scholars and researchers has brought into limelight the importance of language in education. The role of language in education cannot be pushed aside because it is through this vehicle that instruction and information are passed from the teachers to the learners and without language, the act of educating learners cannot be achieved. Amadi [4] sees language as the basic tool for acquiring knowledge which is very crucial to learning.

The rate at which secondary school students fail external examinations like West African Senior School Certificate Examination (WASSCE), National Examinations Council (NECO) and Unified Tertiary Matriculation Examination (UTME) is very alarming and this has been a major concern for educationists and linguists. It has been discovered that one of the major reasons for their failure is the inability of the students to fully understand the language of instruction that is used in the classroom. Therefore, understanding the language of instruction is very pivotal to the academic excellence of students.

At the primary level of education, many researchers advocated the use of mother tongue at the primary school level because it aids the academic performance and achievement of the pupils in all their subjects [5-13]. At the secondary level of education, researches have also been carried out on the language of instruction that is effective for teaching secondary school students. Some researchers are in support of the English language medium of instruction [14-16]. Some researchers are support of the Mother tongue medium of instruction [5, 17, 18] while some researchers are in support of the bilingual medium of instruction which implies complementing English with the Mother tongue as languages of instruction [19-23].

Now, the question that this paper centers on is “which language of instruction is more appropriate for teaching secondary school students in general using senior secondary two (SS II) science students in Osun State as a case study”. It has been discovered that though the English language as the language of instruction is very critical in the educational system of Nigeria, many secondary school students still find it difficult to understand the language, which results in underachievement in their subjects. Furthermore, in senior secondary schools, science subjects are known to be more difficult than Arts and Commercial subjects because the language of those subjects are more complex, technical, complex and knotty which makes students find it difficult to easily understand and comprehend. Therefore, the problem facing the senior secondary science students is not only the inability to understand English which is the language of instruction but also the inability to understand the difficult terms and concepts that are used in science subjects which are expressed in the English language that they find difficult to understand.

In view of this problem, it has been discovered that when the English language is complemented with students’ mother tongue, which is Yoruba in the case study, the students can have a deeper understanding of their science subjects even with their complex language. This is the reason why some secondary school teachers code-mix and code-switch between English and Yoruba in order to explain some concepts that the students do not understand in English to Yoruba for proper understanding. This act of code-mixing and code-switching English and Yoruba

has revealed that the English language is not the sole medium of instruction in reality at the secondary school level [4, 13].

Therefore, in the secondary school classroom setting, there is a diglossic situation in which both English and Yoruba exist side by side and each plays an important role in communication. This is what is called diglossia which occurs where two or more codes exist side by side in a bi/multilingual speech community in which case roles are assigned to different varieties of languages [8]. In this diglossic situation like the secondary school classroom setting, there are varieties of languages which function as high (H) variety and low (L) variety. English is the high variety (H) because it functions as the main medium of instruction in the secondary school while the Yoruba language is the low variety (L) because it complements the English language in the classroom interaction.

The act of complementing English with the students' mother tongue (Yoruba) should not be seen as a process of threatening the role of English as the approved language of instruction in Nigeria but it should be seen as the process of strengthening the English medium of instruction by employing the knowledge of the students' mother tongue (Yoruba) to facilitate their knowledge of English in their science subjects.

4. THE NATURE OF SCIENCE SUBJECTS IN SECONDARY SCHOOLS

The awareness of the vital role of science in national development has prompted both the developed and developing countries of the world to include science subjects in their school curricula to carry out various educational reforms in such areas [24]. This is why the NPE [1] stipulates that secondary school education should equip students to live effectively in modern age of science and technology. Science is a process for producing knowledge which depends both on making careful observations of phenomena and on inventing theories for making sense out of those observations [25].

Shapin [26] also defines science as the study of the physical and natural world and phenomena, especially by using systematic observation and experiment. The secondary school science subjects include Mathematics, Biology, Chemistry and Physics. The objectives of science education in Nigeria include the need to prepare students to observe and explore the environment, explain simple natural phenomena, develop scientific attitudes including curiosity, critical reflection and objectivity, apply the skills and knowledge gained through science to solve everyday problem in the environment, develop self-confidence and self-reliance through problem solving activities in science [27].

Rutherford [25] explains the nature of science which includes the following:

- i.) Scientific ideas are subject to change: In science, the testing and improving and occasional discarding of theories, whether new or old, go on all the time. This is because change in knowledge is inevitable because new observations may challenge prevailing theories. No matter how well one theory explains a set of observations, it is possible that another theory may fit just as well or better, or may fit a still wider range of observations.
- ii.) Scientific knowledge is durable: Although scientists reject the notion of attaining absolute truth and accept some uncertainty as part of nature, most scientific knowledge is durable. The modification of ideas, rather than their outright rejection, is the norm in science, as powerful constructs tend to survive and grow more precise and to become widely accepted. For example, in formulating the theory of relativity, Albert Einstein did not discard the Newtonian laws of motion but rather showed them to be only an approximation of limited application within a more general concept.
- iii.) Science cannot provide complete answers to all questions: There are many matters that cannot usefully be examined in a scientific way. There are, for instance, beliefs that by their very nature cannot be proved or disproved (such as the existence of supernatural powers and beings, or the true purposes of life). In other cases, a scientific approach that may be valid is likely to be rejected as irrelevant by people who hold to certain beliefs (such as in miracles, fortune-telling, astrology, and superstition).
- iv.) Science demands evidence: Sooner or later, the validity of scientific claims is settled by referring to observations of phenomena. Hence, scientists concentrate on getting accurate data. Such evidence is obtained by observations and measurements taken in situations that range from natural settings

(such as a forest) to completely contrived ones (such as the laboratory). To make their observations, scientists use their own senses, instruments (such as microscopes) that enhance those senses, and instruments that tap characteristics quite different from what humans can sense (such as magnetic fields). Scientists observe passively (earthquakes, bird migrations), make collections (rocks, shells), and actively probe the world (as by boring into the earth's crust or administering experimental medicines).

- v.) Science is a blend of logic and imagination: Although all sorts of imagination and thought may be used in coming up with hypotheses and theories, sooner or later scientific arguments must conform to the principles of logical reasoning that is, to testing the validity of arguments by applying certain criteria of inference, demonstration, and common sense. The use of logic and the close examination of evidence are necessary but not usually sufficient for the advancement of science. Scientific concepts do not emerge automatically from data or from any amount of analysis alone. Inventing hypotheses or theories to imagine how the world works and then figuring out how they can be put to the test of reality is as creative as writing poetry, composing music, or designing skyscrapers.
- vi.) Science explains and predicts: Scientists strive to make sense of observations of phenomena by constructing explanations for them that use, or are consistent with, currently accepted scientific principles. Such explanations theories may be either sweeping or restricted, but they must be logically sound and incorporate a significant body of scientifically valid observations. The credibility of scientific theories often comes from their ability to show relationships among phenomena that previously seemed unrelated. The theory of moving continents, for example, has grown in credibility as it has shown relationships among such diverse phenomena as earthquakes, volcanoes, the match between types of fossils on different continents, the shapes of continents, and the contours of the ocean floors.

The importance of science subjects in secondary schools cannot be overemphasized. According to Centre for Education in Science and Technology [28], its importance is categorized into two aspects which include:

- i.) Knowledge: The teaching of science offers students the ability to access a wealth of knowledge and information which will contribute to an overall understanding of how and why things work like they do. Science is able to explain the mechanics and reasons behind the daily functioning of complex systems, which range from the human body to sophisticated modern methods of transport. Children and students are able to use this knowledge to understand new concepts, make well-informed decisions and pursue new interests. Science also helps to provide tactile or visible proof of many facts we read about in books or see on the television; this helps to increase understanding and helps children and teenagers to retain that information.
- ii.) Inspiration: Many students find science extremely inspiring and interesting. Science instills a sense of intrigue and enables students to develop understanding and form questions based both on the knowledge they already have and the insight they wish to gain in the future. Students who excel in science lessons are likely to develop a strong ability to think critically.

4.1 THE NATURE OF MATHEMATICS AS A SCHOOL SUBJECT

Shashidhar [29] states that Mathematics is a subject that seems driven mainly by logic and reason which is not subject to opinion or interpretation. Rutherford [25] also agrees to this fact by stating that Mathematics relies on both logic and creativity, and it is pursued both for a variety of practical purposes and for its intrinsic interest. For some people, and not only professional mathematicians, the essence of mathematics lies in its beauty and its intellectual challenges which Shashidhar [29] calls beauty and elegance. For others, including many scientists and engineers, the chief value of mathematics is how it applies to their own work.

Rutherford [25] explains the nature of Mathematics which are as follows:

- i.) Mathematics is the science of patterns and relationships. As a theoretical discipline, mathematics explores the possible relationships among abstractions without concern for whether those

abstractions have counterparts in the real world. The abstractions can be anything from strings of numbers to geometric figures to sets of equations.

- ii.) Mathematics is also an applied science. Many mathematicians focus their attention on solving problems that originate in the world of experience. They too search for patterns and relationships, and in the process they use techniques that are similar to those used in doing purely theoretical mathematics.

Because mathematics plays such a central role in modern culture, some basic understanding of the nature of mathematics is requisite for scientific literacy. To achieve this, students need to perceive mathematics as part of the scientific endeavor, comprehend the nature of mathematical thinking, and become familiar with key mathematical ideas and skills. Shashidhar [29] also states that a good student of mathematics at school enjoys the subject in part because he does not need to resort to memorization and can derive everything from first principles.

Mathematics as a subject deal with figures, signs, symbols, diagrams, shapes, letters, formulas, theories and equations. For a student to have good understanding of mathematics, he/she has to be familiar with all basic concepts of mathematics. Language plays an important role in the teaching of this subject because it is through this vehicle that teacher explain the basic mathematical principles to the students which can make the teacher to use only English or Yoruba or mix both English and Yoruba together to be able to adequately explain the knotty and difficult aspects of the subject. In Mathematics, there is a need to interpret symbols, signs and figures into simple language which will make the analysis to be much easier. Therefore, a student who is language deficient may not be able to interpret the symbols and signs into the appropriate language which leads to woeful performance in tests, assignments and exams. For instance,

- i.) $2+5 \times 7$ means 2 should be added to 5 and the answer should be multiplied by 7,
- ii.) $8 > 5$ means 8 is greater than 5.
- iii.) 60% of 10,000 means 60 divided by 100, then the answer multiplied by 10,000.

Therefore, for students to be successful in Mathematics, there has to be a correct interpretation and translation of the mathematical symbols and signs into simple English language. Also the teacher can as well explain knotty mathematical questions with Yoruba language in addition with English which is practiced in some secondary schools especially in public secondary schools.

4.2 THE NATURE OF BIOLOGY AS A SCHOOL SUBJECT

Biology is one of the science subjects that senior secondary school students offer at the senior levels in the Nigerian secondary schools. Biology pervades literally every field of human endeavor and plays a fundamental role in educational advancement [30]. This is seen in all the technological advancement in the world today, which is because of scientific investigations. Biology is the science of life [31]. Odogwu [32] pointed out that the teaching of biology is important because it equips the students to comprehend the world around them and equips them with necessary skills to build a progressive society. It also provides a platform for teaching students the ability to apply learning of science concepts and principles in solving every day's problems.

The NPE [33] in the National curriculum for Senior Secondary School volume 3 Science stated the cardinal objectives for Biology which include:

- i.) Adequate laboratory and field skills in Biology;
- ii.) Meaningful and relevant knowledge in Biology;
- iii.) Ability to apply scientific knowledge to everyday life in matters of personal and community health and agriculture and;
- iv.) Reasonable and functional scientific attitudes.

Biology as a subject has a lot of concepts, terms and descriptions which are sometimes abstract that requires the use of diagrams and charts to explain or sometimes practical which can be experimented in the laboratory. There are some botanical and biological terms that may be difficult for a student to understand due to their complexity in pronunciation, spelling and description which makes the subject look difficult and complex for the students. Some of these biological concepts and explanations may be hard for the students to understand in English which may cause the teacher to translate and explain further in Yoruba language for proper understanding. Therefore, the teacher should explain the concepts and terms for the students in simple English language and if they don't understand some knotty terms and names, the teacher can use Yoruba to explain further so that there can be adequate understanding of the subject.

4.3 THE NATURE OF CHEMISTRY AS A SCHOOL SUBJECT

Chemistry is the study of matter, anything that has mass and occupies a space. Edomwonyi & Aava [34] states that Chemistry education has been identified to be one of the major bedrocks for the transformation of our national economy, and hence must be accorded adequate attention. Within the context of science education, Chemistry has been identified as a very important science subject and its importance in scientific and technological development of any nation has been widely reported. According to NPE [33] in the National curriculum for Senior Secondary Schools volume 3 Science, the objectives for Chemistry include:

- i.) To facilitate a transition to the use of scientific concepts and techniques acquired in Integrated Science with Chemistry;
- ii.) To provide the students with basic knowledge in chemical concepts and principles through efficient selection of content and sequencing;
- iii.) To show chemistry in its inter-relationship with other subjects;
- iv.) To show chemistry and its link with industry, everyday life, benefits and hazards and
- v.) To provide a course which is complete for pupils not proceeding to higher education while it is at the same time a reasonably adequate foundation for a post-secondary chemistry course.

Chemistry is a subject that deals with a lot of theories, mathematical calculations, laws and concepts, tables, experimentations which are sometimes abstract that is left to the imagination of the students and sometimes practicalized in the laboratory. The registers and terms that are used in chemistry are sometimes complex and difficult to understand by the students which might make some topics to appear difficult for the students to tackle. In this situation, the language of instruction used by the teacher should be the one that will be simple and easy to understand by the students. This is why some teachers after teaching with English language then translate some knotty ideas and concepts into Yoruba language in order for the students to properly decode what the topics are. This makes the subjects to be less difficult for the students and leads to good performance in tests, assignments and examinations.

Therefore, when the nature of science subjects is considered, it is discovered that the language, terms and registers used are sometimes not every day's language that can be easily understood by the students but are sometimes are complex and difficult to interpret. Therefore, the teacher when teaching science subjects have to teach in simple English and sometimes translate some points, term and concepts that are difficult to understand in Yoruba so that the students can understand these subjects because it is easier for the students to recollect and remember some certain concepts in their mother tongue and then translate the knowledge into English language. This will make the subject to more easy for the students to pass their examinations and result for the success and academic excellence.

In conclusion, having considered the nature of science subjects in senior secondary schools, it is advisable that English should still maintain the role of the major language of instruction but in addition, the mother tongue (Yoruba) should serve as a complementary language of instruction in order to enable the students to have a deeper understanding of the science subjects they are been taught considering its complexity and knottiness of their terms, registers and concepts.

5. DATA ANALYSIS

5.1. Background Information of the Data

The study used both primary and secondary sources of data. The primary source of data comprised responses from two sets of questionnaire that were administered to 400 Senior Secondary School II (SS 2) students and 35 teachers who taught Mathematics, Biology and Chemistry. The respondents were selected randomly and purposively from 12 Secondary Schools in six local government areas (L.G.As) of Osun State. The design of the questionnaire was explorative in order to investigate on the subject of language of instruction used in the selected secondary schools. The names of the local government included Ife East local government, Ife North local government, Ilesa West local government, Ede North local government, Ayedaade local government and Osogbo local government.

The sampling technique used was Purposive Random Sampling. The sampling technique is purposive because the two categories of secondary schools (private and public) were chosen from each of the Local Government Areas used in the study. The data collection instruments were questionnaires on the assessment of the language

of instruction in selected Senior Secondary Two (SS II) classrooms in Osun State and observation of classroom interactions. The data were analysed using Statistical Package for Social Sciences (SPSS).

5.2 Analysis of Questionnaire

Research Question 1: What language do students understand better when being taught the selected Science subjects?

Table 1: Teachers' Response on the language the students understand better in their subjects

	Yes (%)	No (%)	Total (%)
My students understand my subject better when I teach in English	19 (54.3%)	16 (45.7%)	35 (100%)
My students understand my subject better when I teach in Yoruba	11 (31.4%)	24 (68.9%)	35 (100%)
My students understand my subject better when I teach both in English and Yoruba	29 (82.9%)	6 (17.1%)	35 (100%)

From Table 1 above, 82.9% of the teachers said their students understood their subject better when they taught in both English and Yoruba. This means that from the teachers' point of view, it was when they taught their students using the bilingual medium that they understand better.

Research Question 2: What language do students perform better when being taught the Science subjects?

Table 2: Teachers' Response on the language the students perform better in their subjects

	Yes (%)	No (%)	Total (%)
My students perform better in my subject when I teach in English	19 (54.3%)	16 (45.7%)	35 (100%)
My students perform better in my subject when I teach in Yoruba	10 (28.6%)	25 (71.4%)	35 (100%)
My students perform better in my subject when I teach both in English and Yoruba	28 (80%)	7 (20%)	35 (100%)

From Table 2 above, 80% of the teachers said students performed better in their subjects when they taught in both English and Yoruba while 20% of the teachers said students did not perform better in their subjects when they taught in both English and Yoruba. This implies that when the students understand their subjects when they are taught in both English and Yoruba, then they will definitely perform better in the same language that they understand better in their subjects. This finding corroborates Osungbemiro, Olaniyan, Sanni and Olajuyigbe [22] that the students who were taught in Yoruba language performed significantly better than those who were taught in the English language only.

Research Question 3: What language do the teachers explain difficult topics to the students?

Table 3: Language used to explain difficult topics from teachers' response

	English (%)	Yoruba (%)	English and Yoruba (%)	No Response	Total
Teachers' response on Language used to explain difficult topics	8 (22.9%)	6 (17.1%)	21 (60.0%)	Nil	35 (100%)

From Table 3 above, 60% of the teachers used both English and Yoruba to explain difficult Mathematics, Biology and Chemistry topics. This implies that the child's mother tongue is the best language to explain difficult topics and concepts because it is a language that the child was brought up in, used to and have acquired a high level of proficiency. This makes the teachers to translate whatever topic that looks difficult in English to the child's mother tongue knowing fully well that the child will understand perfectly well. This is the more reason why complementing the English with the MT cannot be brushed aside in any ESL classroom because what is the essence of teaching the students in a language that students cannot fully understand when another language they easily understand is available for use.

Research Question 4: What language enhances deeper understanding of the students in the selected subjects?

Table 4: Teachers' Response on Language that enhances deeper understanding of the students

	English (%)	Yoruba (%)	English & Yoruba (%)	Total (%)
Language that enhances deeper understanding of the students in my subject	11 (31.4%)	10 (28.6%)	14 (40.0%)	35 (100%)

From Table 4 above, 40% of the teachers said that the bilingual medium (English and Yoruba) enhanced deeper understanding of the students in their subjects. This reveals the importance of complementing English with the students' mother tongue in order to ensure a deeper understanding of the students.

Research Question 5: What language effectively captures and interprets the aspirations of the teachers to the students in the way the students' best understand?

Table 5: Language that can effectively capture and interpret the teachers' aspirations to the students in a way the students best understand.

	English (%)	Yoruba (%)	English & Yoruba (%)	Total (%)
Language that effectively capture and interpret my aspirations to my students in a way they best understand	9 (25.7%)	8 (22.9%)	18 (51.4%)	35 (100%)

From Table 5 above, 51.4% of the teachers said that the language that effectively captured and interpreted their aspirations to their students in a way they best understood was the bilingual medium of instruction (both English and Yoruba). This implies that the mother tongue plays a vital role in the process of teaching secondary school students because when it is complemented with English, it makes the process of learning and understanding much easier, less stressful, deeper and effective for the students and also makes the process of teaching of the subjects much easier, effective and rewarding. This is in line with Asiyanbola and Ademilokun [13] that if English cannot be eliminated as the principal language of instruction, let it be combined in a code-switching paradigm with the child's mother tongue in the dissemination of knowledge.

Research Question 6: Is the bilingual medium of instruction (complementing English with Yoruba) appropriate and effective in the teaching of Science subjects?

Table 6: Is the Bilingual Medium of Instruction appropriate and effective in the teaching of Science Subjects?

	English (%)	Yoruba (%)	English & Yoruba (%)
Language the students understand better in their science subjects	19 (54.3%)	11 (31.4%)	29 (82.9%)
Language the students perform better in their science subjects	19 (54.3%)	10 (28.6%)	28 (80%)
Language that enhances deeper understanding of the students in my subject	11 (31.4%)	10 (28.6%)	14 (40.0%)
Language used to explain difficult topics	8 (22.9%)	6 (17.1%)	21 (60.0%)
Language that effectively capture and interpret my aspirations to my students in a way they best understand	9 (25.7%)	8 (22.9%)	18 (51.4%)

From Table 6 above, the research questions answered above were brought together in order to answer the question if the bilingual medium of instruction (complementing English with Yoruba) appropriate and effective in the teaching of Science subjects. It was discovered that the bilingual medium of instruction (complementing English with Yoruba) was chosen because it makes the students to understand their subjects better, it makes the students perform better in their subjects, it makes difficult topics easier for the students to understand, it enhances deeper understanding of the students in their subjects and it effectively captures and interprets the teachers' aspirations to their students in the way the students' best understand. The fact that the bilingual medium of instruction (both English and Yoruba) was considered is not just a mere coincidence but a realistic display that the combination of English and Yoruba is the appropriate language of instruction in ESL classrooms.

6. CONCLUSION

The bilingual medium of instruction is the appropriate medium of instruction at the secondary school level because it enhanced better understanding and performance of the students in their science subjects. Therefore, complementing the English language is not threatening the role of English as the dominant language of instruction in Nigeria but strengthening it by employing the students' knowledge of their mother tongue to facilitate their knowledge in English. Going by the conclusion of Chisunum and Ejie [23] which states that "though the English language retains its dominant role in the educational delivery system of Nigeria, the use of mother tongue as the medium of instruction should be encouraged if permanent literacy is to be achieved in the primary and secondary schools", it can, therefore, be concluded that despite that English is highly beneficial to the educational progress of Nigeria, its complementation with the mother tongue of the child is never an aberration.

References

- [1] Federal Republic of Nigeria, "National Policy on Education", 6th ed, Federal Ministry of Education, 2013, pp 1-30.
- [2] Olagbaju, O.O., Akinsowon, F.I., "The Use of Nigerian Languages in Formal Education: Challenges and Solutions. Journal of Education and Practice, vol. 5, no.9, pp 123-127, 2014.
<https://www.iiste.org/Journals/index.php/JEP/article/view/11874>
- [3] Simons, G.F., Fennig C.D., "Ethnologue: Languages of the world", 12th ed, SIL International, <http://www.ethnologue.com>.

- [4] Amadi, E.A., "Parents' and Teachers' Preferred Medium of Instruction in Primary Schools in Enugu, Nigeria". *Educational Research and Reviews*, vol 7, no. 28, pp. 632-636, 2012. DOI:10.5897/ERR12/087
- [5] Fafunwa, A.B. "Education in Mother Tongue: The Ife- Primary Education Research Project (1970-1978)". University Press, Ibadan, 1989, pp 1-192.
- [6] Bamgbose, A., "Language and the Nation: The Language Question in Sub-Sahara African". Edinburgh University Press, 1991
- [7] Dutcher, N., Tucker, R., "The Use of First and Second Languages in Education: A Review of International Experience", Pacific Islands Discussion Paper Series, no. 1, pp. 1-63, 1997. <https://documents1.worldbank.org/curated/en/131161468770987263/pdf/multi-page.pdf>
- [8] Akindele, F., Adegbite, W. "The Sociology and Politics of English in Nigeria: An Introduction". O.A.U. Press, 1999, pp. 1-115.
- [9] UNESCO, "Mother Tongue Instruction in Early Childhood Education: A Selected Bibliography", UNESCO, 2008b.
- [10] Ojetunde, F. A., "Critical Evaluation of the Implementation of the Nigerian Language Policy at the Pre-primary and Primary School Levels". *Journal of Education and Practice*, vol 3, no 16, pp. 8-13. <file:///C:/Users/hp/Downloads/3689-5732-1-PB-1.pdf>
- [11] Oribabor, O.A., Adesina, A.D.O, "Mother Tongue Instruction and Academic Achievement of Pupils in Nursery Schools", *International Journal of Arts and Social Sciences*, vol 2, no. 5, pp. 131-133, 2013, <https://www.interestjournals.org/articles/mother-tongue-instruction-and-academic-achievement-of-pupils-in-nursery-schools.pdf>
- [12] Abidogun, B.G, Adebule, O.I, "Contributions of Mother Tongue Education in Early Childhood Education". *Annual International Interdisciplinary Conference*, vol 2, pp. 24-26, 2013. <file:///C:/Users/hp/Downloads/1337-Article Text-4340-1-10-20130712.pdf>
- [13] Asiyanbola, A.A, Ademilokun, M., "Literacy and Language of Instruction in Nigeria: A Case Study of Integrated Science Teaching in Selected Primary Schools", *Working Papers in Literacy, Culture and Language Education*, vol 4, pp 123-137, 2015. file:///C:/Users/hp/Downloads/WORKING_PAPERS_IN_LITERACY_CULTURE_AND_L.pdf
- [14] Jekayinfa, A.A., "Competence in the Language of Instruction as a Predictor of Performance in Secondary School History", *Ilorin Journal of Education*, vol 11, pp. 103-112, 1991. <http://www.unilorin.edu.ng/publications/jekayinoluwa/1.%20Competence%20in%20the%20Language.htm>
- [15] Oluwole D.A., "The Impact of Mother Tongue on Students' Achievement in English Language in Junior Secondary Certificate Examination in Western Nigeria", *Journal of Social Sciences*, vol. 17, no. 1, pp. 41-49, 2008. DOI:[10.1080/09718923.2008.11892632](https://doi.org/10.1080/09718923.2008.11892632)
- [16] Dearden, J., "English as a Medium of Instruction: A Growing Global Phenomenon, Phase 1", Department of Education, Oxford University, 2014.
- [17] Ojerinde, A. and Cziko, G.A. Yoruba Six Year Primary Project, June 1977 Evaluation, University of Ife, 1979.
- [18] Ezeudu, F.O., "Effects of Language of Instruction on Junior Secondary School (JSS) Students' Academic Achievement in Basic Science", *Journal of Education and Practice*, vol. 4, no. 19, pp. 44-60, 2013. https://www.academia.edu/es/57596370/Effects_of_Language_of_Instruction_on_Junior_Secondary_School_JS_S_Students_Academic_Achievement_in_Basic_Science
- [19] Igboanusi, H.S., "Language Attitude and Language Conflict in West Africa", *Enicrownfit*, 2001, pp. 1-212.

- [20] Amao, T.A., “Effects of Two mediums of Instruction on Primary School Pupils Classroom Participation Academic Achievement in Osun West Senatorial District”. Unpublished PhD Thesis, University of Ibadan, Nigeria, 2010.
- [21] Egwuogwu, C.B., “Teachers’ Perception of the Continued Use of English as the Language of Instruction in Nigerian Schools”, *Journal of the English Studies Association*, vol. 14, no. 1, pp. 29-43, 2011.
<https://api.semanticscholar.org/CorpusID:156022265>
- [22] Osungbemi, N.R., Olaniyan, R.F., Sanni R.O. and A.O., Olajuyigbe, “Use of Indigenous Languages as Media of Instruction in Teaching Biology: A Case study of some selected Secondary Schools in Ondo West Local Government, Ondo State, Nigeria”, *Cambridge Business and Economics Conference*, pp. 1-13, 2013.
<https://studylib.net/doc/7476317/use-of-indigenous-languages-as-media-of-instruction-in-te...>
- [23] Chisunum, I. and Ejie, M., “The Effects of Mother Tongue as a Complementary Medium of Instruction and the Performance of Students in Secondary Schools”, *Journal of Resourcefulness and Distinction*, vol. 8, no. 1, pp. 1-9, 2014.
<https://globalacademicgroup.com/journals/resourcefulness/The%20Effects%20of%20Mother%20Tongue.pdf>
- [24] Oriahi, C.I., Uhumuavbi, P.O., L.I. Aguele, “Choice of Science and Technology Subjects among Secondary School Students”, *Journal of Social Sciences*, vol. 22, no. 3, pp. 191-198, 2010.
<https://doi.org/10.1080/09718923.2010.11892801>
- [25] Rutherford, F. J., “*Science for all Americans*”, Oxford University Press, 1990, pp. 1-272.
- [26] Shapin, S., “*The Scientific Revolution*”, University of Chicago Press, 1996, pp.1-236.
- [27] Maduekwe, A.N., “Perspective on Teacher Education and ICTs in the Language Classroom: An Introduction to Educational Technologies in Education”, in *An Introduction to Information Technologies in Education*, Sibon Books Ltd, 2007.
- [28] Centre for Education in Science and Technology, *Importance of Science in Schools*,
<https://www.cest.org.uk/importance-of-science-in-schools/> (accessed Sept. 21, 2023).
- [29] Shashidhar, J., “The Nature of Mathematics: An Unfolding Story”. *Journal of Krishnamurti Schools*, vol. 9, 2005.
- [30] Chukwunyeremunwa, M.A., “Effects of Students Improvised Instructional Materials on Senior Secondary School Students’ Achievement in Biology”, Unpublished Masters’ Thesis, University of Nigeria, Nsukka, 2013.
- [31] Ogunleye, B.O., “Evaluation of the Environmental Aspect of the Senior Secondary School Chemistry Curriculum in Ibadan, Nigeria”, Unpublished Ph.D. Thesis, University of Ibadan, Nigeria, 2002.
- [32] Odogwu, H.N., “The School Museum Strategy for Enriching Biology Teaching”, *Journal of the Science Teachers’ Association of Nigeria*, vol. 30, nos. 1& 2, pp. 81-85, 1998.
- [33] Federal Republic of Nigeria, “National Policy on Education”, 4th ed., NERDC Publishers, (2004).
- [34] Edomwonyi-otu, L. and Avaa, A., “The Challenge of Effective Teaching of Chemistry: A Case Study”. *Leonardo Electronic Journal of Practices and Technologies*, vol. 10, no. 18, pp. 1-8, 2011.
<http://lejpt.academicdirect.org>