

## Case Study

# Review of the Effects of Language Diversity on Learning Biology: A Case Study of Nigeria Ethnic Languages.

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## Abstract:

This paper attempts to review the effects of language diversities in learning of biology, restricted its boundaries to Nigeria's ethnic languages, the paper research objectives such as investigating the language blend in a typical Nigerian biology classroom, ascertaining the pupils' preferences for their preferred language of teaching, assessing the disparity between pupils' academic performance when learning in English compared to Indigenous languages. The paper reviewed several previous works from scholars on different concepts revolving around the research study including; Educational Multilingualism, English as the medium of instruction, Use of indigenous languages as the medium of instruction, Issues associated with the use of English as the language of instruction, Issues associated with the use of indigenous languages as the language of instruction.

**Keywords: Biology, Indigenous languages, Language diversity, Medium of instruction.**

## Background of Study

In many regions of the world, the ethnic and cultural diversity of student populations is experiencing a shift. Increased cultural and ethnic variety in education has the potential to encourage human development, growth, and innovation<sup>45</sup>, but it also has the ability to introduce new obstacles. Beliefs are viewed as individual cognitive concepts in continual connection to behavior and the external environment, according to ideas from social cognitive theory<sup>5</sup>. There are bidirectional linkages between personal beliefs, behavior, and the external environment, but their impact and reciprocal consequences vary depending on the activity and the conditions <sup>5</sup>.

Within Nigeria, the individuals who speak the various indigenous languages are ethno - linguistic minority who are frequently the most impoverished. Indigenous language speakers appear to be underserved in terms of information, excellent education, social services, and substantial administrative involvement <sup>1</sup>. "Language is power: it means economic opportunity for those whose language is privileged by the state" (de Varennes, 2010, p. 268). Regrettably, most indigenous languages in Nigeria are under-recognized by the authorities and are hardly thriving. This implies that many Nigerians who cannot converse in English but depend on indigenous languages are rendered ineffective and unable to fully engage in national life. Knowledge and information are critical components of sustainable development, and they should be provided to the general societal nook and corner in a language that people comprehend. Language is required for information dissemination, shattering the bonds of ignorance, illiteracy, and intellectual poverty. Indigenous dialects are critical in a multicultural setting like Nigeria, where linguistic integration has forced all Nigerians to use English under the guise of progress<sup>38</sup>.

Basic scientific understanding is required for all sorts of modern progress. To comprehend, regulate, and successfully tap into and manage the natural environment's resources, it is necessary to obtain scientific information, which is a fundamental instrument for every nation's industrial and technical growth. Recognizing this clear truth, many nations, including Nigeria, have acknowledged the importance of science and technology and its developmental endeavors. According to Onu (2017), no nation can become great without science and technology. A conversation opined by Ibe et al. expressed the necessity for all Nigerians to have scientific and technical knowledge <sup>27</sup>. When Ibe stated that we exist in a world wherein technology and research have become an intrinsic part of the world's civilization, he informed the country of the importance of keeping up with the world's progress in science and innovation.

Biology is all about information that has been discovered via research, study, experience, and awareness. Such understanding is organized and methodical. The dynamism of biology is built on theory and experiment, as shown by a detailed examination of the development of biology studies across time. Biology is a natural science that investigates life and living organisms, encompassing their form, structure, function, growth, development, evolution, distribution, and scientific research<sup>23</sup>. The effective study of biology will help to enhance agriculture, that is part of the 17 sustainable development objectives that must be met by 2030.

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Despite the significance of Biology to the person and the nation, records reveal that students consistently do poorly in WAEC's SSCE 45. The condition has been shifting, but learners' performance has consistently been below average. In none of the three years, the average SSCE pass rate was less than 50%.

In second language acquisition (SLA) literature, the function of the first language (L1) in second language (L2) learning has been intensively contested and investigated. The phenomena are also known as 'codeswitching' and, more recently, 'trans-linguaging.' 28. According to research on the roles of teacher first language usage in facilitating learning, it is largely employed to express meaning when communication fails 30. However, intake and engagement researchers<sup>32</sup> have showed that communication difficulties may be resolved by improved intake and meaning bargaining without inevitably activating the usage of first language.

### **Statement of the Problem**

Nigeria as a whole is a multilingual and diversified country, with over 30 percent of the populace considered uneducated in 2022, according to marcotrends. According to Statista in 2022, the predominant languages expressed at households in Nigeria as of 2020 appear to indicate that 30.9 percent claim to speak Hausa at home, 17.4 percent claim to speak Yoruba at home, 9.5 percent claim to speak Igbo at home, and 12.5 percent claim to speak English at home, with the remaining percentage spread across various ethnicities and languages. This clearly shows that the proportion of Nigerians whose dominant language of cultural background is about 10% English based communication and the official language for communicating in the country is English, which implies that all administrative, institutional documents, communication, interactions, curriculum packages, and policy documents are and should be in English, this implies a challenge in the learning process. This study seeks to assess the impact of the three principal languages in the country and decide whether learning biology would be effectively aided by using the indigenous language of the learner's cultural background rather than a foreign language.

### **Purpose of the Study**

The goal of this study is to analyze the impact of linguistic diversity in biology instruction in Nigerian schools. To properly address this goal, the following objectives were created. They are as follows;

- To investigate the language blend in a typical Nigerian biology classroom
- To ascertain the pupils' preferences for their preferred language of teaching
- To assess the disparity between pupils' academic performance when learning in English compared to Indigenous languages.

### **Review of Related Literature**

The relevance of biology to society cannot be overestimated; it is a large subject with several divisions and topics. With approximately 500 different languages spoken there, Nigeria is one of the most linguistically varied nations in the world. English is the official language, however it is less common in rural regions and among those with lower levels of education. Due to the country's curriculum packages' insistence on using English as the primary language of instruction for Biology teaching and learning, this demonstrates how a substantial portion of the population is disadvantageous while learning biology. The learning of Science, including Biology, is now being improved by curriculum professionals from all around the world, including Nigeria, via numerous studies and researches. The review of literature will be done under the following sub-headings;

- Educational Multilingualism
- English as the medium of instruction
- Use of indigenous languages as the medium of instruction
- Issues associated with the use of English as the language of instruction
- Issues associated with the use of indigenous languages as the language of instruction

### **Educational Multilingualism**

In order to optimize engagement and minimize disruption, foreign language instruction has typically separated the target language. However, language separation ideologies have come under fire, and recent ideas have advocated for translanguaging approaches and argued that language borders should be loosened 20. A multilingual approach challenges the idea that languages should be kept separate and suggests that language learners are emerging multilingual speakers who draw on their entire linguistic toolkit while speaking and thinking 11. The significance of this viewpoint to language instruction is supported by a number of factors.

The inclusion of a multilingual approach and its ability to effectively handle the language and ethnic diversity in the classrooms are the first benefits. Students can grow to cherish their native languages and utilize them in their language training when they adopt a multicultural mindset 12. Second, by encouraging optimistic reactions and fostering the growth of linguistic and metalinguistic consciousness, the utilization of materials from the entire linguistic competence can improve language learning. Language consciousness is thought to have a favorable impact on attitudes as well as a number of language acquisition factors 9. Considering various linguistic levels (such as grammatical structures) or linguistic abilities (such as reading or writing) between

languages can help one increase their conceptual understanding 12. Third, the majority of students require English in order to interact with individuals who may or may not be native English speakers. The majority of the time, multiple languages individuals who are able to converse in many languages and who have built grammatical and conceptual compositions when studying a second, third, or even fourth language utilize English as a lingua franca. Therefore, the repertoires of multilingual speakers must be extensive. Last but not least, conceptual representations might be helpful while discovering new languages 13.

Studies already done, such the one by Lyster, Quiroga, and Ballinger (2013), indicated benefits. In Canada, Grade 2 students (ages 7-8) received explicit vocabulary training in both English and French as part of their trans-lingual educational intervention. Students in the experimental group scored noticeably higher on a test of language awareness that evaluated word derivation and deconstruction in French. Students in the test group who were English-dominant outscored their counterparts in the comparison group after the investigators adjusted for language superiority in the English measure. Similar to this, Arteagoitia and Howard (2015) reported encouraging results from a vocabulary training intervention carried out in the United States with kids in Grades 6–8 (11–14 years old) who spoke both Spanish and English. The goal of the program was to improve vocabulary and reading understanding in English through the usage of cognates between the two languages. The results indicated that understanding of Spanish cognates significantly improved both English vocabulary and reading proficiency.

However, as only two languages were used in the Lyster et al. (2013) and Arteagoitia and Howard (2015) investigations, their conclusions might not be applicable to classrooms where many different languages are spoken. Therefore, more research is required to examine the viability of trans-lingual scaffolding in settings with substantial language variety and time constraints imposed by pedagogical demands. Additionally, as these aspects of learning have not yet been covered, greater consideration needs to be given to the emotional results of such actions.

### **English as the Medium of Instruction**

English is unquestionably the world's largest lingua franca today, and it has become an important aspect of global learning. Higher education (HE) institutions throughout the world are progressively attempting to internationalize their institutions by implementing English as a language of teaching 36. In recent years, the phrase "English as a Medium of Instruction" or "English Medium Instruction" (EMI) has grown in use to describe these types of scenarios. It is critical to distinguish the term EMI from scenarios in which teachers merely use English as the medium of instruction in classrooms, as opposed to situations in which English is taught as a language in and of itself 36.

As a result, it should be noted that EMI is a term that refers to the use of English as a medium of instruction, not for students to learn about the English language itself, or at least also for which, students learn other, mostly unrelated subjects, such as coding, history, science, or any other subject, using English as a method of instruction. According to Dearden (2014b: 2), there appears to be a "rapid global change in non-Anglophone nations from English being taught as a foreign language (EFL) to English being the medium of instruction (EMI) for academic topics such as physics, arithmetic, geography, and biology 17."

In terms of practical implementation of English as Medium of Instruction courses in education, as previously said, they are largely and progressively being adopted in Higher Education. According to Macaro et al. (2015: 4), some trustworthy estimates in Europe "put the amount of graduate schools presently provided by EMI at around 60%." Additionally, an examination of data from Studyporals.eu reveals a substantial growth in the amount of English-taught courses available throughout Europe in recent years 34. According to the data, "the number of postgraduates taught fully in English increased from 3,701 at the end of 2011 to 5,258 in June 2013, a 42 percent rise happening in the surprisingly short space of one and a half years." 8. Europe appears to be the driving force in giving more and more English-taught courses to learners, but the development in enthusiasm in English as Medium of Instruction can undoubtedly be observed in other regions of the world as well. For instance, data reveal that in East Asia, specifically Japan, between 2003 and 2013, the number of colleges providing English as Medium of Instruction degrees increased by 50 percent (MEXT, as cited in Galloway et al., 2020). Another non-European example is Turkey, where surveys reveal that over 20% of Higher Education programs offer full or partial English as Medium of Instruction courses (Arik and Arik, as quoted in Ozer, 2020).

A teaching language is an essential aspect of education 44. It allows instructors and students to construct relevant explanations, make significant classroom relationships, and grasp the world 24. The recognition of English as a global communication language by multiple agencies cleared the way for personal improvement 18. English as a medium of instruction (EMI) is increasingly employed in institutions across the world as a result of education's globalization 43. On October 1, 1954, the Lyttleton Constitution came into effect and Article 114(1) specifically provided for English as the official language of Nigeria, with Hausa retaining its co-official status in the Northern Region (Odumuh 1993). English allows pupils to become more involved in their study. Indeed, it is the lingua franca of the postsecondary education system 35. Society increasingly requires graduates with 21st-century skills 29. However, due to evidence of variety and multiculturalism, many college students do badly in courses 42. The terms multiculturalism and cultural diversity are commonly utilized interchangeably. It addresses variety in ethnic, cultural, linguistic, economical, and intellectual terms 14. As a result, teaching strategies that stress integrated, learner-centered, and culturally relevant approaches while displaying understanding for students are becoming more prevalent 22.

## **Use of Indigenous Languages as the Medium of Instruction**

The medium of instruction, which is a part of status planning, is a political decision. It is in the hands of the governing elite<sup>1</sup> and, as such, is certain to be influenced by their perceived interests. These objectives may include the stabilization and maintenance of rule, the facilitation of the elite's admission into positions of power, modernization and nation-building, and the formation of a unified nation-state from various ethnic groupings<sup>15</sup>.

Studies have demonstrated that using first language (L1) as the medium of instruction (MOI) has a good influence on both subject acquisition and second or foreign language development. For instance, Bender (2006) claims that the L1 MOI policy tends to increase equity and access, enhances academic outcomes, and lessens repetition and drop-out rates of minority children in the Mali bilingual curricula, in which students are taught in their first language in the elementary grades with a gradual shift to French<sup>6</sup>. According to Bender (2006), the completion (1994-2000) pass percentage for pupils who transitioned from native dialects to French was 32% better than for students in the French-only curriculum. However, based on the viewpoints of local players, Bender believes that implementing the bilingual education program with inadequate teacher support and the exclusion of local stakeholders from the operational phase is difficult<sup>6</sup>. Ethiopian students who were taught in their Native language for the first eight years had significantly greater assessment scores in mathematics, biology, chemistry, and physics on the 2004-national assessment than students taught in English-medium instruction. Despite these good educational consequences, teachers, learners, and guardians in both Mali and Ethiopia have not wholeheartedly adopted bilingual/multilingual education (MLE) practices that emphasize the 'first-language-first' paradigm<sup>25</sup>.

The prevalence of English may be traced back to colonial and postwar legacies that favored global languages while underrating and under developing indigenous languages. It is also connected to the belief that universal English fluency is a significant signal of predicted economic progress in the world of globalization<sup>16</sup>. English proficiency is frequently assumed, with no or little provision given to facilitate language growth. Decades of study findings reveal that English medium of instruction serves as a barrier to involvement with the curricula for many kids living in places where English is not spoken outside of school<sup>2</sup>. Johnson and Swain (1994) refer to this as the 'Language 2 (L2) proficiency gap,' with other scholars claiming that it is one of the major equity challenges in the low-income countries, with consequences for social equality<sup>2</sup>.

## **Issues Associated With the Use of English as the Language of Instruction**

With the development of international expansion and commercialization of higher education, fueled by the advancing influence of modernization, English has progressively been implemented as the language of instruction in higher education around the world in nations where English is not the overall population's native language<sup>33</sup>. The use of English in education and learning among learners who are primarily second or foreign language learners has raised concerns regarding the impact of EMI on education and learning performance, as well as challenges around policy views and effectiveness<sup>31</sup>.

Because English is widely regarded as the language of globalization in higher education<sup>39</sup>, the majority of Hong Kong's universities and educational establishments continue to use English as the Medium of Instruction. For example, since 2004, the Chinese University of Hong Kong, whose primary language has always been Chinese since its inception in 1964, has gotten progressively bilingual by providing more programs in English<sup>33</sup>.

Even while the "bi-lingual and trilingual" language does not appear to have questioned the lengthy English as Medium of Instruction policy among Hong Kong universities and educational establishments, views and actual usage of the languages in instruction may be changing due to changes in the socio-political context. Such shifts may be exacerbated by the fact that many university learners now lack an acceptable level of English fluency to learn well in an English as Medium of Instruction setting, owing partly to the move from aristocratic to popular education. The dilemma of a contradiction between policy (English as Medium of Instruction) and practical reality (mixed-code of English and Cantonese) has persisted since before the beginning of the century, notably in scientific departments<sup>33</sup>. While only around 2% of the population of students had access to college education in the 1980s, that figure had risen to 18% by the mid-1990s<sup>26</sup> and had continued to rise. Since the turn of the last century, there has been a significant expansion in the variety of sub and degree programs provided by self-financing higher education institutions, in line with the government strategy to raise the level of participation in post-secondary education of the appropriate age group. As a result, for many postsecondary students, English as Medium of Instruction may provide difficulties rather than a competitive advantage.

The use of English as an instructional tool not only does not offer but also hinders students' development of information, skills, attitudes, and understanding in the many topics of the curriculum. It presents a roadblock since it causes students to get tongue-tied and hence unable to effectively engage in learning<sup>41</sup>.

## **Issues Associated With the Use of Indigenous Languages as the Language of Instruction**

There is growing agreement among language education experts that there is a necessity for a concerted effort to implement and expedite the trend of language intellectualization in emerging languages such as those of Africa. The intellectualization of African dialects should be viewed in the perspective of national infrastructural development<sup>21</sup>. In these evolving languages,

intellectualization is a means of providing more specific and accurate forms of communication, particularly in sectors of modern life, such as scientific and technological, government operations, college education, current culture, and so on 21. While language intellectualization may occur organically, there is a widespread belief among language policy experts that there is a need for an intentional and determined effort to expedite and facilitate the efficiency in emerging languages like those of Africa. Language intellectualization, while not expressly mentioned, becomes a part of language planning in this context 15.

It is a well-known fact that languages evolve via use. Cooper (1989) asserts that form always follows function. The primary goal of indigenous language development in South Africa is to prepare them for use in modern fields such as public service delivery, research, and innovation. To strengthen the use of indigenous languages in official government correspondence, the government is enacting legislation that will require each government organization to utilize at least four languages in written correspondence. The most important obstacle in the intellectualization of African languages in Africa is the unfavorable mentality of their inhabitants toward their languages, particularly as a medium of instruction. As a result, many users of these languages perceive little value in employing them in education 39. English and Afrikaans, on the other hand, are seen as languages of better mobility or a passport to career chances in the nation. Despite the fact that the Constitution says that each student has the freedom to select the language of teaching, English remains the exclusive medium of communication in all mostly African institutions. The operational domains of African languages have not been sufficiently broadened to allow learners to appreciate the value of selecting an African language as a medium of communication. Indigenous languages are only employed as a medium of education in the lower primary grades. English is the dominating language in upper classes, as well as at secondary and university levels. Failure to employ African languages as a medium of instruction at these stages of education will undoubtedly hamper their intellectualization. This notion is supported further by the employment of Afrikaans as a medium of education, which has considerably led to the intellectualization of this language. This is supported by the fact that several specialized scientific organizations and institutions in Africa are completely committed to research and teaching in Afrikaans 7. The use of a language as a medium of instruction creates a need for new terminology and also allows them to be used in relevant settings, such as publications, teaching, research studies, and so on.

Several studies have found that the purposeful and conscientious intellectualization of African languages is frequently hampered by organizational or logistical issues 1. Individuals, as well as governmental, quasi-governmental (parastatal), and non-governmental organizations, are involved in Africa's planned language intellectualization.

## **Conclusion**

Within Nigeria, the individuals who speak the various indigenous languages are ethno - linguistic minority who are frequently the most impoverished. Indigenous language speakers appear to be underserved in terms of information, excellent education, social services, and substantial administrative involvement<sup>40</sup>. Although English is regarded as the official language of the country, the use of indigenous languages stems through every breadth of the country in their different regions. It is a well-known fact that languages evolve via use. Cooper (1989) asserts that form always follows function. The primary goal of indigenous language development as seen in South Africa is to prepare them for use in modern fields such as public service delivery, research, and innovation. To strengthen the use of indigenous languages in official government correspondence, the government is enacting legislation that will require each government organization to utilize at least four languages in written correspondence can be extrapolated for use in the Nigeria educational system also.

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