LEARNING THE SCIENCES IN IGBO LANGUAGE.

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Abstract

This article focused on the use of Igbo language in the teaching and learning of integrated science at the junior secondary school (JSS) level, using performance test. The corpus comprising students' tape-recorded responses to questions on integrated science is analysed by the application of psycholinguistics method. The research for this article was done in live selected secondary schools in urban and rural communities in Anambra State. Igbo language has no inherent linguistic deficiency which renders it inadequate for teaching and learning the sciences. The National objectives on scientific and technological development could be best achieved through an effective national policy making English and Nigerian languages the media of instruction at all levels of education. Hausa, Igbo and Yoruba currently serve as official languages at JFK airport, in the United States of America.

Introduction

A solid foundation in science and mathematics is indispensable in the development of modern technology. Language is crucial to the learning process. Student's performance in the sciences, is. therefore, to a higher degree, dependent on their mastery of the medium in which science and mathematics are taught at the three levels of the nation's educational system. Learning science and mathematics in a foreign language poses additional problems to the learner who must first of all master the language of instruction in order to understand the subjects. Time spent in learning, clearlv outweighs the rate of understanding. It follows that no foreign language is as efficient as the mother tongue in the transmission of knowledge, and no policy on the language of education can afford to disregard this fact without serious consequences to the mental and academic achievements of the students (Dakin, 1968). In Nigeria, it is argued that students' poor academic performance and aversion for the sciences are partly due to their mediocre know ledge of the English language.

On accession to political independence in the early sixties, many African and Third-world nations erroneously thought that economic, scientific and technological development would be accelerated by the continued use of the language of their erstwhile colonial masters as the privilege medium of instruction. After over a century of using English in education, Nigeria still imports basic technology not only from the Western World but also from China and India. Until recentlv, Indian nationals controlled the teaching of science and mathematics in most Nigeria's secondary and tertiary institutions of learning. Among Third-world nations, the rapid, systematic, scientific and technological development of India derived from her pragmatic leaders the foremost of whom was M.K. Ghandi. Gltandi realised early enough, the inherit disadvantages of developing science and technology relying on a foreign medium of instruction - English language (E/eani. 1975). As a solution, the use of Indian languages in education became inevitable. By 1972, practically all college level instruction was to be given in one of the fourteen regional languages (Deutsch. 1975). The current phenomenal industrialization of China, India and Japan have conclusively shattered the myth that English, French and German are the only languages suitable for teaching and learning of the sciences which facilitate scientific and technological development.

It is often argued that European language are preferred to African languages in the study of the sciences because African language lack scientific precision and hardly express notions and concepts with mathematical accuracy required of a language of scientific inquiry (Laraki. 1983). The proven syntactic, morphological and semantic characteristics of some European languages, though important in themselves are not the monopoly of these languages. The science of linguistics has shown that there is no human language which within its dynamics, is incapable of adopting to new realities, and of expressing any human experience whenever it is required to do so. A part of Einstein's,works has been translated into Wolof, (an African Language spoken in Senegal), and the

translator had no serious problem expounding the theory of the relativity of time and space (Poth. 1979).

The thrust of this article is on the use of Igbo language in the teaching and learning of integrated science at junior secondary school (.ISS) level in Anamhra State, using performance test. I he corpus composed ot tape-recorded answers given by the participating students are analysed by psvcholinguistic method (Chomsky, 1971; Mehler and Noizet. 1974). T he analysed corpus shows that there is nothing linguistically inherent in Igbo language to render it unsuitable for the teaching and learning of science and mathematics.

experiment

Society for the Promotion of Igbo Language and Culture (SPII.C) is specifically denoted to Igbo terminology for the study of natural and applied sciences. However, there is need to validate the psychological reality of this terminology because, mere availability of scientific vocabulary in Igbo is no guarantee of its correct usage in actual speech or writing (SPll.C. 1982). To conclude otherwise is tantamount to erroneously equating know ledge of a language to vocabulary.

The practical work for this article was done in live selected secondary schools in urban and rural communities in Anambra State. Participants comprised two hundred junior secondary school (JSS II) students in integrated science class. All the students were of Anambra State origin having an average age of 14 years. Prior to this experiment, the students were taught integrated science lessons in English. In other to correlate the effects of the language spoken at home and performance in school work, each student was required to indicate the language(s) spoken at home, if different from the medium of instruction. One hundred and ninety-eight or (99%) of the students indicated that they spoke Igbo at home, w hile one or (0.5%) of the students used English at home. One student provided no information.

The participating students were required to answer orally and strictly in Igbo. five questions on integrated science, in sixty minutes. The questions, and students' responses which were simultaneously tape-recorded and then transcribed into working language are presented in fable 1- of corpus, below.

Table I: Corpus.

Questions/Subjects Biology	Responses/Level of language used by the students	Acceptable level of language in Igbo
1. Weputa odi iclie ato di n'etiti ihe di ndu na like adighi ndu.	Nke mbit movement like ndi oyilxi na akpo movement, otu ha si-aga ije Dika... matin kita a...	Ihe ato di iche n' etiti ihe di ndu na ihe adighi 1 bu ndi -a ekumnme. ngaghari na akumkpuru.
Chemistry 2. kowaa ofu ihe ndi ahu na- eme mgbe etinyere nnu nri n'ime mmiri magharia	Mgbe 1 tinyere nnu n'ime mmiri gbarughaa ya a bia nnu agaa nodu n"ike mmiri	E tinye nnu nri n'ime mmiri gba rughaa, nnu ede tie ya na mmiri aburu out.
Physics 3. Kowaa ihe ndi ahu na-enie mgbe a kporee bolu abuo ha otu na aro n'elu tebulu ka ha jiri out ukw'ii oso gakwuru on we ha...	Ihe nke a na-akowara anyi bu dika I weta ball abuo kitaa, 1 kporee ya n'elu tebul, 1 ya ama na o bu force ka ha ga-eji metukorisi oinve ha onu ...	A kporee bolu abuo, jirikwa out ukwu oso n'elu tebulu. ha zukota, ha akwusi. n'ihi na lima (ike) ha abtio ha. IJgbua ha ga-eji nwayoo gaa azu nke gosiri na lima ha ebelalala...

Analysis Of Corpus

General obsen aliens

In answering the questions the students were expected to encounter problems expressing scientific notions and concept in Igbo language. The most outstanding problem was the student's inability to effectively use in Igbo as the only medium of expressing scientific notions and concepts

required. This problem could have been avoided if (he students had a good command ol lebo grammar. In such a situation, the use of English terms would have been minimal. The participants' mediocre performance did not result from the so-called inadequacy of Igbo terminology, because transcription of their responses showed a tendency to use English words in cases where Igbo terms were available and could have been conveniently used. A summary of such instances which also included recourse to English or Pidgin-liny I ish terms is presented in fable 2, below.

Table 2: Students' Preference for English Or Pidgin Terms

English or Pidgin-English Terms	Expressions Available in Igbo
for example	N'ima atu
force	Ike, uma
Cassava	Akpu, mgbaduga
Movement	Ngaghari
Reproduction	Akumkpuni
Rice	Osikapa (llausa: Shinkafa)
Living	Di ndu, nwere ndu
A laikia	Imasi
Echenjie	Igbanwo
Testie	lie
Mixkoro	Igwako

Psychological Problem

Viewed from a sustained tendency to "validate" lgbo terms with English expressions, (he students gave the impression of having a psychological problem transmitting scientific notions and concepts in Igbo language. Even in cases where they used suitable Igbo expressions, some of the students quickly "corrected" themselves by recoursing to incessant code switching and circumlocution. This psychological behaviour of (he students tended to implv that lhc\ considered Igbo as being inferior to English language in expressing scientific notions and concepts. Here arc some examples:

(i) Ngaghari. like ndi oyibo na-akpo "movement".

(ii) Ekumume. like ndi oyibo na-akpo "respiration".
(Respiration, which the English call respiration).

(iii) Akpu like ndi oyibo na-akpo "cassava"
(Cassava which the English call cassava).

Borrowed Words

It was particularly difficult for the students to select and use words from English or other languages which have formed part of Igbo terminology. Some of this transformed vocabulary are shown in Table 3, below.

Table 3: Transferable Scientific Vocabulary

English	Igbo
Electricity	Eletriki
Beaker	Bika
Carbondioxide	Kabon
Kilogramme	Kilo
Litre	Eita
Metre	Mita

The students were also unable to express the different types of energy such as mechanical, chemical nuclear and solar energy. These foreign words and notions are dormant in Igbo because the language is not used in teaching and learning the sciences. I urtherniore. the method of transmitting knowledge in traditional African society contributed largely lo retarding the creation and dissemination of scientific vocabulary. In most parts of the continent, native artisans and doctors practised their professions in secret. The nature of these professions and terminology used in their practice is still shrouded in secrecy.

Impediments To Dissemination Of Scientific Vocabulary In Igbo Language.

Dike (1974) clearly illustrated some of the negative tendencies whereby among the Igbo, only Awka indigenes excelled in smiting. They successfully monopolized the trade by developing secret codes aimed at denying others any knowledge of the trade. This retrogressive attitude seriously impeded w ider propagation and development of scientific vocabulary in Igbo, more so, because some forms of traditional technology provided the basis for modernization.

Again, one of the factors which hinder the expansion and popularisation of abstract notions for example, forms of energy (mechanical, chemical, nuclear, solar) in Igbo, is the absence of concerted and sustainable'policy of incorporating notions to languages. Thirdly, the development of Igbo into a modern language of science is hampered by the fact that Igbo is not used in areas where innovations (system of administration, industrial fabrications, business and education) brought about by cultural contacts are praticalised. Since the world experiences rapid and constant technological evolution, any language which fails to keep pace with these inescapable trends in modernization is susceptible to atrophy.

It was to the greatest advantage of Luropean language that they have over the years developed registers of science and technology, because the philosophy upon which the models for.teaching and learning were based, demanded that conceptual operations be integrated with the vocabulary and syntax of language of intellectual producers (both, 1979). Igbo language is yet to be endowed with a similar linguo-phisophical models for academic pursuits.

In spite of this deficiency, the abundance of frequency vocabulary places Igbo on a significant linguistic advantage. For example, none of the verbs required to state the notions or concepts for answering the questions in the experiment above was lacking. It is necessary to underscore the fact that Igbo has terms which are essential for scientific reasoning such as: (na mbit) firstly, (tutu) before, (e mechaa) after, (udoli) simultaneously, (n'ihi, maka na) because. These w'ords are important because in teaching and learning the sciences the use of these grammatical words which ensure the progression of a logical process, is inevitable. A research scientist must use these terms to describe the succession of the scientific procedure thus: one does this first... or simultaneously ... because... if one does not do it, it will... because of...

Conclusion

This article has endeavored to demonstrate that the sciences can be taught and learned in Igbo language. 'Die problems which teachers and students encounter in expressing scientific notions and concepts in Igbo are not inherent in the language. On the contrary, such linguistic impediments relate to teachers' and students' average knowledge of Igbo grammar. Right from primary school, students should be able to describe and analyse the internal structure of Igbo language. Above all, they ought to be able to delineate every detail of their natural environment using the mother tongue.

The early stages of the child's formal education represent the most auspicious periods of developing original and sustainable increase in science and mathematics. A national policy on medium of instruction which subjects students to grappling with the frustrating and poorly rewarding experience of mastering English language as a prerequisite to profitable learning experience, conspires to dampen students' interest in the sciences right at the prime stages of their formal education. In view of the low academic achievement associated with learning the sciences in Fnglish. the article posits that the national objectives on science and technology could be best attained by the use of Nigerian languages and English in education, from the primary through university levels of formal education.

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