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Journal of Nigerian Languages and Culture



Volume 10, No 2 November, 2008

ISSN 1595-4730

Published by
Association for promoting
Nigerian Languages and Culture

Journal of Nigerian Languages and Culture (JONLAC)

ISSN 1595 – 4730

Vol.10 No.2

November, 2008.

Published by
Association for Promoting Nigerian
Languages and Culture (APNILAC)

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Printed in Nigeria by:

SAN PRESS LTD.

182 Agbani Road,

Enugu, Enugu State

08033169079, 08051399666

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LOCALISING SCIENCE TEACHING IN THE INDIGENOUS LANGUAGE: YORUBA
LANGUAGE EXPERIENCE

BY

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ABSTRACT

This paper advocates for science teaching in major Nigerian languages. It attempts to review the science curricula at all levels in terms of structural arrangement and instructional strategies. It also peeps into obstacles of implementation. The authors suggested a proposal that would ensure the tenacity of mother tongue in science teaching in Nigeria.

INTRODUCTION

In developed countries of the world teachers teach science, technology, mathematics and several other subjects to their pupils or students in the native language otherwise known as mother tongue. The situation in the third world countries is a different scenario as the mother tongue has been relegated to the background. The reason for this observation is that western education was brought by the colonial masters. The metropolitan powers' European languages of the colonial master were therefore legalized as the official lingua franca in those countries.

Okafor (1991:47-56) observed that most African countries who use English (a second language) as a medium of instruction in their schools are increasingly becoming aware of the effect of language deficiency on the performance of their students in science and mathematics. Otuka (1991:11, 14) also noted that a large proportion of the pupils in the primary schools in Nigeria

and Mathematics lesson given in a non-mother tongue would miss a great deal of the lesson due to difficulty of understanding the language rather than the scientific content.

Olarewaju (1991:1-6) have showed that students achieved more in science when taught in their mother tongue. In 1953, the United Nations Educational Scientific and Cultural Organization (UNESCO) recommended that the most effective means of teaching any child was the mother tongue. The mother tongue policy in Nigeria also stipulated unequivocally that the medium of instruction in all pre-primary and the first three years of primary education shall be the mother tongue or the language of the immediate community.

Before independence, Fafunwa (1983) noted that three major Nigerian languages (Hausa, Igbo and Yoruba) had played significant roles in Nigerian educational system at the primary school level. These languages were used as medium of instruction at this level. The situation has since changed in most schools despite the research attention given to mother tongue. The present reality is that English language is preponderantly used as medium of instruction.

It is therefore necessary to re-invigorate research interest in communicating science in mother tongue. This paper therefore demonstrates the teaching of Science, Technology and Mathematics (STM) in mother tongue using Yoruba language as an example. To achieve this, the paper examines the Science, Technology and Mathematics (STM) curriculum, highlights the obstacles to implementation; exemplifies science teaching with Yoruba language and draws a proposal for implementation.

The STM Curriculum

Mathematics and primary science are offered at the primary school. The content of the primary science curriculum includes aspects of technology, which are deemed relevant to that level of education. The curriculum is thematic and child centred. English version of the curriculum is available for classes one to six. The section of the curriculum for classes one to three has been translated into seven Nigerian languages to ensure that medium of instruction does not constitute a problem to the pupils. This is in compliance with the Nigerian government policy statement as contained in the National Policy on Education (FGN, 2004:8) which stipulates that "Government will see to it that the medium of instruction in the primary school is

initially the mother-tongue or the language of the immediate community and, at a later stage, English".

Integrated Science, Mathematics and Introductory Technology are offered by students at the junior secondary school level, which is the first tier of the secondary school. The integrated science curriculum is developed around six themes with the topics spirally arranged. The activity-based method, which is child-centred, is recommended for teaching the subjects (Olawaju, 1994). A survey of the mathematics curriculum also showed that it is student-centred. This can also be said to be true of the introductory technology curriculum. Textual materials for these curricula have also been written. It is worthy of note here that all the curriculum materials and the textbooks are written in English language. These authors are not aware of any attempt to develop or translate the curriculum materials in integrated science, mathematics and introductory technology into Nigerian languages.

The subjects involved at the senior secondary school level are agricultural science, biology, chemistry, mathematics, physics and technical drawing. Each subject has its own curriculum. The objectives of all the curricula were based on the provisions in the National Policy on Education (FGN, 2004:3-11). It is evident that the topics in the curricula were organized around concepts or themes while the spiral or concentric approach was adapted in sequencing the topics. Activities based on student centred methods were recommended for teaching the various Science, Technology and Mathematics subjects. Textual materials in these subjects have been written and are currently in circulation.

The curriculum at the tertiary level is basically written in English language. Olawaju (1994) has observed that students would consider it *infradignitatem* for them to learn Science, Technology and Mathematics in Nigerian languages.

Obstacles to Effective Implementation of Mother Tongue

Implementing the mother-tongue instruction in science is a daunting challenge. In a multi-lingua society like Nigeria, taking a decision about which mother-tongue to use will be a difficult task since there are about 513 different languages and dialects spread all over Nigeria (Bangbose, 1992).

Science teaching has been adversely affected by language of instruction. Vast majority of Nigerians today do not have a good mastery of the mother tongue. It is common knowledge that elites' children hardly speak in their mother tongue, hence, most

(Makinde, 2007:199-203). How then would they cope if the medium of instruction is mother tongue?

Science, Technology and Mathematics terminology is international and trying to get their meanings in the mother tongue may not be very easy. Ajeyalemi (1981:16-24) noted that "there are technical terms which make the teaching and learning of science difficult. To teach in mother tongue would require that these technical terms would have equivalent meanings.

Reluctance of people to change is another stumbling block. It may be difficult to convince many Nigerians who are used to communicating in English language to jettison that for their mother tongue. Learning science in the mother tongue needs prodigious amount of efforts and resources. The budgetary allocation to education will be insufficient to actualize such a money gulping project. This is a long term project whose goal can only be accomplished with continuity of government policies. The vision of mother tongue teaching has long been conceived, yet no appreciable impact because of the inconsistencies of government policies.

A PROPOSAL FOR CONSIDERATION

Adoption of the national languages as the medium of instruction is not a latest development in the world. In Sri Lanka, India and Wales today, the mother tongue is the medium of instruction in almost all educational establishments. In these countries, English was hitherto used as the medium of instruction in schools.

Implementation Strategies

A gestation period of twenty-five years is proposed for the languages to mature for general use. The implementation of mother tongue should be carried out in phases. The following phases are suggested:

Phase 1: Deliberation and Preparation

The first three years should be spent selecting resource personnels and determining the resource materials and cost implication of the project. Selection of resource personnel should spread across the primary, secondary and tertiary institutions in the country. Also, resource personnels should be constituted to include young and old teachers and administrators. They are

to meet and deliberate on the *modus operandi* of implementation. The number of personnel should be between the range of 250 and 300.

Phase 2: Developing the Curriculum

A curriculum development committee should be set up to identify the languages to be used and coordinate the development of curriculum in the various languages identified. The curriculum should be developed in the major languages across the country. The development of the curriculum should employ 'loan-words'. That is, some terminologies should be assigned to local names without any change in their etymological meanings. Ajeyalemi (1988:16-24) wrote that the use of such loan words would further enrich their local languages. As the case may be, scientific names or terminologies can be transliterated into the Nigerian languages.

The following examples will elucidate this idea:

There have been evidences to show that the Yoruba language can enhance the reasoning of students when it is used as medium of instruction in Science, Technology and Mathematics (Olawajaju, 1991:1-6). The proverbs, adages and wise sayings are useful in this respect. No doubt, there are higher order ways of thinking and reasoning which provide congenial template for learning Science, Technology and Mathematics. There are (a) concepts/principles and (b) attitudes in science which can be taught through proverbs, Olawajaju (1991:1-6) depicts these thus:

a.	Proverbs	Concepts
	1. Laalaa to roke ile ni nbo	Gravitational attraction
	2. Ti ina ba ku a feru boju bi ogede ku a fomo re ropo	Reproduction, like begets like
	3. Bi aja wo agbada ina, ti amotekun wo ewu eje, ti ologinni san akisa mo idi, egbe aperanje ni ise	Group of carnivorous animals
	4. Ibi ti a fi yo si ni i se omi si	Deliquescence
	5. Bi ekofo ba juba ile, ile a lani	Burrowing of earthworm
b.	Proverbs	Attitudes
	1. Pine ni yoo pe, shokole wa ta ba...	

2. Iyanju ni a n gba, ojoojumo ni o nre ni	Perseverance and persistence
3. Owo omode ko to pepe, ti agbalagba ko wo akeregbe	Cooperation and humility
4. Eni ti yoo la oyin inu apata ko ni wo enu aake	Counting the cost

Rhymes can also be used in teaching numbers in mathematics. Local artisans have been using what we are currently advocating as exemplified in the list below:

Vulcanizer	-	Foganaisa or foga
Bricklayer	-	Birikila
Mechanic	-	Mekaniki
Shock absorber	-	Sokansofa or Sokansoka
Solenoid	-	Solo
Battery	-	Batiri
Crank Shaft	-	Kiran Safiti
Spanner	-	Sipana
Shovel	-	Sobiri

The effort of Fakintade (2001), who published a dictionary of scientific terms in Yoruba (covering science subjects like biology, chemistry, mathematics, and physics) is worthy of emulation. The Yoruba language is replete with such things as listed above. The language is flexible to accommodate new words and this account for the growth of the language.

The Federal Government should also set up a body to integrate and harmonise all programmes and activities before final presentation at the Joint Consultative Committee on Education (JCCE).

The training of all teachers should be vigorously pursued to achieve desired outcome. The demand of work at this phase is enormous; six years will however be adequate.

Trial Testing of Programme

The curriculum should be tried out for six years in pilot schools spread across all states of the federation. This should be done in progression whereby pupils from primary one progresses and their performance monitored until primary six. During this period, there should be proper

monitoring and supervision. Appropriate feedback mechanism should be put in place in order to obtain accurate information on identified lapses.

Modification Phase

At this stage, the various defects are remedied and the programme lined out again until desirable impact is achieved. This should take a maximum of ten years.

Installation of Programme

The total installation can take effect as soon as a satisfactory performance is recorded in the trial testing stage. This required that the curriculum should be perfected in various languages and all resources (human and material) are richly available.

Recommendations

In order to achieve these laudable objectives, the following steps are suggested:

1. Production of the National Policy on Education in Nigerian Languages.
2. Use of Nigerian Languages as media of teaching all subjects including science and mathematics from primary one to six.
3. Translation of all Science, Technology and Mathematics curricula at the primary level into Nigerian languages.
4. Translation of all Science, Technology and Mathematics curricula at the junior secondary school level into Nigerian languages.
5. Production of Science, Technology and Mathematics textbooks and glossaries in Nigerian languages at primary and junior secondary school levels.
6. Sensitization of the educational system to the use of Nigerian languages for teaching school subjects.
7. Gradual overhauling of the teacher production process to enable pre-service teachers to be trained on the use of Nigerian languages.
8. Production of textbooks and instructional materials for training teachers in Nigerian languages.
9. Mounting of workshops and in-service courses for serving Science, Technology and Mathematics teachers on how to use Nigerian languages to teach Science, Technology and Mathematics subjects.
10. Development of a system of monitoring and supervision to ensure the effective implementation of the programme.

11. Production of curricula and textbooks in Nigerian languages for use at the secondary and tertiary levels.

CONCLUSION

Attempt was made to draw attention, in this paper, to the fact that it is more beneficial to communicate Science, Technology and Mathematics curriculum in Nigerian languages than in English. Some suggestions have been offered on the way forward. If these suggestions are considered and implemented, it will surely bring about a revolution in STM education in this country. Language associations like Association for Promoting Nigeria Language and Culture (APNHLAC); Linguistic Association of Nigeria (LAN); Association of Nigerian Language Teacher (ANLAT) etc. have onerous task at hand towards the realization of the proposal presented in this paper. It is necessary to carry along the various curriculum development agencies such as the National Primary Education Commission (NPEC), National Commission for Colleges of Education (NCCE), National Board for Technical Education (NBTE), National Commission for Nomadic Education (NCNE), National Universities Commission (NUC), National Institute for Nigerian Languages (NINLAN) and all relevant professional associations in Nigeria.

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