

CURRICULAR IMPLICATIONS OF TEACHING SCIENCE MATHEMATICS AND TECHNOLOGY EDUCATION IN MOTHER TONGUE IN NIGERIA'S SCHOOL SYSTEM

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Abstract

A recurrent challenge in the enhancement of quality education in Nigeria is the choice of language of instruction. Whereas many preferred teaching in Mother-tongue medium, others consider the international lingua franca – English language as the best medium for teaching any subject to any student. The role of Mother Tongue as the language of instruction at least at lower level of education was clearly stated in the National Policy on Education. However, implementing this policy has faced various challenges in Nigeria. This paper discusses this issue of Mother Tongue and its curricular implications in teaching Science, Mathematics and Technology education in Nigerian Schools. Although UNESCO declared in 1958 that it is axiomatic that the best medium for teaching a child is his mother tongue, African countries have not invested enough in ensuring that languages of their communities are used as medium of instruction in Science and Technology Education. The position of this paper is that concerted efforts have to be made to ensure learners in Nigeria are encouraged to use their mother tongue or language of their immediate community in their education. The paper, therefore advocates that regions or states in Nigeria should develop their policy on education and a curriculum that takes cognizance of Mother tongue language of Instruction using any language of its choice at all levels of its education to leapfrog development in Science Mathematics and Technology Education.

Introduction

Instruction in the language which is not the primary language of students can be great hinderance to cognition especially of Science Mathematics and Technology Education. Proficiency in communication is key to meaningful learning. Language of communication plays a leading role in teaching and learning processes and could be a barrier to effective communication in developing critical thinking minds in Science Technology and Mathematics Education which is a factor militating the development of Nigeria in particular and Africa. The role of language as a medium of instruction in promoting an effective teaching and learning is an issue that has occupied many scholars all over the world for many years (Lartec, Belisario & Bendanillo, 2014). English is the language of instruction (official language) in schools and governments official transactions instead of indigenous language which has been found to be the most efficient ways of challenging educational disadvantages in Nigeria in particular and Africa in general (Wolff, 2010; George, 2011).

NEED FOR OPTIMAL USE OF INDIGENOUS LANGUAGE FOR CLASSROOM INSTRUCTION

Although there is a prevalent view that language of instruction is a complex issue, the need to revolutionise the current medium of instruction and optimal use of indigenous language for classroom instruction is a necessary tool for national development. There has been a number of pilot projects conducted on use of indigenous languages for classroom instruction in many African countries including Nigeria. Wushishi (2010) stated that the realization of the

importance of Mother tongue medium of instruction in education has a long history. Mondez (2013) stated that in Iloilo Philippines as early as 1948-1954, an experiment was conducted to compare students' performance taught in Hiligaynon and those taught in English. The result of the study showed that Hiligaynon students outperformed those who were taught in English in Mathematics. Notwithstanding arguments for or against the use of Mother-Tongue, Uchenna, (2012) observed that results of several educators showed that mother-tongue-based bilingual offers significant pedagogical advantages to the students and also enriches classroom discussion.

In Nigeria, results of research findings by Fafunwa (1975); Adler (1998), Setati and Adler (2001), Nicol, (2005), Usman and Umo, (2006), Charanci (2011), Wushishi, Yusha'u and Hassan (2013), as well as Usman, Wushishi, Gambari, and Olayinka (2018), all favoured the use of mother tongue. At a UNESCO conference on cultural diversity in 2001, the use of mother-tongue to enhance learning among children was re-emphasized, especially where there are communication problems. The Federal Republic National Policy in Education recognised teaching using the mother tongue (FRN, 2004) at least at lower basic level in Nigeria. However despite the policy provision which is aimed at improving the quality of the education system, the investment in adopting the use of MT as the medium of instruction has not been encouraging and most states are not implementing the policy (Ohiri-Aniche, 2002). Researchers such as Ezeugwu and Igbo, (2013) asserted that Nigeria needs to review its inherited system of education from the colonial administration that had some defects in terms of contents and philosophy with respect to the needs of the country. This could include making provision for states to develop separate policy on education in line with the National policy that takes cognisance of the state's peculiarities and language used for classroom instruction.

In a study by Awoyemi (2012) on importance of language proficiency in the learning of Science, echnology and Mathematics (STM) in Nigerian schools, the researcher found from their study that there was a significant positive correlation between Yoruba Language and each of the six STM subjects. Similarly, in another study using quasi-experimental research design Patrick and Theresa (2015) the effect of Igbo Languages as the medium of instruction on the enhancement of retention level of Primary 3 Pupils in Primary School Mathematics in Delta State (DS), Nigeria. The researchers found from the study, a difference in Mean Retention Level Scores and then subjected same to z-test analysis; the result found indicated a significant difference in favour of the experimental group. The researchers consequently recommended the use of Language of the immediate environment of the child as medium of instruction in schools in Nigeria. In a study by Bashir (2018), the researcher found very high interest among students in the use of Hausa Language as medium of teaching Mathematics. Significantly, the study found out that interest of student was not tied to the Hausa language as their mother tongue but as a prevalent language of the community which they also speak.

It has been argued that the non-exploration of the Mother tongue medium, which is not to the overall interest of the common man in Nigeria, is hindering advancement in education and other sectors of the economy. Oladotun and Francis (2014) observed that all over the world especially, amongst the developed countries of the world the Mother's-Tongue is usually used in the school system as the medium of instruction. Despite the results of researches that have shown the advantages of educating children in their mother tongue, adopting the Mother Tongue medium still meets with resistance. This suggests that the controversy over the MT usage in Science instruction is not only educational but also political (Wushishi, 2010).

There has been argument that some languages lack orthographies, thereby making the implementation tedious. However, this assertion is not true for other languages, such as the Hausa language. The Hausa language and some other languages in Nigeria have rich orthographies and are widely used as medium of communication by millions of people across the country. Hausa Language, for example, is one of the Major Nigerian Languages and has more native speakers than any other language in West Africa. Out of the ethnic groups in Nigeria, Garba (2014) listed Hausa among the largest and most dominant ones. Bashir (2018) observed that there is availability of Hausa style guide by Microsoft Corporation (2006) and Hausa font called the *Rabiat Muhammad*. With this development lower case as well as upper case of special Hausa characters such as ɓ, ɗ, ƙ, ƴ, ɢ, ɠ, ƙ, ƙ, ƙ ƙ ts, sh. are all available via the computer thereby signifying wide usage of the language for communication including via the computer. Communication using indigenous languages in Nigeria takes place within and outside the school. This is a factor that could aid learning since meaningful learning takes place if there is effective classroom communication (Hassan, 2014).

Communication is relevant in concept formations, and since the intent of science is concept formation and the concepts are its contents, a more familiar language usage in the classroom can aid learning of science. The whole package of education as observed by Bakie (2000) has three levels; the content of the education, that is, the syllabus, the teaching of the subject and learning and thirdly the environment of learning. Intended learning outcomes, contents and methods or learning experiences and evaluation are the basic elements of any curriculum. Also, it should not be forgotten that the content of any curriculum should be derived from the environment where it is to be operated. The teaching of the content must be in a manner that ensures meaningful learning through effective communication. Effective communication is only ensured through the use of indigenous language/language of the environment otherwise known as mother tongue (L1). So, to teach in mother tongue in Nigeria's Classroom would certainly have some curricular implications.

Curricular implications for Teaching STM in Mother Tongue in Nigeria

The argument for the use of Mother Tongue no doubt has elicited support from cognitive development based researchers on learning using first language of the students in many countries. There are nevertheless other intractable and contentious issues that need to be resolved if at all the dream of utilising Mother Tongue for instruction will suffice. No doubt, use of MT may radically address our inability as nation to indigenize scientific concepts even though science and technology are what can be seen in our traditional or local artifacts of our contemporary day-to-day activities. The list of curricular implications may not be exhaustible, however, the following implications are instructive:

- i. Developing Teaching Learning Resources for Instruction in STM Using Mother Tongue. The problem with many learners is how we can mainstream content of instruction to familiar language. And to teach using Mother Tongue will require developing textbooks, teaching manuals, workbooks (print and digital), charts, library etc in Mother Tongue. To achieve these will require a lot of funds and workshops to develop.
- ii. Language of Instruction has to be MT in a multilingual environment for STM teaching. Nigeria is a multilingual society and thus have the problem of which language to adopt as language of instruction for her educational system. Where such a problem is overcome, then the issue of language development for orthography (determination of vocabularies and syntax) will certainly have to be strengthened to produce more orthographies for minority languages. . Therefore, the National Educational Research and Development Council (NERDC) and Nigeria Institute of Languages (NIL) should develop

policy framework for actualization of the language of instruction policy across all the levels of education in Nigeria.

- iii. Designing Curricular in the various aspects of Science Technology and Mathematics will become a problem. This will require assembling experts in various fields with language specialist to carefully transcribe the Science Technology and Mathematical concepts into acceptable language metaphors for instruction. The process will entail pilot testing and revision, field-trial and revision before full-scale implementation. These are processes that can last several months to years but the result will be a breakthrough for implementation and possible realisation of educational policy for enduring industrialization for the country.
- iv. Pedagogical approaches for the instruction of STM in MT. Each area of specialization in Science Technology and Mathematics shall require a procedure of cognition appropriate to its uniqueness. Using Mother Tongue to instruct will automatically require how to translate the all known methodologies to the language of the instruction.
- v. Method of assessments would definitely follow the mode of implementation of the curriculum. The reality is that, it may require students to write or be evaluated in language which instruction was received. This definitely will pose a lot of challenges and create immeasurable issues ranging from validation and reliability of the outcome of the process of education.
- vi. Teacher Training to implement Mother Tongue for STM. UNESCO (2003) advocated the adoption of Mother Tongue (L1) at early grades to enhance children's ability to learn better compared to the use of second language (L2) i.e. English language or foreign language. This proclamation still have left a gap with attendant failure or poor implementation at basic education levels in Nigeria. The question would be, what reforms need to be undertaken in order to implement the use of Mother Tongue for Science Technology and Mathematics Education training teachers to effectively implement the use of Mother Tongue.

Conclusion and Recommendation

The subject of using Mother Tongue as a medium of instruction has remain a beautiful thing on paper but rarely have scholars evolve practically implementable frameworks for using indigenous language (L1). How will Nigeria with a list of over 500 languages and 250 ethnic groups adopt one Mother Tongue as medium of instruction in its educational system. If we draw inference from Mahatma Gandhi who was the greatest proponent of 'Mother Tongue' usage as a language of instruction at primary education who was believed to be wrong in his thinking with India having more than 2000 languages at the beginning of 20th century (Dhananjay, 2016) then Nigeria has to evolve its unique method of attainment of its goal of implementing the Mother Tongue instructional approach. Thus, it is strongly recommended that, each region should adopt its own predominant language as a medium of instruction. This argument is hinged on the earlier finding of Bashir (2018). Furthermore, each region could adopt its own policy on education that suits its peculiarity in tandem with the National Policy on education. The United States of America (USA) has it that education is chiefly a matter of the state. Thus, the practicability of the use of Mother Tongue as language of instruction for STM in Nigeria should be left to the regions to decide and apply based on their peculiarity.

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