

# A STUDY ON THE EFFICIENCY OF NATIVE LANGUAGE IN THE TEACHING OF SCIENCE AND TECHNOLOGY

BY

**SHEHU UMAR DAYA<sup>1</sup>, MUHAMMAD ALI<sup>2</sup> & ADAMU CHIROMA<sup>3</sup>**

Department of Integrated Science, College of Education and Legal Studies,  
P.M.B. 002, Nguru, Yobe State

<sup>1</sup>[sdumarjajere@gmail.com](mailto:sdumarjajere@gmail.com)

<sup>2</sup>[muhdali2030@gmail.com](mailto:muhdali2030@gmail.com)

<sup>3</sup>[adamuchiromer@gmail.com](mailto:adamuchiromer@gmail.com)

## Abstract

This study was conducted on language as a medium of teaching science and technology. A case study research design was used in collecting data for the study. The population of the study was selected public primary schools from Yobe State. There are an estimated 1,013 primary school pupils in the selected primary schools. 36 schools were selected at random for the study from the Local Governments. A total of 10 pupils were selected at random from each school under investigation. Questionnaires, oral interviews, and informal interactions were employed to elicit information. The Sapir-Whorf hypothesis which holds that our thoughts are shaped by our native languages; and that speakers of different languages are thinking differently was used as the theoretical framework of analysis. The study discovered among other things that the science and technology learning has various challenges as pointed out by the participants and need to be learned in simple ways. The work concludes that the people's language is not only part of their socio-cultural heritage; it is the natural medium of thought, expression, and communication within that culture.

**Keywords:** Language, Science and Technology, Learning

## Introduction

The application of language other than the indigenous languages in the teaching and learning of sciences had eventually led many pupils to develop negative attitudes towards science. It is against this backdrop that this research investigated the application of native-tongue in the teaching and learning of science and technology subjects in Nigerian primary schools. Therefore, this research aimed to determine the challenges of developing language for science and technology, teachers' understanding and facilitation of science and technology subjects, the opportunity of multilingual classrooms and the effectiveness of native tongue in the teaching and learning of science and technology subjects.

Language plays a major role in the teaching and learning of any subject. It also contributes a lot to individuals and societal development. Scientific and technological development cannot be achieved without

language. Indeed, for decades after the independence of Nigeria, she is still grouped among the developing countries of the world; and this has led to the hue and cry for national development. This translates to the fact that developing nations cannot produce more goods and services because of the shortage of human capital and use of "primitive" tools. The problem with Nigeria is that in our haste to attain the same height as the Western countries we left the rudimentary processes of development.

The fact remains that we cannot talk of national development without taking into consideration individual development. Individual development, in turn, cannot take place without language and that is why we have languages for the deaf and dumb and also for the computer (Uguru, 2007). In the same lane, Butler (1990) in his emphasis on the importance of language to our society writes: "Linguistics communication is without doubt one of the most important

features of human life and we get better at inducing computers to stimulate it, the effects on our everyday living are bound to multiply". This means that linguistics is a multifaceted discipline. It has some relationship with all aspects of human life.

Language as a phenomenon is generally regarded as a manifestation of inner thoughts. It will be observed that human thinking is controlled by language just as man's thoughts are controlled by language. Human beings equally perceived reality according to their languages. It is difficult to see any separable elements in the language skills, especially in terms of listening, speaking, reading, and writing; and the relationship with thinking.

Technology is a necessary tool for self-reliance and the development of any nation, since man first learned to wield an animal bone and kill his prey more efficiently, technology has progressively changed our activities and attitude towards our environment. Technology in its broadest sense is the human creation of a physical system that performs a task. Some definitions of technology emphasize its effects in terms of the human attempt to control nature and the environment. As cited by Augustne and Okon (2020), technology is often identified with the hardware of production and distributions whether in the term of machines, factories, roads, storage facilities, telephones, know-how, experience, education and organizational forms. Management techniques are also included in the definitions of technology. Science is a systematic enterprise that builds and organizes knowledge in the form of testable explanations and predictions about a phenomenon. The existence of science has interplay between technology and society as something discounted in some seemingly enlightened discourse. Therefore, it has to be appreciated at large in society due to the vital role it plays.

The choice of medium of instruction has remained a bone of contention in many countries of the world throughout history. Some countries prefer teach in their native

language while others prefer to teach in a language in which intellectual pursuits have been pursued more extensively than in their language. English is the language in which the major proportion of scientific information is published. Scientists in many developed as well as developing countries like Nigeria conduct their scientific work in English and not in their languages. It is against this backdrop that this research work tends to investigate an account of science through native-tongue and second language. The work would explore the linguistic history of science; the concept of native-tongues as used in sciences as well as the concept of scientific contribution through English, which comes not only from the native English-speaking scientists but from scientists of other communities.

Many theories and studies have pointed out that using the native language would give the pupils better opportunity to learn academic content. On native tongue-based education, Cummins (2000) stated that "children who come to school with solid foundations in their native tongues and develop stronger literacy abilities in the school language". Similarly, Thomas and Collier (1997) recognized that the deeper a pupils' level of the first language cognitive and academic development, the faster pupils' progress in the second language.

### **Review of Related Literature**

The human world is centered on a language they were built on from childhood. Language forms the basis of whatever social cohesion we can attain, determine our world view. Language intimately links the past with the present and the present with the future. We cannot escape its influences even by silence. Human beings need language to grasp things intellectually and to get others to do so. To a large extent, language defines humanity. Zhang (1997) stated that language is the key to the heart of people, if we lose the key, we lose the people. David (2006) opined that language is undoubtedly one of the most important areas of the curriculum. They are both means to an end and an end in

themselves. That is, it provides a child with the tools to communicate and at the same time an integral part of the creative process that results from this communication when the language arts are taught with awareness, as well as enjoyment, pupils gain competence of their language and confidence in themselves.

The emphasis of science education is to enhance pupils' scientific thinking through progressive learning activities that involve planning, measuring, observing, analyzing data, designing and evaluating procedures, and examining evidence. Learning science will enable our pupils to lead a fulfilling and responsible life by encouraging them to learn independently, deal with new situations, reason critically, think creatively, make wise decisions and solve problems. Through science activities, pupils should develop an interest in science and thus they will be motivated to become active learners in science. Pupils should also develop an understanding of Science, Technology, and Society (STS). They should be able to make informed decisions based on evidence. Pupils with high ability or a strong interest in science need more challenging learning programmes. These programmes should stretch the pupils' science capabilities and offer opportunities for pupils to develop their potential to the full.

Furthermore, according to Dekker (2010), the native tongue-based multilingual education provides a strong foundation in the learners' first language, enabling them to build knowledge and experiences they bring to the classroom. Lastly, native tongue-based instruction provides the means for pupils to understand the science concepts better and helps them to be more critical and rational thinkers. According to Nolasco (2009), Benson (2005) and Sibayan (1994), when the pupils' native language is used in the classes, various concepts are easily understood by pupils and it enables them to be more critical and rational thinkers. The native language is also best used as a bridge in learning the main languages of instruction.

Native tongue education is said to be any form of schooling that makes use of the

language or languages that children are most familiar with. This is usually the language or languages that children speak at home with their families. For example, they may speak one language with their mothers, another with their father and a third with their grandparents. Although there is overwhelming evidence that children learn best through their native tongues. Indeed, millions of children around the world receive education in a different language. This is usually the dominant language of the country they live in. In the case of former colonies, this may not be the language spoken in the community at all, but the language of the former colonial power, such as, English, French, Arabic, Dutch, Spanish, etc. Some of these languages children may hear them for the first time when they enter school.

Native language, native tongue, or mother tongue is the first language or dialect that a person has been exposed to from birth or within the critical period. In some countries, the term native language or mother tongue refers to the language or dialect of one's ethnic group rather than one's first language.

According to Lepschy (2002) the notion of native tongue and native speaker "still remains elusive and hazy and its history difficult to ascertain." Usually, it is understood as the first language somebody learns, the "native language" or the language of socialization. The native tongue is mostly the language of the homeland and the language of the group to which a person belongs. Very often both ethnic or national identities, as well as regional ones, are strongly connected with the native tongue. Native tongue is seen as "one's own" language, inseparable from personal identity (Aldous 2010).

Children who speak a different language at home than the language in which they are taught at school will by definition become bilingual. The degree to which they become bilingual may vary considerably and depends on the goal of the school programme. There are bilingual education programmes that aim at teaching children a

second language at no expense to their first language. In such programmes equal use is given to learning in both languages; and children learn how to take full advantage of their multilingualism within a particular speech community. In Nigeria for example, the majority of schools offer education only through one language which is the English language instead of the native-tongue advocated for. Thus, children lose or leave behind their native tongues and use only the language of the school as provided by National Policy on Education.

### **Theoretical Framework: Sapir Whorfian Hypothesis**

The Sapir-Whorf hypothesis holds that our thoughts are shaped by our native language and that speakers of different languages, therefore, think differently. This hypothesis is controversial in part because it appears to deny the possibility of a universal groundwork for human cognition, and in part, because some findings taken to support it have not reliably replicated. We argue that considering this hypothesis through the lens of probabilistic inference has the potential to resolve both issues, at least concerning certain prominent findings in the domain of comprehension of concepts and ideas. Thus, the researcher employed the principle of linguistic relativity. This formulation implicitly acknowledges that Sapir and Whorf were not the first or only scholars to have theorized about relations between language and thought and that other strands of thinking about the issue also exist. The main point of debate in the discussion of linguistic relativity is the correlation between language and thought. The strongest form of correlation is linguistic determinism, which hold that language entirely determines the range of possible cognitive processes of an individual. This view has sometimes been attributed to Benjamin Lee Whorf, and to Ludwig Wittgenstein, but it is not currently the consensus that either of these thinkers espoused determinist views of the relation between language and thought.

### **Procedure**

A case study research design was employed in collecting data for this study. Though, there have been several suggestions to ensure that research of this nature fits into the context of Northern Nigeria and in Nigeria in general. Struwig and Stead (2004) write about the need for researchers to be cognizant of the socio- historical, temporal and contextual factors and the role that they play in the research process. In any case, other scholars use case studies sparingly because they involve a small number of participants, although the focus is on arriving at a complete description of the situation.

The method is preferred because it is usually an in-depth type of study. The study investigated some selected public primary school pupils in some selected local government in Yobe state and these are Bade, Damaturu, Fune, Geidam, Gulani, Jakusko, Machina, Nguru and Potiskum. We gave an in-depth historical overview of each of the local government with a view of linking the existence of an individual local government with the linguistics background and a study on the efficiency of native language on teaching of science and technology.

### **The Population of the Study**

The population of the study comprises selected public primary school pupils in some selected local government in the state. There is an estimate of about 1,013 primary school pupils in the selected schools. Participants were randomly selected from public primary schools of these areas through a stratified random sampling technique. This study involves 9 out of the 17 local governments in the states four (4) public primary schools were equally selected from each of the local government selected for the study. A minimum of five (5) pupils were selected at random from each school making a total of sixty (60) pupils for the study.

### **Method of Data Collection**

The subjects are selected from a large pool of pupils who showed interest after the objective of the study was explained to them.



A questionnaire, oral interviews and informal interaction were employed to elicit information from the pupils. Key Person Interview (KPI) was also used to verify/supplement the information obtained from the oral and informal interactions. A few members of participants were interviewed to ascertain the efficacy of the teaching of science and technology subjects through the medium of native-tongue.

We also used the reading materials taken from science textbooks in the English language which are used by the primary school pupils in public schools across the selected primary schools within the study areas. We translate the materials into the Hausa language which is the dominant native language. From the translated materials, corresponding test questions are developed to confirm pupils' understanding of the science and technology content. Administering tests in this language helps to assess the pupils' understanding of science ideas from the reading materials. We developed the tests consisting of multiple choices, true or false items, and open-ended questions in which pupils/ participants are allowed to explain in their native tongues the science concepts in the readings.

### **Data Analysis, Results and Discussions**

A large amount of data was collected for the study. Four steps as highlighted by (Bhatia 2018), (a) getting familiar with the data (b) revisiting research objectives (c) developing patterns and (d) connections were followed as we prepared the data for analysis.

Having analyzed the data, the study reveals several position aspects about teaching science and technology in native-tongue. For instance, in a multilingual country such as Nigeria, teaching science and technology in Nigerian indigenous language in addition to English, would enable teachers to use other languages besides English. The School system should enable learners to write an examination in native languages as well. These advantages can assist in promoting multilingualism and enable teachers to utilize code-switching as well.

On the aspect of teachers' understanding and facilitation of teaching science through native-tongue, the researchers discovered that facilitation and teaching through native tongue needs a shift in thinking and philosophy of teaching. This means, seeing teaching and learning differently because using native language would enable more achievement and improvement in result.

Indeed, it is not only about effective communication but also language impact on a child's self-confidence. Pupils' sense of self in society are undermined if the native tongue cannot be used for learning and these may be aggravated by the experience of repeated underachievement. This advantage has cognitive, psychological and cultural aspects, all manifested in the ongoing failure of our education system. Most of our participants pointed out that they always tried to use both English and Hausa in teaching science.

On the aspect of the challenges of developing language for science and technology, the science and technology learning area has various challenges, as spelt out by the participants. The principal among these is knowing what to teach and how to teach it. Yet critical behind this is translating and using the correct science concepts when using native tongue. The language aspect requires an extra necessary but daunting skill from the teachers in the study. The teachers were aware that their teaching in Hausa would be as effective as their translation of content, for bad translation would aggravate understanding by both learners and teachers. The teachers stated that while they were aware of the need to use well-translated materials, they were not always able to produce effective translations for their classrooms.

### **Data Analysis**

According to the table below out of 60 questionnaire distributed to the respondent, total of 53 were returned out of which 3 were not completed and 7 were not returned data. Therefore, the total of 50 questionnaires are used for the analysis and took the duration of

three weeks for the administration of the questionnaires the below table shows the distribution of the questionnaire. From the table 1, the total returned questionnaires 50

(83%) of the respondent while total not returned of questionnaire are 10 (17%) respondent.

**Table 1: The Distribution of the Questionnaire**

RESPONSES	RESPONDENTS	PERCENTAGE %
Total Returned	50	83%
Total Not Returned	10	17%
<b>TOTAL</b>	<b>60</b>	<b>100%</b>

Source: field survey 2022

Question 1: Is Native Language Going to Be Effective Way for Teaching Science and Technology?

**Table 2 Responses to The Research Question 1**

OPTIONS	Number of Respondents	PERCENTAGE %
Agree	40	80%
Partially agree	5	10%
Disagree	5	10%
<b>Total</b>	<b>50</b>	<b>100%</b>

Source: Field Survey 2023

Table 2 show that 40 of the respondents agree that the use of native language in teaching of science and technology will be a good idea for pupils understanding, while 5

of the respondent are partially agree about the statement and others 5 respondent disagree

Question 2: Is Native Language a Negative Way for Teaching Science and Technology?

**Table 3 Responses to The Research Question 2**

OPTIONS	NO. RESPONDENTS	PERCENTAGE %
Agree	5	10%
Partially agree	10	20%
Disagree	35	70%
<b>Total</b>	<b>50</b>	<b>100%</b>

Source: Field Survey 2023

Table 3 shows that 10% agree that native language is a negative way of teaching science and technology, while 20% of the respondent are partially agree about the statement and others 70% of the respondent disagree.

## Conclusion

This research takes and maintains the same position with the National Policy on Education (NPE) which affirmed that Government recognizes the importance of language as a means of promoting social interaction, national cohesion and preservation of our culture. The policy

endorsed the need for every child to learn the language of the immediate environment. In the interest of national unity, it is expedient that every child shall be required to learn one of the three major Nigerian languages Hausa, Igbo or Yoruba. It is not surprising that many children cannot speak any of the indigenous languages including their native tongue. The challenges of teaching in the native tongue may remain unattainable unless Nigeria's education system is decolonized, English may remain the official language since it is our colonial heritage (Adekunle, 2008). Fafunwa (1998) attributed the continued retention of English as our official language

to colonial mentality. Fafunwa stressed that children should be given early education in their native tongue because it will last longer in their memory than any other tongue. Even The United Nations Education Scientific and Cultural Organization (UNESCO, 1953) found out that children will excel more when taught in the local language. Fafunwa faulted the school of thought that Yoruba or other native languages have no numerals, scientific formulas and terms. Since English used Arabic numerals successfully, any Nigerian language could as well borrow numerals and others from other regions of the world. Therefore, Language learning and teaching as critical, other factors impact teaching such as teacher preparedness resources used and the socio- economic status of the learners. Yet, language is a tool that is pivotal in the classrooms and the use of learners' native tongue is as critical as the teachers are committed to using languages they are proficient in.

### Recommendations

1. That the National Policy on Education (NPE) which affirmed that Government recognizes the importance of language as a means of promoting social interaction, national cohesion and preservation of our culture should be sustained. The policy

endorsed the need for every child to learn the language of the immediate environment. In the interest of national unity, it is expedient that every child shall be required to learn one of the three major languages in Nigeria either Hausa, Igbo or Yoruba.

2. Science and technology education should be an essential component of a learning continuum for all, from pre-school to actively engaged citizenship through the medium of native-tongue. Therefore, indigenous language must not be only taught and used but taught properly at all levels of the educational ladder both by utilizing the outcome on research with these languages and by ensuring adequate and suitable training for the teachers concerned.

3. Support schools, teachers, teacher educators and pupils of all ages to adopt an inquiry approach to science education as part of the core framework of science education for all through the medium of native-tongue;

4. Science education should balance requirements of breadth and depth of science knowledge to ensure young people and adult learners are both motivated to learn and equipped to fully engage in scientific discussions and decisions and to facilitate further and deeper study through the medium of native- tongue.

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