

TEACHING SCIENCE AND TECHNOLOGY USING INDIGENOUS NIGERIA LANGUAGE.

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Abstract

Science, technology and language are both relevant to life as in Education. While science builds and organizes knowledge, technology arises from the needs of a particular environment, but language helps to store, preserve and transmit knowledge, culture and technology from generation to generation. Language determines how one perceives, interprets, reconstructs and transforms an immediate environment into a more conducive habitat. This work investigated language medium and teaching of science and technology through the medium of indigenous language in Abakaliki Education Zone, Ebonyi State. A descriptive survey design was used for data collection. Six (6) schools were selected for the study. A sample of 12 Junior Secondary School Science teachers and 100 students were simple randomly selected. Indigenous language in teaching and learning science and technology questionnaire (NILTLSTG) was used to elicit information. Trial test technique was used for reliability of the instrument and was subjected to test of internal consistency using Cronbach Alpha. Mean (x) and standard deviation (SD) were used to answer the research questions while t-test statistics was used to test the null hypothesis at 0.05 alpha level of significance. The study discovered among other things that indigenous language can help learners to understand scientific and technological concepts covered in the curriculum in Ebonyi State secondary schools. On the whole, the work concludes that the people's language is not only part of their socio-cultural heritage, but also, relevant and a natural medium of thoughts, expression and communication both in life, and in teaching and learning of science and technology in secondary schools in Ebonyi State.

Keywords:

Introduction

The basic goal of education is to develop the physical, mental, emotional, social, moral and as well, the spiritual aspects of human life. Hence, education as an age-long or life-long process is always used to imply positive state of mind. According to Nigerian National Policy on Education (2007), education is for the:

- Development of an individual into a morally sound, patriotic and effective citizen.
- Total integration of individual into the immediate community, the Nigerian society and the world as a global village.

- Inculcation of national consciousness, values and national unity.
- Development of appropriate skills, mental, physical and social abilities to empower individuals live and positively contribute to the society.

The National Education Strategy 2024-2030 states that, Education has always been the cornerstone of societal progress, shaping the minds of individuals and preparing them for the challenges and opportunities of the future. In line with this, Goutam Patra (2021) holds that, Education is the manifestation of perfection

already in man. Gandhi in Patra said that education is an all-round drawing out of the best in child and man's body, mind and spirit. The highest education is that which does not merely give information, but makes our life in harmony with all existence. Education is something which makes a man self-reliant and self-less. On the other hand, education could be viewed as an organized, deliberate, systematic and continuous effort to transmit, generate or acquire the proper knowledge, values, attitudes, skills or sensitivities as well as any learning resulting from the effort. As an essential process of human development, education deals with the total process of human learning by which knowledge is imparted, faculties trained and different skills developed.

According to United Nations Education Scientific and Cultural Organization- UNESCO (2024), the world is seeing a surge of violent conflicts parallel by a concerning rise of discrimination and racism. It was due to this that the International Day of Education 2024 aimed at generating visibility to education at local level to strengthen and sustain peace.

The National Policy on Education NPE (2014, edition) holds that Education in Nigeria is an instrument par excellence for effecting national development. To this extent, education has remained the greatest instrument to bring about positive changes to a people of a given nation. Without quality education, there would be no meaningful development in a nation. Thus, according to Ali (2014), Education is the most powerful weapon that can be used to change the world. Unless the citizens are given the right type of education, no nation would develop meaningfully. The best in the mind, body and spirit of a child cannot be drawn out to help develop a nation which he/she is an integral part without right kind of education. Life cannot be made meaningful and in harmony with existence if the product of education fails to become salvation without the application of right type of language as a mode of instruction in the classroom settings. To give credence to this, Hans-Georg Gadamer identified "that all human understanding involves interpretations and that

such an interpretation is itself historically, conditioned by particular culture and language (Dimkpa and Eze, 2023).

The above is a clear manifestation that one's mode of understanding and interpretation of concepts is traditionally determined by his/her exposure to a given language and culture as the primary advance of right encounter with the concepts. Hence, Patra (2021) quotes Rousseau saying "that education is the child's development from within and John Dewey who said "that education is not a preparation for life, rather it is the living. Education is the process of living through a continuous reconstruction of experiences. It is the development of all those capacities in the individual which will enable him to control his environment and fulfill his responsibilities.

A child who does not understand the language of instruction cannot fulfill his/her responsibilities since education is an activity that involves imparting knowledge or skills. To this end, Zhang (1997) identified that, language determines our world view. He further stated that language is the key to the heart of people. If we lose the key, we lose the people. One of the most relevant areas of curriculum is language. They are both means to an end and an end in themselves. They provide a child with the tools to communicate and at the same time, an integral part of the creative process that result from this communication when the language arts are taught with awareness, as well as enjoyments, the students gain competence of their language and confidence in themselves. They learn to integrate the components of language into all aspect of their lives.

Right language is the right means of communication. Language is central in interactive process. When language disappears, a medium or vehicle of communication is gone. Without proper language, scientific and technological developments cannot be achieved. Without individual development, no nation develops; and without language, no individual develops. The question is: Could this be the reason why Nigeria as a nation is still crawling

under the belly of development?

Decades after independence, according to Saidu and Mudassir (2022), Nigeria is still grouped among the underdeveloped countries of the world. This is because, Nigeria in her haste to aim the same height as the so called Western countries, has left the rudimentary process of development. It is very impossible for national development to occur without outright individual development. Without language, individual development becomes null and void. Hence, language is a fulcrum to national development. The language of a people is an inescapable nature's gift. It is a medium of thought, expression and communication within their culture; hence, indigenous or native language. Indigenous language is the language of a people otherwise referred to as mother tongue. According to Dimkpa and Eze (2023), indigenous language enables one to compare and associate new vocabulary with the already established repertoire of words in the human brain. This goes a long way to make provisions of appropriate sense of directions in the learning and understanding of scientific and technological concepts. It allows one build or creates classifications of objects for easy recognition, identification and communication. This leads credence to the relevance of human language, most especially, the irreplaceable roles played by indigenous languages in science and technology education in Nigeria.

Statement of the Problem:

The role of education and language towards national and individual development cannot be over emphasized. To this extent, Ochoyi and Danladi (2009) identified that education is generally concerned with the transmission of worthwhile values such as skills, knowledge and planned activities that can develop learners' potentials for national development.

Federal Ministry of Education (FME, 2012) states that Nigerian Education Research and Development Council (NERDC) was directed by the Council on Education for All, to prepare the curricular that can restructure and realign school curricular at all levels of education to enable

achieving the objectives. The results of some findings proved that some students perform poorly in science and technology yearly.

Since language is central to communication and understanding, the statement of the problem therefore is; the use of Nigeria Indigenous Languages in Teaching Science and Technology in Junior Secondary Schools in Abakaliki Education Zone in Ebonyi State.

Purpose of the Study

The major purpose of the study is to determine the relevance of using Nigerian indigenous language (Igbo) in teaching science and technology in Nigeria, particularly in Abakaliki Education Zone in Ebonyi State.

Specifically, the study tends to:

- I. Determine the knowledge of students in translating indigenous language (Igbo) to science and technology terminology.
- ii. Find out the extent to which indigenous language (Igbo) helps in understanding the scientific and technological concepts covered the curriculum.
- iii. Determine the extent to which learners can solve the learning activities at the end of each chapter of science and technology textbooks.

Research Question:

The following research questions were raised to guide the study.

1. To what extent are students knowledgeable in translating indigenous language (Igbo) to science and technology terminology?
2. How does indigenous language help learners to understand scientific and technological concepts covered in the curriculum?
3. To what extent is indigenous language adequate to solving chapters' learning activities?

Research Hypothesis:

H₀: There is no significant difference between the mean ratings of teachers and students' on students' knowledge in translating science and technology

terminology to indigenous language (Igbo) in schools Ebonyi State?

H₀₂: There is no significant difference between the mean ratings of teachers and students' on how indigenous language can help learners to understand scientific and technological concepts covered in the curriculum in Ebonyi State.

H₀₃: There is no significant difference between the mean ratings of teachers and students' on Indigenous language adequacy to solve chapters' learning activities in science and technology in Ebonyi State Secondary Schools.

Scope of the Study:

The study focuses on Teaching of Science and Technology Using Indigenous Nigeria Language in Abakaliki Education Zone in Ebonyi State”.

Conceptual Framework

Both language and culture, according to Dimkpa and Eze (2023) enrich each other. Language harbours the culture and mental wiring of its speaker. Culture as well harbours a language. Therefore, language is at the centre of development and is pivotal to human existence, understanding and survival. To give credence to this, they stated “that nothing exists except through language. This demonstrates the importance and efficacy of language as employed by human”. In identification and communication of ideas conceived, language plays vital roles and helps to promote intellectual growth by facilitating learning. Hence, Dimkpa and Eze (2023) hold that “Language promotes intellectual growth by facilitating learning, unlearning and relearning of ideas within one's habitat”. The ability of a learner to learn or a teacher to teach another language is largely dependent on his/her proficiency in his/her mother tongue as his/her native or first language.

The most expensive or sensitive form of language is its oral or verbal communication. Language is not limited to this form, but could equally come in form of signs and symbols. To Richard Schafer (2002), language is the

foundation of every culture. It is abstract system of words, meanings and symbols. It helps in expression of non-verbal communication. Ademowo (2021) identified four ways language is used in the society as:

1. A means of expressions.
2. A purpose of records.
3. A To set matter in motion.
4. An instrument of thinking

Sequel to this, language is a means of communication and is a reservoir of a people's cultural heritage. It controls human thoughts and behavior and sets the boundaries of world view of its users.

Language as a Harbinger of Knowledge

Burling (1970) identified that language is the harbinger of knowledge. As a branch of philosophy called epistemology, knowledge means “what is known” and it deals with source, extent and limit of what is claimed to be known. According to Baldwin (1960), knowledge is defined in three ways:

1. As the cognitive aspect of consciousness in general, where to know means to perceive, apprehend, understand or comprehend.
2. As a belief or subjective certitude without objective foundation.
3. As what is known; hence science is the body of knowledge.

Patterns of Language

Languages have existing patterns. These patterns are perceptual structures and customary ways of operation or behaviour presented as models. A model is a hypothetical description of a complex entity or process. It is a display or representation of worthy type of product. The modals are: Amodal, unimodal and multimodal Policy Patterns.

Amodal Policy Pattern: This extols one foreign language and belittles the other language which is mostly, native language of a people. This is a practice in French and Portuguese ex-colonies. This is the product of their colonial master's legacy that can't often be changed overnight. This is because; they are tied to juicy programmes like

French Assimilation Policy by the colonizer's language. This makes French the only acceptable means of communication and social instruction. This converts indigenous language to a private or inferior language of the uncivilized and locals in the society.

Unimodal Policy Pattern: This extols a widely spoken indigenous language that is adopted either as natural or official language while the other indigenous languages are allowed to functions like domain, serving other functions like political campaigning, public announcements etc. This policy reflects the adoption of Kirundi in Burundi, Swahili in Tanzania and Somali in Somali. Unlike the Amodal Policy Pattern, wherein the foreign language dominates the entire dealings within the policy, Unimodal Policy allows for the use of the foreign language or colonizer's language in some sectors of national life, most especially, in education.

Multimodal Policy Pattern: This extols one foreign or exogamous language as well as one or more indigenous majority languages over and above other minority languages. The continued existence of minority languages, in most cases, is often threatened due to concentration on the majority languages. Nigeria (with its Igbo, Yoruba and Hausa and English languages), Kenya (with its English and Swahili), Sierra Leone (with its English and Creole), and Ghana with its English, Akan, Ewe and Moshi-Dogomba) operate in this policy.

Roles of Language as a Common Tool

1. As a tool of interaction with others. Interaction process allows interchange feedback between the speaker to his interlocutor
2. Reflects person's level of education. Educated people tend to interact with the environment that supports the use of language quality than less educated.
3. Indicates authority. It allows the expression of ideas in a clear and straightforward manner.
4. As the force of law. Language is implemented as an ability or skill in

communication.

5. Attract customers as admirers.
6. Indicates a person's social standing to reflect his position in a society.

In Nigeria, the language of science is colonial or foreign language. Native or indigenous language, despite its proven ability in enhancing cognitive understanding, is not prioritized in teaching and learning, especially, science and technology subjects in junior secondary schools (Ademowo (2012). Chinese, Portuguese, Japan are good examples of the countries that have realized this indubitable fact. They developed their indigenous languages to accommodate techno-scientific terms and this has resulted in breakthrough. This made them among the world leaders in science and technology today. The question is: What can Nigerian leaders learn from this and when will they do so?

Ebonyians which are integral part of Nigeria, see Igbo language, their mother tongue, as an optional language or subject. Even in the universities, English Language is a compulsory GST course while Igbo Language is not at all. English Language remains the only language of instruction in schools, while Igbo or native language, unless during the teaching of the subject, Igbo language cannot be remembered. According to Dimkpa and Eze (2023), colonial mentality may be the cause of some students developing apathy towards science and technology subjects. The subjects have English Scientific terms, formulas and symbols more difficult to understand by students, especially, those that fortune could not give the opportunity to pass through good schools. Until Nigerians realize the relevance of indigenous language in education, their advancement in science and technology remains elusive.

Nature of Indigenous Language:

The mind of a man is always active. As the result of this, it keeps processing information endlessly so long the person remains active and alive. The social background and widest medium of communication is formed by the very language one is most comfortable with. Dimkpa and Eze hold that indigenous language is one's original,

homegrown, local native and aboriginal language. It determines one's thinking since it is the first language that shapes his/her thought processes and vocabulary. It also determines one's mode of perception of concepts. Uzgali (2022) cites John Locke who postulated the theory of *tabula-rasa* as being the original state of the human mind after birth.

John Locke was basically concerned with the human understanding and the knowledge. The point of comprehension for Locke is that a human mind starts function once it gains some sort of experience, else, it is a blank or clean slate since birth time hence, *tabula rasa*. The extension of *tabula rasa* is the personal appeal which is adapted by family dynamics, hereditary and congenital influences on human personality and brought up.

Indigenous language configures a child's brain from birth to adulthood and helps to determine his world view cum the rate at which he assimilates new ideas. This determines how he understands and transfers or develops his environment through science and technology. Sequel to this, Dimkpa and Eze hold that, If indigenous language, understood as the first language of encounter of a human with reality and the widest spread avenue of communication around the individual-determines how one's brain is wired and how they perceive their environment then, it should be the most appropriate tool for integral education including teaching, research and learning in schools.

In line with this, the most appropriate language of instruction in education at a tender age should be the native or first language of a child. The language will go a long way in maximizing the intellectual potentiality of the child's brain and help to improve his rate of perception of concepts of scientific and technological inclination. This does not mean that English Language is not good for classroom instructions since Nigeria is bilingual in communication.

A child may not appreciate the enormity of discourse at hand when there is no difference between what they speak at home and the

instructional vehicle of formal education. Therefore, the latent untapped potency of any mother tongue to the release of faster rate of scientific advancements and technological developments for man in general is revealed by the success rate of indigenous language in fostering mutual disposition to listening, consideration, understanding, peace and collaboration. In scientific and technological formation, language according to Dimkpa and Eze, is an important tool. Its primacy gave rise to no common-person to-person interactive vocabularies and expressions as computer, mathematical, logical and technical languages. Therefore, language should be given its pride of place in educational field, because it plays irreplaceable roles in training, the mind. John Dewey (2008) is emphatic when he postulates that language is the tool for tools. He further said that, communication is the most wonderful. That, things should be able to pass from the plane of external pushing and pulling to that of revealing themselves to man, and thereby to themselves, and that the fruit of communication should be participation, sharing ... Failure to recognize that this world of inner experience is dependent upon an extension of language which is a social product and operation led to the subjectivistic, solipsistic and egotistic strain in modern thought ... modern thinkers composed nature after the model of personal soliloquizing.

Sequel to this, the emphasis of the work is specifically on the indigenous language of a people and its relevance as their mother tongue to teaching and learning of science and technology. As an autochthonous language, mother tongue is the language native to a particular province and is used as medium of communication by the aboriginal people. Shimizu (2022) lays emphasis on the importance of native languages and their efficacy in presenting human cultural and intellectual heritage when he wrote, preserving indigenous language as a reservoir of diversity and an essential component of collective and individual identity, stands as an ethical imperative in dissociable from respect for the dignity of the individual. When an indigenous language is lost, not only does the knowledge accumulated by the community of its speakers

face away, but also the worlds' cultural and biological diversity is jeopardized.

As the language spoken by a people, indigenous language might not be national language of a country, but can equally be accepted as a national language. It is not foreign language, but the language native to a people located with a geographical settlement or location. Since the people are cognizant and are more conversant with the language, it should be the mainstay of science and technology education. Indigenous language is a potent tool of education, because it is the language deep rooted in the people's way of life or culture and in the way they perceive the world around them.

The Nigeria Policy makers and her political puppet leaders are yet to overcome the inferiority complex that holds their native language in the belly of inferiority. They still strongly believe that their language is inferior and so, is not good enough to be used in education for training the mind and imparting knowledge. They prefer the language of their colonizers or colonial masters and hold it better than their own mother tongue. This is one of the residual effects of slave trade and colonialism.

Indigenous Language, Science And Technology Education

For Dimkpa and Eze (2023), Nigeria as a nation is grossly backward in the field of education as a local content. This, they said, could be the result of negative impact of colonization. Since native language is potent and deep rooted in people's way of life, whatever knowledge that could be communicated through it is easily decoded, understood and internalized by the people. Learners do not require the services of dictionaries in an extraordinarily burdensome way in order to understand the meaning of words used during teaching and learning, because the language has become their way of life and identity.

In many part of Nigeria, students still rely heavily on the language the colonial masters imposed on them as the language of instructions in schools. This has failed in harnessing the intellectual

potentials of individual citizens appropriately, most especially, in the field of science and technology education. Technology is culture-bound and so, deals with the best understandable language to the citizens. Fredrick Forsyth in his book on Nigeria Biafra War cited a formidable instance on the relevance of native language in technology. In the three years of existence of the state of Biafra, they soared so high in technology and innovations that the Western World Championed by Britain was amazed that it held off their sponsored genocidal war for three years through locally, but effectively, technological arms fabrications (Ubong, 2011). It is heart rendering that one is still rated today in Nigeria as an educated person based on how fluently he/she speaks foreign languages such as English, French, Greek, Latin, Portuguese, among other languages. The essence and end of any language is communication.

Any language that lacks the ability of effective communication has implicitly, failed. All ideas will naturally fall in place and all levels of comprehension become higher among the listening students and audience when indigenous or native language as mother tongue of a people is used. Native language helps students to be more relaxed, feel happier, have better understanding of concepts and positively respond to the teacher's questions. Coherent, creative and correct responses to a teacher's questions help in boosting of morals and would be motivated to do more as to assist the students learn well as they pay more attention in the classroom.

Ademowo (2012) holds that education polices on indigenous languages are often neglected and inferioritized to the benefit of foreign languages in Nigeria. In 1997, UNESCO organized an intergovernmental conference on language policies in Africa in Harare, Zimbabwe which the product was a resolution tagged "Harare Declaration on Language Policy". Like African Language Bureau, which Nigeria is part of, Harare Declaration turned out to be a more rhetoric and shelvable product of a sponsored talkshop.

According to Harmmound (1975), language is central to the sustenance of a group of people for it the vehicle through which other constituents of cultures are communicated, acquired, admired shared and transmitted. To Bewaji (2002), language is central to the interactive process. When language disappears, a medium or vehicle of communication is gone. No country has risen to first rank scientific, technologically and economic power by excessive dependence on foreign language. Japan rose to dazzling industrial heights by scientificating the Japanese language and making it the medium of its own industrialization. Can Nigeria ever take-off technologically and scientifically if it remains so overwhelmingly dependent on foreign languages for discourse on learning? For Mazrui (2002), indigenous language is capable of enhancing cognitive understanding and removes pedagogical barriers in teaching and learning.

Pragmatic Approximating Process

This is a proposed process directed to have adequate manual for translation of the scientific terms into the indigenous language realm without, or with minimum loss of meaning. It is a painstaking, thinking, discussing, explaining and approximating new words process in translation of scientific concepts and theories from foreign to an indigenous language without any possibility of loss in meaning occasioned by cross cultural translation. According to Ademowo (2012), Pragmatic Approximating Process has three stages as: Explanation, thinking and approximating stages:

i. Explanation stage: This is the first stage of African Languages Scientific Manual (ALSM) which involves active dialogue that entails explanations and discussion on the English meaning of scientific objects and theories. At this stage, clarification for adequate understanding occurs.

ii. Thinking: This is the second ALSM involving personal reflections on the explanations given at explanation stage. It results in participation and re-examining of the concepts explained, described objects and narrated process.

iii. Approximating stage: This is ALSM stage that involves supplying approximates for the scientific terms under discourse.

According to Robins (in Owolabi, 2006), PAP (Pragmatic Approximating Process) professional participants must hold on the three canons as: Exhaustiveness, precision and consistency.

a. Exhaustiveness is the canon that holds all language regularities to be adequately accounted for without leaving behind, even the smallest part.

b. Precision is the canon that discourages the involvement of long explanations, rather, a precise or shorter statement which uses few terms preferable to longue terms.

c. Consistency is the canon which holds that different parts of the statements translated should agree with each other for the avoidance of contractions.

According to Owolabi, there are fourteen methods of creating new linguistic terms to obliterate the obstacles of cross-cultural translation bound to rear its ugly head during PAP. They are: Semantic extension, composition, dialectic/internal borrowing, loanwords/external borrowing, specification, explication, idiomatization simple equalence, acronyms, coinage, description, translation, adaptation and range extension. In its implication, PAP ensures that the original scientific words are correctly translated and helps words be put in the same practical usage in various native language of the country (Nigeria) as other scientist worldwide. It also help to produce the same or even better results capable of causing the understanding of the universal test characteristic of science and technology.

Saidu and Mudassir (2022) hold that employment of language other than indigenous language in teaching and learning science and technology had eventually led many students develop negative attitude towards sciences. It is against this backdrop that this work investigated on, "The Use of Indigenous Nigeria Language in Teaching Science and Technology in Abakaliki

Education Zone, Ebonyi State". Science and technology education encourages students to think scientifically and creatively through progressive learning activities involving planning, measuring, observing, analyzing, designing, experimenting, evaluating and other scientific procedures. Hence, in Nigeria schools, the bone of contention is the medium of instruction. The country still prefers foreign languages over her native languages.

Cummins (2000) states that children who come to school with a solid foundation in their mother tongue develop stronger literacy ability in their school language. The deeper a student's level of first language cognitive and academic development, the faster the student's progress in the second language. Various concepts are easily understood, assimilated and accommodated when a student's mother tongue is used in the classrooms. This will enable the student become more critical and rational thinker. The correctness and understandability of scientific concepts depends largely on the usage of language.

Policy on Education (NPE, 2014 edition), section 5, and subsection 22 (secondary), Federal Ministry of Education (FME) stated that the government shall;

- (I) Develop and promote Nigeria languages, arts and cultures in the context of the world's cultural heritage.
- (ii) Language of the environment to be taught as L1 (first language). Teaching the language of the environment as L1 will help to:
 - a. Enable learners speak, write and communicate fluently with the neighbor.
 - b. Familiarize with the sound system, structure of grammars and features of native language.
 - c. Expose the learners to their cultures, customs and traditions.
 - d. Acquaint with vital materials required for creative writings and appreciation of Nigerian languages and literature.

The FME in section 4 and subsection 18 (primary) also stated that the government shall;

- i. Lay a sound basis for scientific and reflective thinking
- ii. Ensure that the medium of instruction in primary school shall be the language of the environment for the first three years (Junior secondary).

Methodology

The researchers used a descriptive survey design for this study. This survey design is appropriate because according to Abonyi, Okereke, Omebe and Anugwo (2006), it is a design in which a group of people, objects or items under study which are considered to be a true representative of the parent population. The study was carried out in Abakaliki Education Zone, Ebonyi State. The sample for the study was twelve (12) Junior Secondary School science teachers and one hundred (100) science students, using simple random sampling technique to draw schools from the education zones. A structured questionnaire developed by the researchers and titled, Nigerian indigenous language in teaching and learning science and technology questionnaire (NITLSTQ) was used for data collection. Two experts, one from science and technology department and one from linguistic department face and content validated the instrument. For reliability of the instrument, it was subjected to test of internal consistency using Cronbach Alpha estimate. It was administered to 30 teachers outside the area of the study and the instrument yielded a reliability coefficient of 0.76 as tested on cluster, subscale 1 had a coefficient of 0.73; 2 had coefficient of 0.82; and 3 had a coefficient of 0.72. The researchers then distributed the questionnaire to the schools with the help of the science and technology teachers in the area. Descriptive statistics of mean ($\bar{x}$) and standard deviation (SD) was used to answer the research questions while t-test statistics was used to test the null hypotheses at 0.05 alpha level. A mean score of 2.5 and above was accepted as agreed while below 2.5 was accepted as disagreed.

Results

1. To what extent are students knowledgeable in translating science and technology terminology

to indigenous language (Igbo) in secondary schools in Ebonyi State?

Table 1: Mean and standard deviation of the respondents on students' knowledge in translating science and technology terminology to indigenous language (Igbo) in secondary schools in Abakaliki Education Zone, Ebonyi State

Teachers, 12. JSS3 students, 100

Item	Translating science and technology terminology to indigenous language(Igbo)	Mean	SD	Dec	Mean	SD	Dec
1.	I can translate characteristics of living things	2.85	0.63	A	2.54	0.94	Agreed
2.	I can translate Acid to Igbo language	2.76	0.74	A	2.62	0.88	Agreed
3.	I can translate Salt to Igbo language	3.65	0.42	A	2.65	0.86	Agreed
4.	I can translate Starch to Igbo language	3.27	0.47	A	2.57	0.90	Agreed
5.	I can translate photosynthesis to Igbo language	2.62	0.88	A	2.55	0.92	Agreed
6.	I can translate respiration to Igbo language	2.77	0.73	A	2.75	0.78	Agreed
7.	I can translate nutrition to Igbo language	2.64	0.81	A	2.61	0.89	Agreed
8.	I can translate movement to Igbo language	2.55	0.86	A	2.73	0.77	Agreed
9.	I can translate characteristics of non-living things	3.28	0.46	A	2.84	0.64	Agreed
10.	I can translate Hydrogen to Igbo language	2.72	0.77	A	2.63	0.87	Agreed
	Grand mean	2.73	0.76	A	2.64	0.86	Agreed

(Source: *Researcher's Field Work 2024*)

Result as presented on table 1, showed that the respondents over whelmingly agreed on all the items as students knowledgeable in translating science and technology terminology to indigenous language(Igbo),with a grand mean score of 2.73 and SD 0.76 for teachers. While the

students have the mean of 2.64 and SD 0.86

Research question 2: How does indigenous language (Igbo) help learners to understand scientific and technological concepts covered in the curriculum in Ebonyi State?

Table 2: Mean and standard deviation of the respondents on how indigenous language help learners to understand scientific and technological concepts covered in the curriculum in Ebonyi State

Teachers,12.				JSS3 students,100			
S/N	Items	Mean	SD	Dec	Mean	SD	Dec
1.	Scientific and technological terms are explained with indigenous language in the classroom	2.75	0.73	Agree	2.68	0.75	Agree
1.	I learn more when concepts are explained using indigenous language.	2.86	0.66	Agree	2.66	0.74	Agree
2.	Teachers demonstrate practical with indigenous language	3.45	0.46	Agree	2.65	0.76	Agree
3.	Assignments are carried out with indigenous language	3.37	0.48	Agree	3.17	0.58	Agree
4.	Scientific substances/tools are tagged with indigenous names	2.82	0.64	Agree	2.52	0.87	Agree
Grand mean		3.12	0.56	Agree	2.84	0.63	Agree

(Source: *Researcher's Field Work 2024*)

Result as presented on table 2, revealed that all the respondents agreed on all the items, as indigenous language helping learners to understand scientific and technological concepts covered in the curriculum, with a grand mean score of 3.12 and SD 0.56 for teachers and the

students had the mean of 2.84 and SD 0.83

Research question 3: To what extent is indigenous language adequate in solving chapters' learning activities in science and technology?

Table 3: Mean and standard deviation of the respondents on adequacy of indigenous language help learners to solve chapters' learning activities in science and technology

Teachers, 12.				JSS3 students, 100			
S/N	Items	Mean	SD	Dec	Mean	SD	Dec
1	Most chapter learning activities cannot be solved with indigenous language.	3.35	0.48	Agree	3.15	0.56	Agree
2	Most scientific formulae cannot be explained with indigenous language.	3.42	0.46	Agree	3.22	0.52	Agree
3	Most scientific terminologies have no indigenous words	3.07	0.58	Agree	3.01	0.58	Agree
4	My knowledge of indigenous language helps me understand my environment	3.12	0.56	Agree	3.02	0.56	Agree
5	The indigenous language is not adequate to solve chapters' learning activities in science and technology?	3.52	0.43	Agree	3.52	0.42	Agree
Grand mean		3.31	0.51	Agree	3.11	0.61	Agree

(Source: *Researcher's Field Work 2024*)

From the result presented on table 3, indicated that both teachers and students agreed on all the items, that indigenous language cannot adequately solve chapters' learning activities in science and technology in schools, with a grand mean of 3.31 and SD 0.51 for teachers and the students had the mean of 3.11 and SD 0.61

Testing Hypotheses

H0₁: There is no significant difference between the mean ratings of teachers and students' on students' knowledge in translating science and technology terminology to indigenous language (Igbo) in schools Ebonyi State?

Table 4: T-test analysis of difference between means ratings of teachers' and students on student's knowledge in translating science and technology terminology to indigenous language (Igbo) Ebonyi State

Category	N	Mean	SD	Df	t-cal	t-crit	Dec
Teachers	12	2.73	0.76	110	0.41	1.96	H0₁: Accepted
Students	100	2.64	0.86				

From the result of the t-test analysis shown in the table 4 above, the t-test calculated is 0.41 while the t-critical is 1.96 at 0.05 alpha level. Since the calculated value which is 0.41 is less than the critical value which is 1.96, the hypothesis should be accepted which states that, there is no significant difference between the mean ratings of teachers and students on students' knowledge in translating science and technology

terminology to indigenous language (Igbo) in schools Ebonyi State.

H0₂: There is no significant difference between the mean ratings of teachers and students' on how indigenous language can help learners to understand scientific and technological concepts covered in the curriculum in Ebonyi State.

Table 5: T-test analysis of difference between means ratings of teachers' and students on how indigenous language can help learners to understand scientific and technological concepts covered in the curriculum in Ebonyi State.

Category	N	Mean	SD	Df	t-cal	t-crit	Dec
Teachers	12	3.12	0.56	110	1.81	1.96	H0₁: Accepted
Students	100	2.84	0.63				

From the result of the t-test analysis shown in the table 5 above, the t-test calculated is 1.81 while the t-critical is 1.96 at 0.05 alpha level. Since the calculated value which is 1.81 is less than the critical value which is 1.96, the hypothesis is therefore accepted which states that, there is no significant difference between the mean ratings of teachers and students on how indigenous language can help learners to understand

scientific and technological concepts covered in the curriculum in Ebonyi State Secondary Schools.

H0₃: There is no significant difference between the mean ratings of teachers and students' on indigenous language adequacy to solve chapters' learning activities in science and technology in Ebonyi State Secondary Schools.

Table 6: T-test analysis of difference between means ratings of teachers' and students on how indigenous language can help learners to understand scientific and technological concepts covered in the curriculum in Ebonyi State Secondary Schools.

Category	N	Mean	SD	Df	t-cal	t-crit	Dec
Teachers	12	3.31	0.51	110	0.92	1.96	Ho1: Accepted
Students	100	3.11	0.61				

From the result of the t-test analysis shown in the table 6 above, the t-test calculated is 0.92 while the t-critical is 1.96 at 0.05 alpha level. Since the calculated value which is 0.92 is less than the critical value which is 1.96, the hypothesis is therefore accepted which states that, there is no significant difference between the mean ratings of teachers and students' on indigenous language adequacy to solve chapters' learning activities in science and technology in Ebonyi State Secondary Schools.

There was no significant difference between the mean ratings of teachers and students on indigenous language adequacy to solve chapters' learning activities in science and technology in Ebonyi State Secondary Schools.

Discussion of findings

The research findings were discussed under the following sub-headings:

- To what extent are students knowledgeable in translating indigenous language (Igbo) to science and technology terminology in Ebonyi State Secondary Schools
- How does indigenous language help learners to understand scientific and technological concepts covered in the curriculum in Ebonyi State Secondary Schools
- To what extent of indigenous language adequacy to solve chapters' learning activities in Ebonyi State Secondary Schools.

On the extent students are knowledgeable in translating indigenous language (Igbo) to science and technology terminology in Ebonyi State Secondary Schools

The result of the study revealed that students can translate the followings to indigenous language (Igbo): characteristics of living things, acid, salt, Starch, photosynthesis, respiration, nutrition, movement and characteristics of non- living things. This is in agreement with Dimkpa and Eze (2023) who hold that "Language promotes intellectual growth by facilitating learning, unlearning and relearning of ideas within one's habitat". The ability of a learner to learn or a teacher to teach another language is largely dependent on his/her proficiency in his/her mother tongue as his/her native or first language. It is on these bases the students can translate those substances and concepts.

On how indigenous language help learners to understand scientific and technological concepts covered in the curriculum in Ebonyi State Secondary Schools.

The result of the study showed that indigenous language can help the learners to understand scientific and technological concept in the following ways; when they are explained with indigenous language in the classroom, Teachers demonstrate practical with indigenous language, Assignments are carried out with indigenous language, and when scientific substances/tools are tagged with indigenous names. These findings are congruent to Cummins (2000), who states that children who come to school with a solid foundation in their mother tongue develop stronger literacy ability in their school language. He also recognized that the deeper the students level of first language cognitive and academic development, the faster the student's progress in the second language. Various concepts are easily understood, assimilated and accommodated when a student's mother tongue is used in the classrooms. This will enable the student become

more critical and rational thinker. The correctness and understandability of scientific concepts depends largely on the usage of language.

On the extent of indigenous language adequacy to solve chapters' learning activities in Ebonyi State Secondary Schools,

It was discovered that most chapter learning activities cannot be solved with indigenous language, most scientific formulae cannot be explained with indigenous language, most scientific terminologies have no indigenous words, and the indigenous language is not adequate to solve chapters' learning activities in science and technology. However, the National Policy on Education (NPE, 2014 edition), stated that the government shall;

Develop and promote Nigeria languages, arts and cultures in the context of the world's cultural heritage, Language of the environment to be taught as L1 (first language). Teaching the language of the environment as will help to: Enable learners speak, write and communicate fluently with the neighbor, Familiarize with the sound system, structure of grammars and features of native language, Expose the learners to their cultures, customs and traditions, Acquaint learners with vital materials required for creative writings and appreciation of Nigerian languages and literature, and lay a sound basis for scientific and reflective thinking among other things.

Conclusions

The study was on the relevance of using Nigerian indigenous language in teaching and learning science and technology in Ebonyi State secondary schools. The study reviewed and cited relevant literature. With adequate data analysis, conclusion was inferred that, Nigerian indigenous language is relevant in teaching and learning science and technology in Ebonyi State, Nigeria.

Recommendations

The following recommendations were made based on the findings of the study

1. The teaching of translating science and technology terminology to indigenous language (Igbo) in Ebonyi State Secondary Schools should be made compulsory.
2. Government at all levels should provide adequate instructional materials for the learning of indigenous language that can help learners to understand scientific and technological concepts covered in the curriculum in Ebonyi State Secondary Schools.
3. The teaching of indigenous language that can adequately solve chapters' learning activities in science and technology in Ebonyi State Secondary schools should be encouraged.

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