

**TEACHERS' AND STUDENTS' PERCEIVED USEFULNESS, IMPACT AND
EASE-OF-USE OF MOTHER-TONGUE IN TEACHING AND LEARNING OF
BIOLOGY IN SECONDARY SCHOOLS IN MINNA METROPOLIS**

BY

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MTech/SSTE/2018/9320**

**DEPARTMENT OF SCIENCE EDUCATION
FEDERAL UNIVERSITY OF TECHNOLOGY,
MINNA.**

AUGUST, 2023

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**A THESIS SUBMITTED TO THE POST GRADUATE SCHOOL, FEDERAL
UNIVERSITY OF TECHNOLOGY MINNA, NIGERIA IN PARTIAL
FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF MASTER OF
TECHNOLOGY (MTech) IN BIOLOGY EDUCATION.**

AUGUST, 2023

DECLARATION

I ABBAS Lami, hereby declare that the research work, titled **“Teachers’ and Students’ Perceived Usefulness, Impact and Ease-of-Use of Mother-Tongue in Teaching and Learning of Biology in Secondary Schools in Minna Metropolis”** is a collection of my original work and it has not been presented for any other qualification anywhere. Information from the works of other scholars (Published and unpublished) and their contributions here have been duly acknowledged.

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SIGNATURE & DATE

CERTIFICATION

This thesis titled: **“Teachers’ and Students’ Perceived Usefulness, Impact and Ease-of-Use of Mother-Tongue in Teaching and Learning of Biology in Secondary Schools in Minna Metropolis”** by ABBAS Lami (MTech/SSTE/2018/9320) meets the regulation governing the award of the degree of Master of Technology (MTech) of the Federal University of Technology, Minna and is approved for its contribution to scientific knowledge and literary presentation.

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DEDICATION

This research project is dedicated to my late father Alhaji Muhammad Abbas Bani-Hashim.

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ABSTRACT

This study was aimed at surveying the teachers and students' perception of the use, impact and ease of use of Mother Tongue in teaching and learning Biology in secondary schools in Minna Metropolis. A multi stage sampling technique was used. Twelve research questions were set to guide the study, and six corresponding research hypotheses were tested at the 0.05 level of significance. Descriptive survey was adopted. Population of the study comprised all Biology teachers and SSII students in the secondary schools in the municipal. 357 students and 16 teachers and four schools were randomly selected using simple random sampling technique for students and a purposive sampling technique for the teachers. Two perception instruments TPMTTQ and SPMTLMQ which were validated and confirmed reliable (0.84 and 0.86) were used for the study. 12 research questions and six hypotheses were raised and answered using descriptive statistics and independent t-test respectively. The findings of the study with the grand mean of $X = 3.80$ with standard deviation of $SD = 0.87$ revealed that teachers have positive perception of the use of mother tongue in teaching Biology in secondary schools in Minna. The study established the grand mean of $X = 3.65$, and the standard deviation $SD = 0.87$, indicating that students perceived mother tongue as a positive medium of instruction for learning Biology in secondary schools in Minna. The study also established that; ($t(14) = 1.187$, $p = .225$) shows no significant difference between the mean response of male and female teachers' perceived use of Mother Tongue in teaching and learning Biology. It was recommended that; teachers, students and parents should embrace the use of mother tongue in teaching and learning of Biology and other sciences in secondary schools. All stakeholders should embrace the development and give maximum cooperation in the implementation of the mother tongue policy in secondary schools.

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CHAPTER ONE

1.0

INTRODUCTION

1.1 Background to the Study

Education is an act of teaching, leaning and training of individual to become a useful instrument of change in to the society. For effective teaching and learning to take place language is required whether written in a textbook or taught orally during classroom instruction, language serves as a guide for thinking and thinking is requisite for effective communication in teaching and learning (Isah *et al.*, 2017). It is also an integral part of any culture hence any child born into any family will first acquire the linguistic aspect of that culture which eventually is passed from generation to generation known as the learner's language or mother-tongue (Diaz & Perez, 2015).

Education in the mother tongue refers to the type of schooling that uses the language familiar to the *students (Bagari, 2016). In the same vein, Wushishi *et al.* (2016) stressed that learning becomes effective when both the teacher and the learner speak well the language of instruction. Educators argue that only those countries where the student's first language is the language of instruction are likely to achieve the goals of Education for all (Diaz & Perez, 2015). Many countries adapted the language of their immediate community as the language of instruction for example, English language is adapted in Europe, China adapt mandarin, India adapts Hindu but Nigeria adapts English. The challenge posed by the multi-lingual nature of Nigeria facilitated the use of English as an official language which is perceived to be a barrier for the attainment of the education objectives right from independent, until recently the Federal Government of Nigeria (FGN, 2014) revised the national policy on education on the use of Mother-tongue in teaching and learning at the six years of lower basic primary education.

Another development at the tail of 2022 by the Federal Executive Council of Nigeria on national policy on education led by Minister of education presided over by president Muhammed Buhari warrants the use of mother-tongue in teaching and learning at lower secondary school level of education. Looking at the enormous advantages of the mother tongue, the National Policy G Education (FGN, 2014) emphasizes the use of the language of the immediate environment to be the medium of instruction in monolingual communities during the first three years of lower basic education, and English to stand as a subject (FGN, 2014). Perception in human brain is such and authority of self-verified sensory data that cannot be seen but manifested. Olaoye (2013), perception is also an individual's view or stance on using a particular idea or strategy that will enhance or improve his or performance also influenced by the attitude of the user of a particular strategy of instruction.

Perception goes a long way in affecting individual attitudes, values and beliefs. Perception is one's view about the outcome of an experience. Yusuf *et al.* (2016) defined perception as individual's view or stance on using a particular idea or strategy that will enhance or improve his or her performance. This implies that perception has a positive relationship with behavioral intention (Zhao, 2019).

The traditional teaching approach emphasizes learner-centered activities such as group work and discussions, leading to an enhanced teaching and learning experience in biology (Asanre *et al.*, 2022). The choice of teaching methods employed by educators plays a critical role in conveying specific concepts, with inadequate methods identified as a significant contributor to students' subpar performance in biology (Maisamari & Akinsola, 2020).

Teaching biology and other science-related subjects has become a challenging task, particularly in Nigeria's northern region. This predicament has become particularly acute

in numerous schools (Asanre *et al.*, 2022). One primary challenge is that some biology instructors struggle to convey complex biological terms in a manner that resonates with students. Moreover, in addition to issues concerning teaching methodologies and the inadequacy of laboratory resources, the language used for instruction has consistently emerged as a significant hurdle, impeding students' grasp of biological concepts (Guga & Bawa, 2016).

The ongoing discourse surrounding the medium of instruction in Nigeria underscores the importance of various considerations, including a heightened emphasis on employing students' mother tongues as a means of instruction. This emphasis is especially crucial, given the multicultural and multilingual characteristics of many urban areas.

Biology is one of the core science subjects offered at senior secondary school level of Nigeria's education system and a subject that student must pass in order to study courses at tertiary level of education. Courses, such as medicine, agricultural sciences, pharmacy, engineering, nursing, science education and other science related courses needed biology as a pre-requisite.

There is a growing support for the use of mother tongue or language of the immediate community as a medium of instruction in the first three years of primary education in Nigeria. This position has been spelt out clearly in the National Policy on Education in Nigeria (Ige, 2012). Biology encompasses numerous complex concepts that can pose challenges for learners when explained in a second language, often resulting in a lack of clarity and hindered comprehension. Therefore, employing the first language, or "the Mother Tongue," can facilitate more effective learning. It enables students to grasp and simplify intricate ideas during classroom instruction (Diaz & Perez, 2015).

Before the introduction of the revised 9-year basic education curriculum, Biology held a nearly revered status as a core subject taught in Nigerian senior secondary schools. This

prominence was attributed to its crucial role in promoting self-reliance by creating employment opportunities and ensuring the production of staple foods for the population as well as supplies for agro-allied industries.

In its relentless pursuit of these commendable objectives, the Federal Republic of Nigeria has delineated the fundamental goals of teaching Biology at the secondary school level. These objectives encompass kindling and sustaining students' interest in Biology, instilling agricultural skills, imparting indispensable knowledge and practical expertise in Biology, preparing students for advanced studies in the subject, and nurturing potential future farmers (FGN, 2014).

Employing the native language for the instruction of science holds significant promise in cultivating practical, innovative, and higher-order thinking abilities, which constitute bedrock elements of scientific progress (Isah *et al.*, 2017). Furthermore, research conducted by Wushishi *et al.* (2016) demonstrates that teaching Biology in the mother tongue results in a more profound understanding compared to instruction conducted in English.

The mother tongue embodies a distinctive human system of communication, encompassing both spoken and written symbols. It serves as the medium for transmitting a community's cultural heritage and is founded on a foundation of mutual and intrinsic trust among its speakers (Abdulrahman, 2014). Proficiency in one's own language holds immense importance in facilitating effective learning because language serves as a guiding framework for cognitive processes, which, in turn, are pivotal for facilitating effective communication.

Language assumes a central role in the education of young children, encompassing essential skills such as listening, speaking, reading, and writing. Children receive verbal messages and respond to them, forming the cornerstone for social interaction and the

development of cognitive abilities. Consequently, language lies at the heart of the interactive learning process (Ademowo, 2010).

Furthermore, Abdulrahman (2014) view the mother tongue as not only the bedrock of every culture but also as an abstract system encompassing words, meanings, and symbols essential to all cultural facets, including speech, written characters, numerals, symbols, gestures, and non-verbal expressions. It is through the mother tongue that other components of culture are transmitted, making it vital for the preservation and communication of a group's identity.

Language incompetence and inequality by learners are also being identified as one of the significant factor contributing to the poor performance of students in Biology (Ige, 2012). It implies that Listening-Speaking-Reading-Writing-continuum represents the natural sequence of language growth in mother tongue. Therefore, mother tongue refers to any language indigenous to Nigeria (Isah *et al.*, 2017).

Teachers have varied mother tongue abilities to make a subject interesting and meaningful in their bid to facilitate coherent learning and achievement and motivation. Biology and English Language should be taught functionally in small groups with the use of students who can speak a universal Nigerian Language (Ricablance, 2014). The most common language in Nigeria used in teaching and learning situations, which is been described as a medium of instruction, is English language. However, it is no longer tenable to posit that the use of English language as the official language of Nigeria has solved the problems of equal access to knowledge, divisiveness and grounding poverty and underdevelopment.

Conversely, it can be argued that English language as a medium of instruction in schools has become a formidable and impenetrable barrier to access to knowledge and information, for a great part of the Nigerian society by ostracizing the languages of the

environment and disengaging them from the business of education (Hanafi, 2013). Attahiru further noted that if we were not prepared to accept the fact that foreign languages cannot be sufficient for the educational needs of Nigeria, then the aspiration for a knowledge driven and modern society will remain a mirage to Nigerians.

Surprisingly, most of the Biology teachers of secondary schools are still known to have difficulty in teaching some concepts in Biology, this leads to students' poor performance in such areas especially in public examinations, like the West African Senior Secondary School Certificate Examinations (WASSCE), National Examinations Council (NECO) and the National Technical Business Educations Board (NABTEB) (Isah *et al.*, 2017). Researchers reported that many students have negative perception on Biology as a subject that is dominated with practical, and is majorly meant for students that are intellectually capacitated (Adah, 2011). As a result of this negative perception, students find it difficult to understand concept of Biology and consequently fail in the WAEC and NECO examinations over the years. Recently, the Federal government of Nigeria re-emphasized the need to adopt Mother Tongue in teaching and learning at lower and upper Basics education in Nigeria. This is deemed as a great development but if there is negative perception on the policy among teachers and students then, it will appear difficult to attain the objectives of such policy. Teachers and students are the key players of curriculum and policy implementation in education, as such, appraising their perception of the use of Mother Tongue in teaching and learning of Biology will be of great significance before diving into the experimental studies as Mother Tongue is concerned. Thus, the study investigated the teachers' and students' perception on the use of mother tongue in teaching and learning of Biology in secondary schools in Minna metropolis, Niger State, Nigeria.

A curriculum may be properly implemented or not depending on the teacher's view or perception about the curriculum to be implemented. This is why Biology teachers' perception about mother tongue instruction plays a pivotal role in effective curriculum implementation. If an issue is perceived sensitive, such perception, it fertilizes individual beliefs, attitudes and values. The perceptions of teachers have several implications for language policy implementation in the school (Ige, 2012). If teachers view mother tongue instruction positively, believing it to be effective and valuable, they are more likely to embrace it as a teaching method. Conversely, if they have reservations or negative perceptions, they may be less inclined to adopt it.

In essence, teachers' perceptions about mother tongue instruction can act as a catalyst, either fostering or hindering the effective implementation of curriculum goals (Mahmud, 2017). The alignment of teacher perceptions with curriculum objectives and language policies is essential for creating a conducive and supportive learning environment. Therefore, it is crucial for educational institutions and policymakers to understand and address teachers' perceptions when implementing curriculum changes that involve language choices.

The gender of the teachers, the years the years of experience and the type of school (either public school or private school) are all important variables which must be considered in the study so as to know the influence the variables have on teachers' and students' perception of mother tongue in teaching and learning of biology. Since teachers are regarded as the facilitators and disseminators of knowledge via the use of language identified as a medium of instruction, it is highly important to study and analyze their perceptions on the use of mother- tongue in teaching and learning at the senior secondary school level so as to know their view, as many schools failed to adopt the use of mother tongue as a medium of instruction.

1.2 Statement of the Research Problem

Mother-tongue was found to be an effective medium of instruction which leads to better performance of the subject matter of biology (Satayev *et al.*, 2022). There was also persistent poor performance in biology over the years in the national examinations such as West African Senior Secondary School Certificate Examination (WASSE), National Examination Council (NECO) and National Board for Technical and Business Examination (NABTEB) due to the abstract nature of biology (Owolade *et al.*, 2022).

Implementing mother-tongue if perceived negatively by the stakeholders could serve as barrier for the attainment of educational goals and objectives. The teaching methods adopted by teachers, the language of instruction and the difficult concepts of biology pose a challenge on the students (Owolade *et al.*, 2022).

Science subjects are considered to be difficult; partly because students find science words unfamiliar. Students often confused when a word that means one thing in everyday language means something different in science. They also puzzled when technical words and non-technical words seems to have a meaning specific to the context of their mother tongue. Even children, who speak English fluently as their first language and also learnt science in English, struggle because of these differences. Students struggle irrespective of their ages and individual cultural backgrounds (Gulamova, 2022).

The Federal Government in the contribution to ensure quality learning as recently approved a new national language policy that makes the mother tongue a compulsory medium of instruction for public primary school pupils at Federal Executive Council (FEC, 2022). Numerous researchers have investigated Yusuf *et al.* (2016); Isah *et al.* (2017); and Asanre *et al.* (2022) influence of mother tongue teaching strategy on academic achievement of lower and upper junior, basic education in Nigeria, and the findings had recommended among other things that mother tongue should be employed

in the teaching and learning process, Therefore, this study assessed the perception of teachers and students on the usefulness, impact and ease-of-use of mother-tongue in teaching and learning of biology in senior secondary school in Minna Metropolis.

1.3 Aim and Objectives of the Study

The aim of the study is to survey the teachers' and students' perceived usefulness, impact and ease-of-use of Mother-Tongue in teaching and learning of Biology in secondary schools in Minna, Metropolis. Specifically, the objectives of the study are to determine;

1. the teachers' and students' perceived use of MT in teaching and learning of Biology
2. the teachers' and students' perceived impact of MT in teaching and learning of Biology
3. the teachers' and students' perceived ease of use of MT in teaching and learning of Biology
4. the difference in male and female teachers' perceived use of MT in teaching and learning of Biology
5. the difference in male and female students' perceived use of MT in teaching and learning of Biology
6. the difference in the male and female teachers' perceived impact of MT in teaching and learning of Biology
7. the difference in the male and female students' perceived of impact of MT in teaching and learning of Biology
8. the difference in the male and female teachers' perceived ease of use of MT in teaching and learning of Biology; and
9. the difference in the male and female students' perceived ease of use of MT in teaching and learning of Biology

1.4 Research Questions

The following research questions were raised for the purpose of this study: -

1. What is the teachers' perceived use of MT in teaching and learning Biology in secondary school in Minna metropolis?
2. What is the students' perceived use of MT in teaching and learning Biology in secondary school in Minna metropolis?
3. What is the teachers' perceived impact of MT on teaching and learning Biology in secondary schools in Minna metropolis?
4. What is the students' perceived impact of MT on teaching and learning of Biology in Minna metropolis?
5. What is the teachers' perceived ease of use of Biology in secondary schools in Minna metropolis?
6. What is the students' perceived ease of use of MT in teaching and learning of Biology in secondary schools in Minna metropolis?
7. What is the gender difference in the teachers' perceived use of MT in teaching and learning of Biology?
8. What is gender difference in students' perceived use of MT in teaching and learning of Biology?
9. What is gender difference in teachers' perceived impact of MT on teaching and learning of Biology?
10. Is there gender difference in students' perceived of impact of MT on teaching and learning in Biology?
11. What is gender difference in the teachers' perceived ease of use of MT in teaching and learning of Biology?

12. What is gender difference in the students' perceived ease of use of students' perception of ease of MT in teaching and learning of Biology?

1.5 Research Hypotheses

The following research hypotheses are formulated and tested at 0,05 level of significance

HO1: There is no significant difference between the male and female teachers' perceived use of MT in teaching and learning of Biology

HO2: There is no significant difference between male and female students' perceived use of MT in teaching and learning Biology

HO3: There is no significant difference between male and female teachers' perceived impact of MT on teaching and learning Biology

HO4: There is no significant difference between male and female students' perceived impact of MT on teaching and learning Biology

HO5: There is no significant difference male and female teachers' perceived ease of use of MT in teaching and learning Biology

HO6: There is significant difference between male and female student perceived ease of use of MT on teaching and learning Biology

1.6 Significance of the Study

Findings of this study would be of great benefit to the following: Teachers, Students, Curriculum planners, Policy makers, Examination bodies, NGOs, Parent and the Society. It is hoped that the study will be very useful to the teachers as well as the students to develop an effective method of teaching and learning of biology.

Teachers: Exposure of teachers to the findings of the study would assist biology teachers to develop new learning strategies and experiences for the students and to recognize these learning experiences in ways enough around the interest of the students. This study will also enable teachers to identify their problems in teaching biology, which will also enable students to understand the terms, concept and process use in teaching and learning biology using their mother tongue. It will also encourage the Biology teachers on the use of mother tongue for instruction senior secondary school students, especially at the at junior class.

Students: The study will as well improve the academic performance of the Biology students in the course of their study using mother tongue at secondary school level.

Curriculum Planners: the study will be of immense benefit to the government and the curriculum planners in the implementation of the use of mother tongue as language of instruction at secondary schools.

Policy makers: Reform on the national policy of education in the use of mother-tongue in conformity with the policy on education through the provision of necessary instructional materials such as language translator, text book for the proper teaching and learning.

Examination body: to checkmate the persistent poor performance in biology over the years in the national examinations such as West African Senior Secondary School Certificate Examination (WASSE), National Examination Council (NECO) and National Board for Technical and Business Examination (NABTEB) due to the abstract nature of biology

Non-Governmental Organization (NGO): significance to NGOs lies in its potential to inform advocacy efforts, policy development, teacher training programs, community engagement, resource allocation, collaborative initiatives, monitoring and evaluation, and knowledge dissemination in support of mother tongue instruction in biology education. It

aligns with the broader goals of promoting inclusive and culturally responsive education systems.

Parents and Society: Parents will also learn from the results and recommendations of this study, because it will help to change their orientation about the use of mother tongue as language of instruction. The society will benefit from this study, because it will help the students to imbibe the cultural norms of the society through the mother tongue.

1.7 Scope of the Study

The study is conducted within Minna Metropolis, a specific geographic area in Niger State, Nigeria. It centers on science secondary schools located within this city. The research is limited to investigating the perceptions of teachers and senior secondary (SS II) students regarding the use of the mother tongue as a medium of instruction in the teaching and learning of Biology. It is essential to clarify that the study focuses exclusively on the context of Minna Metropolis, and its findings may not be generalized to other regions or settings.

The primary focus of the study revolves around understanding teachers' and students' perceptions in three specific areas: The usefulness of using the mother tongue in teaching and learning Biology. The impact of mother tongue instruction on the understanding of Biology concepts.

The ease-of-use associated with implementing mother tongue instruction in Biology classrooms. The study involves Biology teachers from four selected senior secondary schools within Minna Metropolis, as well as SS II students from these schools. These respondents are integral to the investigation of teachers' and students' perceptions. Researchers employed a questionnaire that they developed themselves as the primary tool for gathering data from the identified respondents. The questionnaire likely included structured questions aimed at eliciting responses regarding the identified areas of focus.

The data collected from the questionnaires were analyzed using descriptive statistics, particularly the calculation of Mean (average) and Standard Deviation (a measure of data dispersion). Additionally, the independent t-test may have been used to compare and assess potential differences in the perceptions of teachers and students. The study's timeline was limited to a duration of three weeks, indicating the period during which data collection and initial analysis occurred. This timeframe sets boundaries on the research process, ensuring that it is conducted within a defined schedule.

1.8 Definition of Terms

Mother Tongue (L1): The term "Mother Tongue" (L1) refers to the first language that an individual acquires during their early years of life, typically from their family or immediate environment. It is the language that an individual is most proficient in and often has cultural and emotional ties to.

Language: In the context of this study, "Language" encompasses any system of communication consisting of spoken, written, or signed words and symbols, including both natural languages (such as English, Hausa, or any other language spoken in Minna Metropolis) and artificial or constructed languages.

L1 – 1st Language: L1, an abbreviation for "1st Language," specifically designates the primary language that an individual learns as their native language during early childhood. It is synonymous with the concept of "Mother Tongue" in this context.

L2 – 2nd Language: L2, short for "2nd Language," refers to any language that an individual learns after acquiring their first language (L1). It may be learned for various reasons, such as for communication, education, or work, and is not the individual's native language.

Perception: "Perception" in this study pertains to the way individuals, including both teachers and students, subjectively view or understand the use of the mother tongue in the

teaching and learning of biology. It encompasses their beliefs, attitudes, and opinions regarding the effectiveness, impact, and feasibility of using the mother tongue as a medium of instruction.

Biology: In the context of this study, "Biology" specifically refers to the academic subject that involves the scientific study of living organisms, their characteristics, structures, functions, and interactions with the environment. It is the subject being taught and learned within secondary schools in Minna Metropolis.

CHAPTER TWO

2.0

LITERATURE REVIEW

2.1 Conceptual Framework

The conceptual framework is shown in Figure 2.1

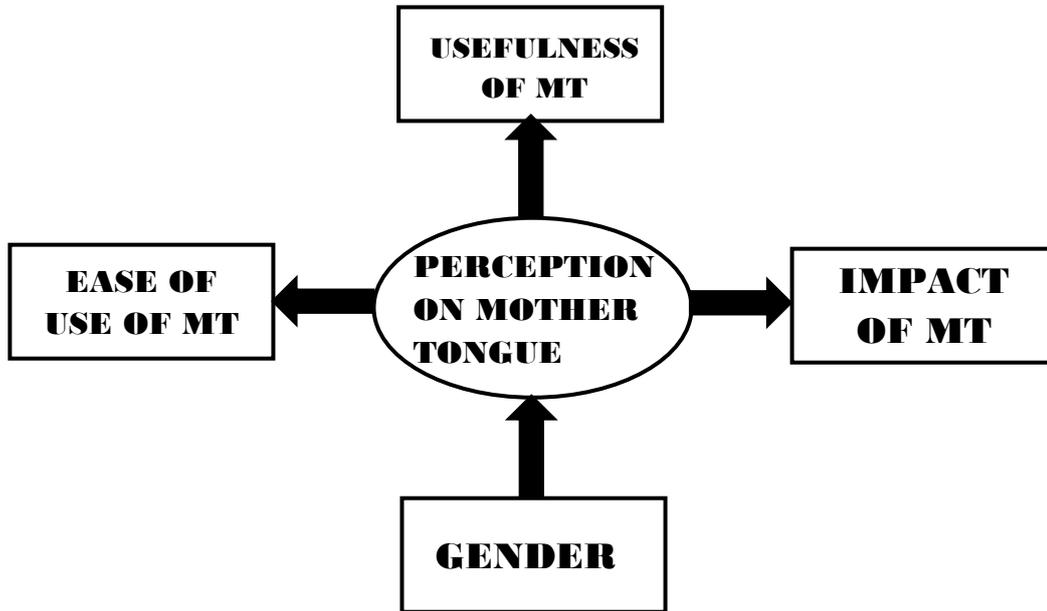


Figure 2.1: Conceptual Framework

Figure 2.1 depicts how perception of use, impact and ease of use of MT were discussed in this chapter. It also described how gender influences teachers and students' perception on the three variables. The Figure 2.2 and Figure 2.3 display the concept of Perception in the Human Brain and its perceptual stage for working condition

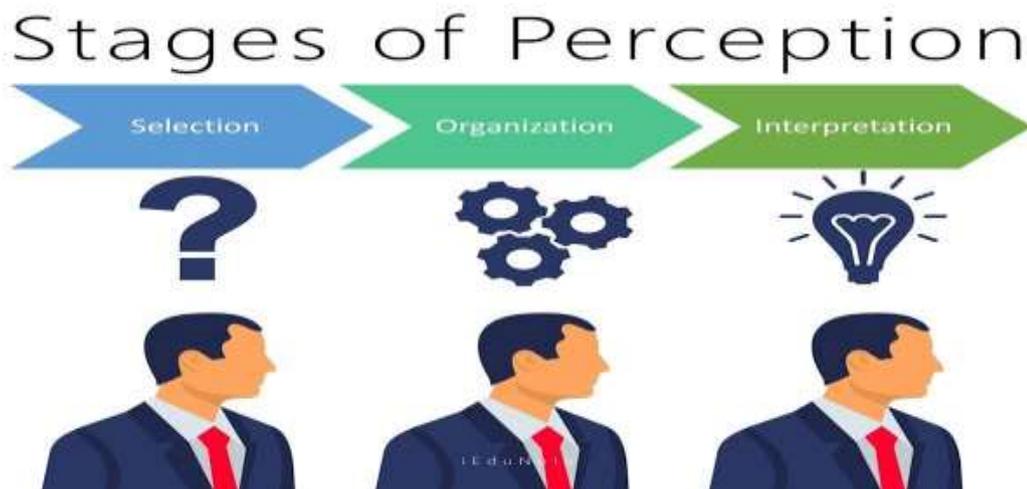


Figure 2.2: The concept of Perception in the Human Brain

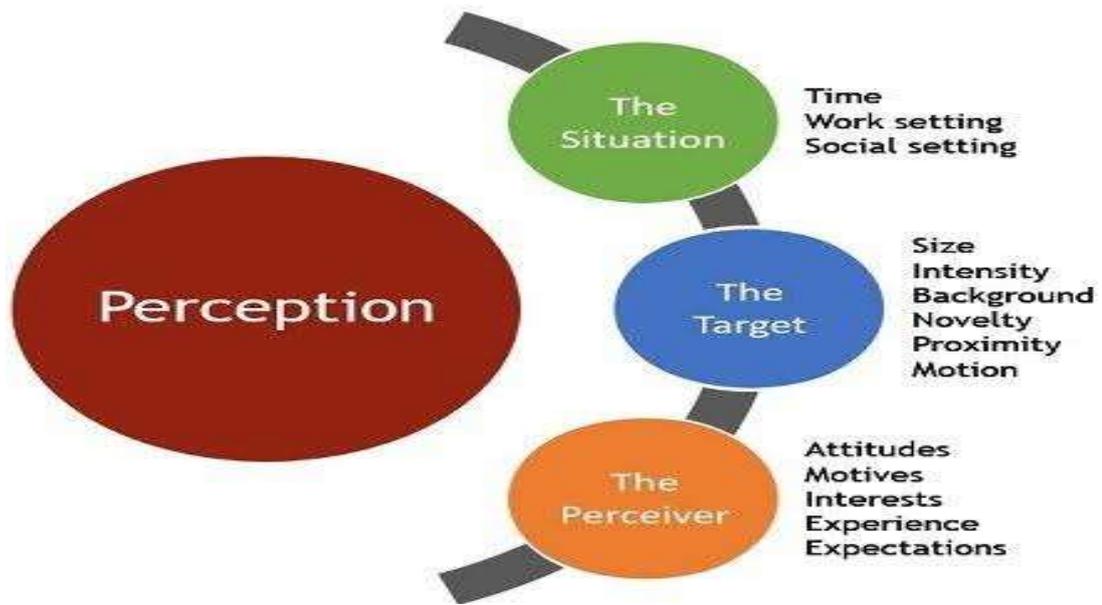


Figure. 2.3: Perceptual Stage for Working Condition

2.1.1 Historical background of mother tongue in Nigeria education

The vast majority of Nigerian languages were not put into writing until the 18th century and earlier studies on these languages were carried out by missionaries from Europe, whose aims were to translate religious materials into some African languages and design school books as painted out by Ndayambaje *et al.* (2021). Between 1817, 1845 Hanna Killham suggested that Africa should read and write their own languages (Nishanth, 2020). She was one of the earliest Europeans to collect African language materials on which to base school books. She proposed a linguistic institute to be established in England, where selected Africans could study their languages develop a writing system for them and prepare translations of religious materials

2.1.2 Conceptual framework of the study

Mother Tongue: This is the local language which an individual possesses consciously or unconsciously. It is an indispensable cultural legacy with which all forms of human interactions are carried out, it is the most effective engine of a people's culture (Adeleye

& Ogunremi, 2017). Olaoye (2013) submits that mother tongue is the key to the heart of the people, if we lose the key, we lose the people, if we treasure the key and keep it safe, it will unlock the door to wealth and affluence. Asanre *et al.* (2022) submit further that education through the indigenous languages in Nigeria will stimulate learners' productivity more than the foreign language, and making learning more functional.

In Nigeria, the issues of indigenous languages and English language have been debated by so many scholars. For some scholars, the use of mother tongue or Nigeria languages in modern education is one of the problems militating against qualitative teaching and learning of the English language (Alimi *et al.*, 2020). Some other researchers have claimed that when a person is taught in the mother tongue, such a person understands what is being taught faster and easily than when he/she is taught in another language. This is also established by the Ife Six Year Primary Project (SYPP) when learners achieved better when taught in their mother tongue (MT) or the language of the immediate community than in a foreign language (Adeleye & Ogunremi, 2017).

Literacy: the ability to read, view, writes, design, speak and listen in a way that allows you to communicate effectively. The power to literacy lies not just in the ability to read and write, but rather in a person's capacity to apply these skills to effectively connect, interpret and discern the intricacies of the world they live. Beyond its conventional concept as a set of reading, writing and counting skills, and literacy is now understood as a means of identification, understanding, interpretation, creation and communication in an increasingly digital, text-mediated, information-rich and fast-changing world (Maisamari & Akinsola, 2020).

Numeracy: the ability to understand and work with numbers/or the ability to reason and to apply simple numerical concepts. It also means ability to use mathematics in everyday life. Being numerate means having the confidence and skill to use numbers and

mathematical approaches in all aspects of life- at work, in practical everyday activities at home and beyond, as consumers, in managing our finances, as parents helping our children learn, as patients making sense of health information, as citizens understanding the world about us.

According to Robson (2016) assert that the MT is usually the sequential first language of a bi/multilingual person, however, if a Yoruba-English bilingual who was born in and grew up in England, uses English for most of his needs without having recourse to using Yoruba will have English as his MT. This suggests that a mother tongue is the language that bilinguals have very good mastery of and which he or she can conduct and communicate effectively with. It is what a person has learned from birth or within a critical period, where the ability to acquire a language is biologically linked to age, and thus becomes the basis for social identity (Oliver, 2013).

According to Maisamari and Akinsola (2020), the mother tongue is the language which the child can communicate ideas and feelings with ease. In it, he is inquisitive, creative and original. Denying him learning in the medium therefore would render him tongue-tied. Oyewole (2017) seems to support the National Policy on Education that call for the use of the MT or language of immediate community (LIC). This is in agreement with Khan (2014) who assert that students who commence school education in MT or LIC learn better and later learn other languages more effectively. Sato *et al.* (2018) drawing from the international success of early education in MT, advocates the use of MT in primary school education because it has succeeded in countries like India and Tanzania and it will guard against the loss of students roots. Daneshfar and Moharami (2018) asserts that children learn English much more effectively if they continue to develop their proficiency in their Mother Tongue. This follows that Mother Tongue is not totally a negative phenomenon in the learning process (Zhao, 2019). It is a sign that learners are

in the process of learning a foreign language and this is because learners are between the mother tongue or source language (SL) and the TL. It starts from near the SL level competence to a place close to TL competence. Complete native-like competence is never attained in second language situation (Zhao, 2019).

Lastly, according to Maisamari and Akinsola (2020), the mother tongue is the language which the child can communicate ideas and feelings with ease. In it, he is inquisitive, creative and original. Denying him learning in the medium therefore would render him tongue-tied.

2.1.3 Importance of English language

The importance of English language as a school subject derives mainly from its utilitarian value to the larger Nigeria society. English is the official language of administrating and commerce in Nigeria. Awoniyi (2016) had emphasized the importance of the use of English language in improving communication among the various ethnic groups in Nigeria. In addition, the importance of English language acquisition as a stepping stone for proficiency in in school subjects cannot be overemphasized. Language plays different and important roles in education of any country, this suggests that behind any learning process, language is always involved. It will be no exaggeration to that, without language objective, knowledge is almost impossible. Language question becomes crucial to any education policy that deserves to be taken seriously.

It is with the context that we should see the education in mother tongue and second language are very important. According to Oyewole (2017) no language can take place of native tongue and no system of education can afford to disregard the native tongue without detriment to the mental development of the child such an unassailable premise must have promoted the birth of the controversial mother tongue education doctrine propounded by some experts in education in Nigeria. The federal government of Nigeria

was aware of the unspeakable danger inherent in the allowing of the foreign language to take place of the mother tongue. Hence in the national policy on education (FGN, 2014) curriculum activities were prescribed in order to achieve the general objectives of education.

2.1.4 Notions of mother-tongue in Nigeria education

This is a language a child first came in contact with in life. It is the language of the immediate environment. Some scholars claim that, it is acquired and not learnt. It is the language that one grows up with, Oyewole (2017). When Chomsky theorized on the innate capacity of human to acquire language like English or a foreign one, depending on which the child is exposed to early in life. This implies that in Nigeria, Yoruba, Igbo, Hausa, Efik, Tiv, and so on are majority tongue but English or Arabic could be a mother tongue (MT) for a Nigerian speaker whose father is a Yoruba, if either of the foreign languages was what he/she was exposed to.

In teaching and learning process in Nigeria, the mother tongue of the child is of great importance. It categorises a large part of the child's environment that is it has names for most of the object, action, ideas, attributes that are so important to him as well as to any given society. Realizing the importance of mother tongue in Nigeria education. Mother tongue in Nigeria education was encouraged for many reasons as stressed by scholars, such as Buhari *et al.* (2020) who explained that a child learns best in his mother and that is natural to him as mother's milk, therefore, it would not be astonishing that the mother tongue should be encouraged in young people at the primary school level. Explained further that, the mother tongue is a way of promoting our culture and if a subject like English is made compulsory at the primary school level, pupils will recognise its importance and will lead to understanding of English language.

2.1.5 Significance of mother tongue

The first language of a child is part of his personal, social and cultural identity. Another impact of the first language is that, it brings about reflection and learning of successful social patterns of acting and speaking. It is basically responsible for differentiating the linguistic competence of acting. To a person, his mother tongue is a “blessing in disguise” it is not merely a timetable subject in his education but is forced upon him from all sides. It is learned by both the conscious and unconscious methods.

The conscious supplement and regulate the knowledge gained by hearing. The mother tongue is an indispensable instrument for the development of the intellectual, moral and physical aspect of education. In addition, it is a way through and by which other subject can be tackled, understood and communicated (Musa & Osa-Omoregie, 2020). Further explained that clarity of thought and expression is only possible when one has certain command over the mother tongue. Weakness in any other subject means weakness in that particular subject only, but weakness in mother tongue means the paralysis of all thought and the power of expression. Deep insight, fresh discoveries, appreciation and expansion of ideas area only possible when one understand the subject through the help and understanding of mother tongue.

2.1.6 Controversy over choice/ negative attitude towards mother tongue

The use of mother tongues as a medium of instruction in education as generated a serious controversy in Nigeria. Some assume that, it is not practical and anti-nationalistic and divertive. They lose their contention on social political factors. For instance, the linguistics tell s us that we have (300) different languages (excluding dialect) in Nigeria, and that if each linguistic groups insist on giving educational instruction in their mother tongue, the objective of primary education in Nigeria will become unattainable.

According to Oyewole (2017) who argues that in a country like Nigeria, the mother tongue education is hardly feasible in real term, if pursued to its logical conclusion, he says further that, the mother tongue proposal may even destroy some of the principles the country should cherish. One of the earliest scholars of language education Mahmud (2017) asked the question whether the danger envisage would not be there without the policy advocated was the Nigeria civil was caused by the use of Nigeria language, rather than another, as a medium of instruction. Mahmud himself now said, as long as many Nigeria languages are not deemed out of existence, dangers of some sort will exist, particularly as self-centred politicians will always be there to fan the flame of sectionalism. He now concluded that an adequate overall national language educational policy seems to be the only answer.

Another area of contention is the area of educational sector. One of the assumptions are made by mother tongue crusaders is that, a child learns better or more easily when instruction is given out in his mother tongue. According to Awoniyi (2016) “it is undeniable for instance that there is no surer way to an adequate understanding of the nature of a thing or process than through the medium of language whose syntactic and semantic requirement are adequately understood”. Since most of our children are brought up in environment where mother tongue is the predominant means of communication, then, it is only logical that they are inducted into the world a society through the agency of such language.

It is also true that education depends specifically on language, and also determines the constant of education. Therefore, if the second language is used as a medium of instruction, there is danger of cultural deprivation. However Egenti (2015) says, “assumption that a child learns better or easily when instructions is given out in is mother tongue can only be true in a basically monolingual environment ”. Our argument now is

that, in an environment where there are competing languages, (for instance Nigeria), it may be difficult in the mother tongue than the so-called foreign tongue. Mother tongue does not make it necessarily easier to grasp. He also talk about the problem of adjustment from mother tongue to English at the secondary school level, even though Egenti believes that the use of mother tongue in primary education would make Nigeria genuinely bilingual as

they would become thoroughly proficient in both mother tongue and English language and it will pave way for better results.

The anti- mother tongue crusader points out the disadvantages of using mother tongues, for instance, they believe that it will fail in area of science related subjects with technical term. And because the books on science related subjects with technical term. And because the books on science are written by foreign authors, they may be difficult to interpret. However, Oyewole (2017) now assures that the necessary books and teaching aids can be publish in Nigeria languages in subject like Mathematics, Science, Agriculture and science to suit our need.

Furthermore, in negative views towards mother tongue, most factors discussed earlier may be regarded as beyond the control of speakers of language; the question of attitude is squarely within the power of those who own the language. One would have expected speakers of an African language to be proud of their language, but quite often, one encounter negative altitude. The most common of such altitude is that the elite who refer education in the imported language for their children. Taking their cues from elites, it is not surprising that parents belonging to lower social groups also want similar education for their children. For instance, in Nigeria, it is amazing to find the large number of English medium private nursery and primary schools offering education to young children. Patronage of such schools comes not only from well-to-do parents, but also from

lowly paid blue collar workers, who believes that they are making a great sacrifice for their children's future, (Egenti, 2015).

Another type of negative attitude is that exhibiting by speakers of minority language. While linguistics readily object to the marginalization of such languages and advocated roles for them in certain domains. It is not unusual to find speakers of minority languages denigrating their own languages, and preferring to them some major languages of the country or an improved official languages. Pretty much the same attitude exist for endangered languages. The point must be made that, unless speakers of minority and endangered languages take pride in their own language and show a definite desire to preserve them, no amount of external engineering can ensure any status and viable roles for them.

2.1.7 Mother tongue interference and its effects on english language pronunciation

As observed by Alimi *et al.* (2020) the learning of language involves a complete set of interwoven features, almost all of which have implication for the several problems associated with the learning of English as a subject in Nigeria. One major problem which many are quick to point out is the problem of interference. Interference is a linguistic phenomenon whereby the features of one language (those of the L1) are transferred into the target language or (L2) second language. Interference hinders many learners in their effort to master the grammar of English language.

At the level of phonology, for instance, many learners find it a hard task learning the prosody of English language, in the area of grammar, the syntactic pattern and structures of English language post a great difficult to learner. Example of phonological interference includes the pronunciation of English language word utterances with the tonal pattern of Nigeria languages such as Igbo, instead of the usual English stress associated with

particular syllable (Allan *et al.*, 2015). Furthermore, there are other problems such as inadequate exposure to English learning and the need for language acquisition. Some of the effect of mother tongue interference in English language pronunciation are phonetics, articulator phonetics, acoustic and auditory phonetics.

I. Phonetics

Basically, the interference of mother tongue in learning English is down to three basic concepts of phonetics. These concepts are articulator, acoustic and auditory phonetics.

II. Articulatory phonetics

This concept is all about how sounds are produced by speakers. The production of speech sounds depends on vocal tract and articulatory capacities of speaker. In other words, how a speaker produces the sounds in his mother tongue will interfere with the sounds that are produced in Yoruba. Some languages for instance, produce clicking sounds and the rest of the world is almost incapable of producing.

III. Articulatory and auditory phonetics

These are about the reception, perception and mechanism such as pitch, harmonics and amplitude of sounds. This is why it is important to hear words, rather than trying to learn from written context only.

2.1.8 Influence of mother tongue on second language vocabulary acquisition and use

As a learning process, transfer supports the learner's selection and remodeling of imputes structure as the learner progresses in the development of his inter language knowledge. As a production process, transfer is involved in the learner's retrieval of this knowledge and in his effort to bridge linguistically these gaps in his knowledge which cannot be side-stepped by avoidance.

2.1.8.1 How language differs

It is quite an illusion to think as even illiterate people sometimes do, that meaning are the same in all languages that language differs only in the form used for those meaning (Alimi *et al.* 2020). The word contains too much things for us to have one word for each: we economize by using words in more than one sense, leaving context to disambiguate. Unfortunately, different languages pared up meaning into word in different ways, and so a word in language “A” may have various equivalents in language “B” depending on exactly what is meant. There are several typical pattern of relationship between words in different languages.

2.1.8.2 Teaching and learning of English language in schools

In any institute of learning where indiscipline is highly pronounced, effective teaching and learning cannot take place and this will go a long way in deciding the performance of these students during examination. The following point will help the students to know the necessities of learning English language with all seriousness in school and the points will gear the student minds so as to develop interest in the course under study. The following points are discussed:

- a. Distribution.
- b. Communication.
- c. News or information.

I. Distribution

English is the most widely spoken language in the world, apart from the distribution of native speakers. There are over 400 million native speakers worldwide and there are 600 million speakers of English as a second language. 900 million people using English to communicate in one way or the other out of the total world population of about 6.7 billion people, it is only 15% of the total population that uses native language to communicate.

Though, the importance of English language is not in the number of speakers, but language is spoken all over the world.

II. Communication

To enable students to be able to communicate with their peers within and outside the country without any form of errors, there is need for proper teaching of English language. Also, to afford students to be able to use all interacting sites that are online with great ease on their part, communication is important. To enable students to acquire knowledge and skills, abilities in teaching English language whenever they find themselves in teaching line (Alimi, *et al.*, 2020)

III. News or information

To acquaint students with the knowledge of English both in the area of grammar and semantic because many of them may find themselves becoming news caster in the media houses, and as English is the language which news is being mostly casted, it will not pose a threat for them. Also English language will also be useful in the area of reading dailies as they are mostly written in Yoruba language (Oyewole, 2017).

IV. Inadequate

A library can be seen as the store house of knowledge. It renders great service to the society. It plays a very important role in promoting the progress of knowledge. The school library provides information and ideas that are fundamental to successfully function in today information and knowledge driving society. Going to library in schools will make significant differences to students learning outcome. Everyone knows that student from a school with appropriate library materials will perform very well in any aspect of English language courses or even other courses than those from schools that has no library materials.

This is because students with well-equipped materials that will help in complementary their teacher's work in the classroom, especially, those that are not lazy. According to Akinsanya and Tella (2019) who said that "the function of textbooks are to provide in readily accessible for, the body of knowledge which is required by students in relation to a particular subject". Green further comments on the importance of the library stated a library is essential for effective learning of English language. And to buttress what green said, library surely helps students with problems and difficulties which cannot be solved by the help of usual textbooks arises especially in more advance word, are being found in more elaborate textbooks in the library. Also, students reaching advances level have to consult books as references, so as to give more insight to whatever might have being taught in the class.

In addition to it, teacher is an infallible guide, so references to textbooks aside those used in the classroom is sometimes required as it will be a long way in interpreting some ideas, and this will have a great impact on student's results. Furthermore, if the relation of English language with other field of learning and social affairs is to show and explore as they should be, library resources are necessary (Akinsanya & Tella, 2019). In conclusion, some of our parents are not well educated and they did not know the value of the courses their children offers in school, so this makes some of them to take their children with levity. Most parent are poor to the extent that they could not even afford some textbooks for their children not to talk of dictionaries and some relevant materials because they are expensive

2.1.9 Influence of mother tongue interference on second language learning

Language is a creation which every human being is endowed with or blessed; a unique gift of language is used naturally as one tool of expression consisting of different sub skills. The English language is the official and native language of Britain, Ireland, North

America, Australia, America and most of the British colonies, (for the colonies, it is regarded as the official language rather than native). It is commonly divided by periods into Anglo-Saxon, or old English Middle English and modern English. Mother tongue is one's native language. A language besides being the major distinguishing phenomenon between man and other creatures is evidently the most enduring of every people's cultural heritage. It reflects the culture of a people and it is inextricably bound up with it.

Language is an important tool that enhances human communication and interaction. It is a vital instrument in cultural transmission and preservation of a social group. It is in a fundamental sense, a crucial tool in the preservation and propagation of the human species. An examination of the linguistic content of a particular speech community can provide information about the life style, occupation etc. of a given people. The English language being the national official language for the British colonies of which Nigeria is among makes it our second language. Hence, our respective mother tongue exists before colonization. This has necessitated the teaching and learning of the English language and its consequent interference in our mother tongue in various study points nationwide. It is therefore, glaring to state that, Nigeria is a linguistically complex society by the mere fact of the history of its creation. It is estimated that there are between 250 and 400 languages spoken in Nigeria (Egenti, 2015).

This linguistic heterogeneity promotes the continued use of English in Nigeria. Ethnologists include English amongst its list of Nigeria languages this hardly supervising since the role of English language in Nigeria is diverse and ubiquitous, especially as a means of intra and international communication. It is as a result of the negative effects which the mother tongue had caused the study of English language on the educational structures of the attempt to determine the effect of the use of mother tongue on the teaching and learning process in secondary schools.

The term “interference” in second language acquisition and language contact refers to the influence of one language or variety on another in the speech of bilinguals. Egenti (2015) states that many speech communities in the world are constituted of individuals who speak two or more shared languages and such individuals are bilinguals. This seems to suggest that a Nigerian is at risk of transferring the language system of his MT into the use of English language; a child or an adult tend to think in his MT and tries to express him/herself in the second language (Batool *et al.*, 2021). Sharma (2015) see interference as the influence that the learning of the subsequent list has on the retention of the original learned list, termed retroactive interference and the detrimental effects on the retention of the subsequent learned list resulting from prior knowledge of learning called Proactive interference. Interference is due to unfamiliarity with the second language, as such language structure of the native language tends to be transferred to the second language (L2) and that where their structures differ, it becomes difficult for the L2 user of English language (Derakhshan & Karimi, 2015).

Udensi *et al.* (2018) opine that a Nigerian will find English language difficult because there is inherent difference between the forms and meaning of English and those of the Mother Tongue. This implies that learners are likely to produce the substandard form of the L2 which can bring about the breakdown of communication. Interference is the automatic transfer, due to habit, of the surface structure of the MT onto the surface structure of the language learnt. It is governed by learners’ perceptions about what is transferable and by their stage of development in second language learning (Tess & Helen, 2022). Language interference is the situation where the habits of MT stand in the way of proper pronunciation and grammar of the TL. It results to easy identification of non-speakers of the TL by the mistakes they commonly make in syntax, word choice and especially pronunciation. It is when the previous performance disrupts the performance

of the second tasks. The formal elements of L1 are used within the context of L2 resulting in errors in the L2 since the structure of the two languages are different (Derakhshan & Karimi, 2015).

According to Chebet *et al.* (2018) said though using different words but with a common ground, see interference as the instances of deviation from the norm of either language which occur in speech of bilinguals as a result of their familiarity with more than one language. It involves moving the elements of a speaker's native language and equating them with those of the foreign language that is being learnt. It affects various levels of language including phonological, grammatical, lexical and orthographical.

However when learners apply knowledge of their MT to the Teaching and learning, there are two possible results that may arise: positive or negative transfer. Positive transfer occurs when items in the first language is similar to those of the second language. Here the learner acquires the L2 with ease and faster. Negative transfer in the other hand occurs when items and structure of the MT and L2 are not similar. This brings about errors which hampers communication. It implies that the more differences that exist between the MT and L2, the more negative transfer. For instance, a positive transfer may occur when Mwangavul speaker from Mangu Local Government Area of Plateau State comes in contact with Ngas native speaker of Kanke Local Government Area of the same state. However, negative transfer occurs when Flier, though a language in Pankshin Local Government Area, comes in contact with Ngas, a language also in the same local government.

Interference can be conscious or unconscious. In the former, speakers may guess when producing speech or text in the TL because they have not learned or have forgotten its proper usage. In the latter, they may not realize that the structures and internal rules of the two languages are different (Elvira *et al.*, 2017).

2.1.10 Effect of mother-tongue interference on the teaching and learning of biology

From the foregoing so far, the importance of mother-tongue in the learning of Biology cannot be overemphasized. Language is said to be universal so these issues are not peculiar to Nigerian context, it is therefore necessary to tackle the issue of interference to bring a free flow from mother-tongue to the learning of Biology among students. Errors may occur due the fact that some of the Biology terms are not found in their mother-tongue. It has rightly been observed that in the first language learning, the learner is highly motivated and is surrounded by a conducive linguistics environment, the kind that the second language lacks. This implies that though language learning is generally difficult, second language learning has greater problems which results in the greater number of errors in performance of second language users (Munro, 2018).

Attahinu (2015) opined that in as much as the second language learning environment encompasses everything the language learner hears and sees in the new language, the learner's goal is the mastery of the target language. The learner begins the learning task of learning a second language from point zero (or close to it) and, through the steady accumulation of the mastered entities of the target language, eventually amasses them in quantities sufficient to constitute a particular level of proficiency. L1 interference when speaking or writing in a second language is generally a lifelong experience which needs continues attention, sometimes even up to adulthood the lexical stress patterns of their mother-tongue in their second language (English) oral production, are not shaken off in spite of years of teaching and listening.

Interference can be identified according to regional variations in Nigeria, especially, in phonology and lexis. Certain pronunciations are identified with members of an ethnic group and when all the markers of the group's accents are present in a particular speaker, one can be fairly certain that the speaker in question is a member of that ethnic group by

birth or upbringing, or both. So, it is easy to identify Yoruba, Igbo, Tiv, Hausa speakers, just a few out of about 400 languages in Nigeria (Adedigba, 2016).

In general, the overall performance in science subjects is generally low, Biology and other science-related subjects have become very difficult in the Nigerian context, most especially in the northern part of the country. The problem has become unbearable in many schools. Apart from the issues of instruction and well-equipped laboratories, the language of instruction has become a great barrier and purposely causes the poor comprehension of the subject matter. Mastery of the language of instruction by both teachers and students lead to the mastery of the subject matter.

This low performance in science subjects in general and Biology in particular could be attributed to several factors Ndayambaje (2021);

- a) Teachers and learners generally perceive science as difficult.
- b) Teachers misrepresent their own content in the science classrooms.
- c) Students' attitudes towards science (Biology) influence their understanding of science concepts.
- d) Inadequate resources such as textbooks, laboratory equipment and chemical reagents.
- e) Students' language as a barrier and
- f) Language that teachers use in instruction.

Language used by teachers is getting increasingly important as Aterwe (2016) notes:

Traditional science teachers view science as being independent of mind or social context.

This could be one of the reasons why language has not been considered important until lately (Aterwe, 2016). The language must be distinctly clear in expressing subject matter since what may be very clear to the teacher may be so much meaningless jargon to the learner. According to Adeleye and Ogunremi (2017) for many learners the greatest barrier

to learning science is language. The problem is that like many other African countries, Nigeria has developed curricula and content that teaches science mainly in the second language, which is English. Thus, the majority of students may not comprehend quickly enough what is written or taught and thus may result into misconception. Further complications arise from the difference between the normal scientific English (for example compound, diffusion or molecule) that demands clarity and common English language (such as displace, essential or spontaneous) usage.

Nigerian suffers additional problems in that there could be no direct translation of a scientific concept in vernacular. For example, the terms smoke, gas and steam may all be referred to, by one general term, as “efi” in Yoruba language (the first language of most students in the region the research was conducted). This concern has been noted by a number of scholars. For instance, Tess and Helen (2022) opined that teachers have difficulty in expressing science concepts via English and especially in relating the abstract world being created in the classroom to the concrete world outside. Language of instruction effects on teaching practices and schooling outcomes is an aspect of education in developing countries that has received scant attention. The language of instruction becomes an important target language to be mastered so that full access to the benefits of secondary schooling can be obtained (Udensi *et al.*, 2018).

Thus, the language barrier could account for the difficulty that learners and teachers find within science education leading to low performance in the science subjects in the secondary school level. The language used by Biology teachers when presenting science concepts, principles and skills during the process of instruction may attract students to the study of Biology (swing towards Biology) or may discourage them (cause a swing away from Biology). Thus, the use of language of instruction deserves careful attention.

There are many words used in the teaching of science that may cause difficulties for students even though teachers would not consider them to be specialist scientific words. For example, Oliver (2013) gives a list of such words that were found to present problems to students. Such include disintegrate, random, spontaneous, rate, symmetrical, average, partial, reverse. Sharma (2015) carried out an extensive research on learners' understanding of non-technical words and found out that non-technical words associated with science are a source of misunderstanding for students. Words that are understandable in normal English usage change their meaning when transferred into, or out of, a science situation. For instance, the word "volatile" was assumed by students to mean unstable, explosive or flammable. The reason for such confusion is that volatile, applied to a person, implies instability or excitability and this meaning is naturally carried over into science context with consequent confusion (Ndukwem, 2019). 'Gas' and 'steam' are two common words which easily present difficulty. To learners these two words mean the same thing, yet they are different since steam is water in gaseous state.

2.1.11 Controversy over choice/ negative attitude towards mother tongues.

The use of mother tongues as a medium of instruction in education as generated a serious controversy in Nigeria. Some assume that, it is not practical and anti-nationalistic and divertive. They lose their contention on social political factors. For instance, the linguistics tell s us that we have (300) different languages (excluding dialect) in Nigeria, and that if each linguistic groups insist on giving educational instruction in their mother tongue, the objective of primary education in Nigeria will become unattainable.

According to Akinsanya and Tella (2019), who argues that in a country like Nigeria, the mother tongue education is hardly feasible in real term, if pursed to its logical conclusion, he says further that, the mother tongue proposal may even destroy some of the principles the country should cherish. One of the earliest scholars of language education Owolade

et al. (2021) asked the question whether the danger envisaged would not be there without the policy advocated was the Nigeria civil war caused by the use of Nigeria language, rather than another, as a medium of instruction. Owolade *et al.* (2021) now said, as long as many Nigeria languages are not deemed out of existence, dangers of some sort will exist, particularly as self-centred politicians will always be there to fan the flame of sectionalism. He now concluded that an adequate overall national language educational policy seems to be the only answer. Another area of contention is the area of educational sector. One of the assumptions made by mother tongue crusaders is that, a child learns better or more easily when instruction is given out in his mother tongue.

According to Sharma (2015) “it is undeniable for instance that there is no surer way to an adequate understanding of the nature of a thing or process than through the medium of language whose syntactic and semantic requirements are adequately understood”. Since most of our children are brought up in an environment where mother tongue is the predominant means of communication, then, it is only logical that they are inducted into the world a society through the agency of such language. It is also true that education depends specifically on language, and also determines the content of education. Therefore, if the second language is used as a medium of instruction, there is danger of cultural deprivation. The argument now is that, in an environment where there are competing languages, (for instance Nigeria), it may be difficult in the mother tongue than the so-called foreign tongue. Mother tongue does not make it necessarily easier to grasp. He also talks about the problem of adjustment from mother tongue to English at the secondary school level, even though Fafunwa believes that the use of mother tongue in primary education would make Nigeria genuinely bilingual as they would become thoroughly proficient in both mother tongue and English language and it will pave way for better results.

The anti- mother tongue crusader points out the disadvantages of using mother tongues, for instance, they believe that it will fail in area of science related subjects with technical term and because the books on science related subjects with technical term. And because the books on science are written by foreign authors, they may be difficult to interpret. However, Udensi *et al.* (2018), now assures that the necessary books and teaching aids can be publish in Nigeria languages in subject like Mathematics, Science, Agriculture and science to suit our need.

Furthermore, in negative views towards mother tongue, most factors discussed earlier may be regarded as beyond the control of speakers of language; the question of attitude is squarely within the power of those who own the language. One would have expected speakers of an African language to be proud of their language, but quite often, one encounter negative altitude.

The most common of such altitude is that the elite who refer education in the imported language for their children. Taking their cues from elites, it is not surprising that parents belonging to lower social groups also want similar education for their children. For instance, in Nigeria, it is amazing to find the large number of English medium private nursery and primary schools offering education to young children. Patronage of such schools comes not only from well-to-do parents, but also from lowly paid blue collar workers, who believes that they are making a great sacrifice for their children's future (Sharma, 2015).

Another type of negative altitude is that exhibiting by speakers of minority language while linguistics readily objects to the marginalization of such languages and advocated roles for them in certain domains. It is not unseal to find speakers of minority languages denigrating their own languages, and preferring to them some major languages of the country or an improved official languages. Pretty much the same altitude exists for

endangered languages. The point must be made that, unless speakers of minority and endangered languages take pride in their own language and show a definite desire to preserve them, no amount of external engineering can ensure any status and viable roles for them.

2.1.12 Role of Language in the Teaching and Learning of Science

Language is a medium of communication. Communication, according to Omega (2014), is the sharing of information, attitudes and feelings by words, tones and behavior. Reasons for communicating include gaining or passing ideas or knowledge, getting or giving help, learning or teaching, changing ideas, persuading and negotiating. Communication involves the receiver of a message and understanding it in the way the sender intended. If the message is not interpreted in this way then there has not been effective communication.

The language of instruction occupies a very important part in the teaching and learning process. The teacher's competence in presenting the scientific knowledge using language appropriate to the learner's level of comprehension determines the effectiveness with which teaching and learning takes place. Presentation of the scientific knowledge, concepts and skills using appropriate language is largely dependent on the teacher's experience and training, since a good teacher is a product of among other factors, experience and training. Learning science thus means learning to use the language of science through opportunities to practice the talking, reading and writing of science (Nishanth, 2020).

All human activities have developed special terminologies to simplify the description of facts, methods and processes. Parts of these terminologies slowly enter common usage and jointly form our common language. Others remain confined in the special field. Science has not only created a terminology to describe its observations but has also

developed a language corresponding to a way of thinking. The scientific language is usually more precise and rigorous than common English language; it is „a purpose-designed tool“, used in specific contexts to meet specific needs and uses abstractions with which most people are not familiar. Science concepts can be communicated by use of words, signs and symbols. These include graphs, charts, diagrams, mathematical symbols, chemical symbols (such as Na to stand for sodium) and formulae (for example, NaCl for sodium chloride) and chemical equations (for example, $2\text{Na} + \text{Cl}_2 \rightarrow 2\text{NaCl}$). Hence it is essential for science teachers to be aware of how these signs and symbols can be instrumental in helping students to develop scientific concepts in classroom discourse. The scientific language is molded on a special attitude of the mind and therefore, it does not easily lend itself to precise translation. For full enjoyment of science, at least some of the scientific language must be learned, and the most appropriate place in which to learn it is school (Maisamari & Akinsola, 2020). Meşe and Sevilen (2021) noted that the language of science, like all other languages, has its own rules, structure, easy and difficult parts and peculiarities. Guga and Bawa (2016) noted that learners often become confused over words that sound or look similar, have difficulty with words that have one meaning in everyday use and another, sometimes completely different, meaning in science. For instance „salt“ is a technical term in Biology that refers to a chemical compound formed when a metallic ion combines with a non-metallic ion. For example; $\text{Na}^+ + \text{Cl}^- \rightarrow \text{NaCl}$, (where Na^+ is the metallic ion, Cl^- is the non-metallic ion and NaCl is the salt). In everyday use, a salt refers to a substance used to season and preserve food. Allan *et al.* (2015) points out that language of science also conveys its processes and thinking patterns, along with its concepts, ideas, facts, principles and theories. Like all other languages, the language of science must be taught, practiced and used constantly if the learner is to become proficient with its use (Aterwe, 2016).

The functional approach to teaching science is to introduce new scientific vocabulary where there is a need for it in conjunction with new principles. Scientific terms should be employed in discussions to illustrate their meanings and in making applications. For example, if the major concept is salts and the new scientific term to be introduced is solubility of salts, then the effect of temperature or the polar nature of water molecule could be included when discussing solubility of salts in water. Similarly, when a teacher says that crystals of copper (II) sulphate are blue, he or she is stating a fact“ that only has meaning within the whole conceptual apparatus of elements, compounds and crystalline structure. When heated it turns white, is the statement that „the crystalline structure breaks down when the bound molecules of water are driven off as steam, leaving anhydrous copper (II) sulphate powder, which does not absorb light of the same wavelength. “The language in which observations are recorded presupposes a view of the world that is not simply, given” (Asuai, 2014).

Language is the medium through which students gain access to scientific ideas, and when sufficient attention is paid to presenting language, this can facilitate learning. Words special to science subjects ought to be presented to the learners with deliberate care. The language teacher’s use in presenting scientific concepts, principles, skills and knowledge should be simple and easy to comprehend. This makes it easy for learners to grasp what is being presented and apply it in their daily experiences (Charmaz, 2014). The process of thought itself is dependent on growth in language since the ultimate sign of understanding a subject is the ability to convey one’s knowledge effectively. The importance of language in successful learning should be constantly promoted as a priority (Robson, 2016). Four aspects of science; body of scientific knowledge, a collection of scientific skills, scientific attitudes and a unique scientific language and that science is a complex involving interplay of these four aspects:

- a) Scientific knowledge (also referred to as the content of science) implies that what constitute science are not the individual pieces of knowledge it provides but how we make sense of the knowledge.
- b) Scientific skills – serve to reinforce scientific knowledge being taught, lead to the development of scientific attitudes and contribute widely to the study of a science as a whole.
- c) Scientific attitudes – science is a way of thinking (through the demonstration of the ability to think through problems).
- d) Scientific language - The skills of communication through speaking and listening. This thus indicates need for the development of a knowledge and understanding of scientific language for ideas and phenomenon in science. It is the language of science that allows scientists from all backgrounds, cultures, countries and language bases to communicate.

Samuel (2016) asserts that when a teacher talks to his or her class, draws a diagram on the chalkboard, discusses a chart on the wall or asks learners to read a textbook his or her intended meaning or that of the textbook author is not automatically transferred to the mind of the learner. Each individual in the classroom constructs his or her own meaning from a variety of stimuli, including specific words read or heard which are in the learning environment. How similar the constructed meaning is to that intended by the teacher depends on the way the learner copes with the language the teachers use freely as their own main means of instruction. The foregoing assertions are strong arguments advanced in support of the importance of language, in particular verbal language, in learning science.

Language does not merely label objects or events. If learners are to get a good understanding of language as an interpretive system, they must have experience of using

it themselves. Students' learning is in making sense of what is said or written. Zergani (2016) Piaget recognizes language as an important means of crystallizing and communicating thinking. Vygotsky (1987) maintains that once a child gains control of language as an instrument of organizing thinking his or her whole intelligence is transformed. Students thus, require language for trying to put new ideas into words, for fitting together new ideas with old ones in order to bring out new understanding. Language enables us to codify the input of our senses, and thus to organize and make sense of our experiences (Zergani, 2016).

The coding ability of the human mind allows us to create and to comprehend meaningful language out of all the raw linguistic substance available to us. Language facilitates our thinking processes and some internalization of experience is a prerequisite for meaningful language use. Edwards and Mercer observe that; the overriding impression from our studies is that classroom discourse functions to establish joint understanding between teacher and learner, shared frames of reference and conception, in which the basic process is one of introducing learners into the conceptual world of the teacher and of the educational community. Language is essentially a process of cognitive socialization through language. It is thus, unlocks the fountain of scientific knowledge hence due emphasis should be accorded to it. A primary school student according to FGN (2014) comprises children aged between 6 – 11 years) plus. The primary education is graded from Primary 1 to 6. The first three years of the primary education is termed the lower primary. Children at the lower primary form the bedrock of the educational system in Nigeria. Therefore, the success of the whole system of education is hinged on the success of the lower primary education level. At this level, students are still very attached to their home which is one of the agents of socialization. Hence, the mother tongue which is a

means of transfer of cultural practices, norms and mores of the society should be given utmost priority.

According to Zergani (2016) the child's mother tongue is the child's first language, the one in which he/she feels most at home with and which he/she uses most of the time. Mother tongue refers to any language indigenous to Nigeria. The National Policy on Education (FGN, 2014) stipulates the importance of language as a means of promoting social interaction, national cohesion and preserving cultures. Thus, every child should learn the language of the immediate environment. Furthermore, in the interest of national unity, it is expedient that every child should be required to learn one of the three Nigerian languages: Hausa, Igbo and Yoruba. According to Aterwe (2016) parents' and teachers' perception of the use of mother tongue or the traditional language to teach the child is negative. This is because many parents, especially the ones living in the urban areas of Nigeria, do not even have the mastery of the mother tongues and this is applicable to the teachers. As Agagu puts it, one cannot give what one does not have. As parents who are the first teachers of the child at home, the educated urban dwellers especially, do not know how to speak the mother tongue without code-mixing it with English Language. They lack the capability and competence to impart it to their children. Also at school, the teachers cannot teach the children with the mother tongue because many do not have the mastery of the indigenous language such as Hausa, Igbo, Yoruba, Efik, Urobo, Nupe. This has left the child to be more proficient in English Language which his/her teachers and parents mostly apply in teaching and interacting with them.

Language plays a very important and active role in the effective education of the child. In the process of educating the child, especially at the primary level, different languages could be used, for example, the mother tongue of the child. This is the first acquired language by the child from parents who are the child's first teachers (Aliñab *et al.*, 2018).

Once a solid educational foundation is laid in the child's first language, the child learns more even through other languages spoken in his/her wider environment (Omego, 2014). Children who come to school with a solid foundation in their mother tongue develop stronger literacy abilities in the school language. For example, when parents and other caregivers are able to spend time with children and tell stories or discuss issues with them in their mother tongue, it will in a way help them to develop vocabulary and concepts in their mother tongue (the L1) thus, the children will be well prepared to learn the school language which is English Language (L2) and this will enhance their success educationally. Mother Tongue education encourages the understanding of those linguistic concepts in English.

According to Asuai (2014) the destruction of the local language and culture in schools is highly counter-productive for the society itself. Whether it is done intentionally or inadvertently, when the child's mother tongue is destroyed or ruptured, their relationships and interactions with parents and grandparents especially the uneducated ones, will be affected. The need for the use of mother tongue as a means of instruction in schools has featured prominently in educational discussions in recent times. It has postulated that a child needs to be tutored by both parents and teachers in the mother tongue at the early stages, in order to enable him/her think clearly and communicate effectively in his/her immediate environment or at school (Awoniyi, 2016).

Various educationists including the former Minister of Education, Professor Babs Fafunwa have recommended the use of the mother tongue as a medium of instruction in the first three years of the primary schools. The United Nations Educational, Scientific and Cultural Organization (UNESCO), has been pioneering and promoting the use of the mother tongue as a means of education and more actively so in the last decade. For example, the 2009 Memorandum on Education, the British Colonial Government

Officially approved the use of mother tongue in education. According to Psychologist: “the first twelve years is the most formative in a child’s life, therefore, the mother tongue education for the child should be seen as a right and it’s denial be viewed as denial of the fundamental human right” (Fafunwa *et al.*, 1989).

The challenge for parents, teachers and policy-makers is to shape the evolution of national identity in such a way that the right of the school children is respected and the cultural, linguistic and economic resources of the nation are maximized.

Therefore, any credible educator will agree that schools should build on the experiences and knowledge that children bring to the classroom and instruction should also promote children’s abilities and talents. Mother tongue can be any of the indigenous languages in the country. The three major languages are Igbo, Hausa and Yoruba have become the subjects of study and examination even in secondary schools. At primary school level, which is our major concern, some efforts in the use of mother tongue have been made, although with varying degrees of success.

The Nigerian National Curriculum Conference held in 1969, declared that: “The Nigerian primary school child should be well grounded in his mother tongue”. Therefore, both parents and teachers should have positive perceptions of the use of mother tongue as the language of instruction for children in lower primary schools.

2.2 Theoretical Framework

This study is anchored on the linguistic interdependence and the threshold level hypotheses (Cummins, 2000). The linguistic interdependency hypothesis was partly influenced by an earlier UNESCO (2022) in the determination on the linguistic level and development of both the mother tongue (MT) and the second language (L2) of Finnish migrant children attending Swedish comprehensive school. Empirical evidence of the study showed that the extent to which the migrant children had developed their MT prior

to contact with Swedish was strongly related to how well they learned Swedish, that is, their L2. Cummins, therefore, posit that the level of L2 competence that a bilingual child attains is partially a function of the type of competence he/she has developed in L1 at the time when intensive exposure to L2 begins. Furthermore, when the child's first language is promoted, exposure to the L2 is likely to result in high level of linguistic competence in the target language (L2), without reducing her/his competence in the L1 (Cummins 2000).

The threshold level hypothesis is also a theoretical model for explaining the cognitive effects of bilingualism on bilingual children. Cummins proposes that there may be threshold levels of linguistic competence which a bilingual child must attain both in order to avoid cognitive deficits and reap cognitive benefits in full (Cummins 2000). He believes that there are two threshold levels of bilingual competence: the lower and the higher. Attaining a lower level would suffice to avoid any negative cognitive effects whereas attaining a second, higher level might be necessary to lead to accelerated cognitive growth. Cummins (2000) had argued that the basis for the possible attainment of the threshold level of L2 competence might depend on the level of competence attained in the mother tongue.

2.2.1 Gibson perception theory (J. J. Gibson) cognitive theory of perception

This is one of the renowned theories on perception that has been widely accepted and used in 1988 (Reed, 1988). According to the Gibson, our cognitive apparatus was created and formed by a long evolutionary influence of external environment which is apparent in its structure and abilities (Sato *et al.*, 2018). We learned to extract precisely the information which is necessary for our survival. In accordance with Darwin's assumption, the pressures of the environment caused our receptors to be created and formed so that they became sensitive to relevant stimulus from the environment and they adapted to the

environment. Such interpretation of perception is called the ecological one because it attributes the determinative role to the environment and to its influence on the whole process of perception. The basis of Gibson's theory is regarded as some sort of structures or patterns of light in the environment. The visual terminology he was using is not important since, analogically, it can be used for auditory or tactile components of perception.

Gibson believed that a human perceives objects (their sensory qualities) in a way by which packets of information — arrays determined (structured) by objects, enter his sensors. The beams of light reflect off the surface of objects and thus carry the information about their shape, size, texture, etc. Similarly, our ears are impacted by arrays of vibrating waves or by the influence of tangible objects. These information beams — arrays — form an extremely broad set of information flows, as in our environment there are billions of beams impacting our receptors from the entire perception field we happen to be in. It may seem that in Gibson's view an observer is more or less a passive space into which the information coming from the environment is being imprinted (Reed, 1988). However, the opposite is true. Gibson realized that, to some extent, our perception is effected by our active approach. And it doesn't mean only focusing our attention and perceptual accommodation. For perception the most significant thing is movement. For example, when we are sitting at a table in a room, there are beams which strike the retina from the perception field of our eyes and which carry some information.

Thus, for example, we can see a book we are reading, the table, but not many other objects that are out of our visual field. If we change our position, for example, if we stand up (or if we just turn our head slightly), the group of optical arrays falling on our receptors will change (Sato *et al.*, 2018). This allows us to see some other objects or the same objects from a different angle. And exactly this change of position of our body or position of our

receptors is the key matter for environment mapping. Only by this change can we catch surrounding information beams and acquire or be aware of the information present in our environment. Nevertheless, Gibson thought, the main part of information contained in information beams around us is invariant. This is a result of the fact that we perceive reality which is independent of us and our position is only a slight determinant of what we are able to capture from the world. So, if we change our position, we are changing a set of information that is available to us, but we are not changing reality itself. Information structures such as texture gradient, optical array and horizon–ratio relation are some of the key points of our environment (Sato *et al.*, 2018).

By implication, the theory is relevant to this study as the main focus is appraising the perception of teachers and students of the usage, impact and ease of use of Mother Tongue in teaching and learning Biology. From the theory, it is obvious that every individual has his or her pattern of perceiving information, and information changes with movement from places or position. To have a general view on certain phenomena or events, there is need to have perceptions converging in a direction giving a harmonious opinion and understanding of issues and events. But when perception is divergent, then it means there is no consensus on issues or phenomena of concern and that can enhance active and immediate decision taking to address issues on time.

2.2.2 Lev vygoteky's socio-cultural theory of cognitive development

This is another relevant theory as this study is concerned. The major theme of Vygotsky's theoretical framework is that social interaction plays a fundamental role in the development of cognition. The full cognitive development requires social interaction. In another word, individual's development is a result of his or her culture. He states, "Any function in the child's cultural development appears twice, or on two planes. First it

appears between people as an inter-psychological category, and then within the child as an intra-psychological category (Lloyd & Fernyhough, 1999).

In Vygotsky paradigm culture makes two sorts of contributions to the child's intellectual development. First, children acquire much of their thinking (knowledge) from it. Second, children acquire the means of their thinking (tools of intellectual adaptation [language] from the surrounding culture. He views cognitive developments as a dialectical process, where the child learns through shared problem solving experiences with someone else, such as parents, teacher, siblings or a peer.

According to this theory, the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with a more capable peer (Lloyd & Fernyhough 1999). In 1976 Wood, Bruner and Ross invented the term scaffolding to describe tutorial interaction between an adult and a child. In Vygotsky's in the year 1978 account, adults transmit to children the rich body of culture through their speech. Then the child's own language, as learning process, comes to help his or her intellectual transformation (Daneshfar & Moharami, 2018). Concerning internal speech (egocentric speech in Piaget's view), Vygotsky's view is that children can use their own internal speech to direct their own behaviour in much the same way that their parents' speech once directed it.

This transition reflects the Vygotsky's theme of development as a process of internalization. Therefore, unlike Piaget, Vygotsky views egocentric speech as a transition from social speech to internalized thoughts or inner speech (Castrillón, 2017). For Vygotsky egocentric speech is a transition between the child's acquiring language in a social communicative context, and attempting to internalize it as an inner speech (thoughts). He argues, "Besides being a means of expression and of release of tension,

[egocentric speech] soon becomes an instrument of thought in the proper sense – in seeking and planning the solution of a problem” (Castrillón, 2017). In his words: "this speech becomes gradually intellectualized and starts serving as a mediator in purposive activity and in planning complex actions"

Vygotsky's theory focuses heavily on language and social interaction, and the role they play in helping learners acquire the culture in which they live. In his theory, language is the tool people use for cultural transmission, communication, and reflection on their own thinking. For him language is the most important psychological tool that mediates our thoughts. Based on Allan *et al.* (2015) accounts of Vygotsky's theory, "language is the tool that enables emergence of self-awareness and consequently voluntary control of [one's] actions". Initially it is the adult who says yes or no to the child, and then the child will say yes or no to her or himself. In other words, "An inner process stands in need of outward criteria" (Allan *et al.*, 2015). So, for Vygotsky, the goal of development is to make the transition from being other-regulated to becoming self-regulated.

In short, according to his theory, language has two specific roles in cognitive development: communication and regulation. Communication is important in the transmission of culture. Regulation is important in gaining control over one's own cognitive processes (such as thoughts, memory, among others). He puts forward: "In growing up within linguistically structures and sustained relationships the child begins to perceive the world not only through its eyes but also through its speech. And later it is not just seeing but acting that is informed by words. In later developmental procedures, however, he emphasizes much more on the role of language in intellectual development. Until he asserts, "thought development is determined by language, that is., by the linguistic tools of thought and by the socio-cultural experience of the child. His proposal is logical and appropriate once the child masters his/her mother tongue.

Nevertheless, before Mother Tongue, a Necessary Step to Intellectual Development mastering MT, Piaget's view that focuses on cognitive achievements and development is more plausible. By implication, this theory portrays that language of a child is paramount to his thought or thinking abilities, especially the mother tongue which is the primary means of communication of a child at early stage of development. From the teachers and students' perception of the usefulness and ease of use of mother tongue in classroom instruction, it will prove and confirm the bond between child's language and thoughts or cognitive abilities (Charmaz, 2014). It is expected that the two parties will have the perception that the use of mother tongue has significant role to play in cognitive development of a child, and will boost child's cognitive, psychomotor and affective domains which will positively influence learning in schools (Allan *et al.*, 2015).

These theories are relevant to the present study because in Nigerian, English, which is predominantly used for teaching and learning, is an L2 for most students. Going by the two hypotheses, students need to be proficient in their MT in order to have a solid linguistic foundation for learning English language. Proficiency in the MT should therefore be considered an added advantage to Nigerian students. However, if students are to attain the higher threshold level, their MT should be used for instruction and taught as a school subject as these would increase their proficiency level. One of the commonest excuses for failing to use the MT in Nigerian education is due to the belief that it could impede students' learning of English language. Added to this is the belief that bilingualism could cause mental confusion (Charmaz, 2014), thus, in order to learn a second language, the L1 has to be subdued. The two ideas are therefore, misleading. Asanre *et al.* (2022) also observed that children with poor skills in their mother tongue are prevented from developing a strong and balanced national and cultural identity, which could lead to psychological, educational and social problems as well as forced cultural

assimilation. In the present study, the emphases are on both the pedagogical and sociocultural relevance of the mother tongue in education.

2.3 Empirical Studies

2.3.1 Empirical studies on teachers' perception

Sam (2015) examined teachers' perceptions of factors that hinder students' achievement in Biology in Ondo State. A sample of 153 teachers responded to a 21-item questionnaire on correlates of language competence in biology. Using relative frequencies of biology teachers' responses, analysis of data identified nonchalant attitudes, declining reading culture and misinterpretation of questions, linguistic interference of mother tongue with English, visual illiteracy, wrong spellings, limited biological vocabulary and defective study habits as some of the factors that might impede students' performance and interest in biology classrooms. Hence, it is suggested that continuous exposure of students to effective reading culture, constructive English language skills, good teaching with multimedia devices, and remediation of emerging learning difficulties can enhance their language and communicative competence, comprehension and achievement in biology. The similarities is that they both used questionnaire as an instrument for data collection. The difference is that the later examined teachers' perceptions of factors that hinder students' achievement in Biology in Ondo State while the present study is on teachers' and students' perception on the use of mother- tongue in teaching and learning of biology in secondary schools in Minna Metropolis Niger State.

Chebet *et al.* (2018) establish the influence of teacher preparation mother tongue/first language usage as a medium of instruction in rural ECDE centres in Nandi County, Kenya. The study adopted the Interdependence Theory. A descriptive survey research design was used. Target population was 4 Quality Assurance and Standards Officer (QASO), 200 head teachers and 400 teachers from 200 ECDE centres in the county. The

sample size was 241 respondents, these were; 4 QASOs, 79 head teachers and 158 pre-school teachers. The study used purposive sampling technique to select seventy nine head teachers and four Sub County QASOs. The study used simple random sampling technique to select 158 teachers from the sampled schools. The instruments for data collection were interviews and questionnaires. Questionnaires were administered to the pre-school teachers, while Sub County Quality assurance officers and head teachers were interviewed. The instruments were piloted in Kericho County that had similar characteristics as the study area. The reliability of research instrument was tested using Cronbach's Alpha coefficient. Data was analyzed using Statistical Package for Social Sciences (SPSS). The findings indicated that teacher preparedness, teacher attitude, instructional materials and medium of instruction accounted for 55.7% of classroom instruction. Classroom instruction was influenced by teacher's preparedness. Good teacher preparation enabled them to implement the language policy effectively. The teachers lacked teaching and learning materials on vernacular languages. The study recommended that the government should support in-service training for pre-school teachers on the use of mother tongue/first language as a language of instruction; provide funds for the development and acquisition of L1 resources for teaching that ensures schools comply with the language policy. The similarities are that they both used questionnaire as an instrument for data collection. The difference is that the later establish the influence of teacher preparation mother tongue/first language usage as a medium of instruction in rural ECDE centres in Nandi County, Kenya. while the present study is on teachers' and students' perception on the use of mother- tongue in teaching and learning of biology in secondary schools in minna Metropolis Niger State.

2.3.2 Empirical studies on language of instruction

Wushishi *et al.* (2016) investigated the effects of Hausa Language as a medium of instruction on academic performance of secondary school Biology Students in Sokoto State, Nigeria. The design used was experimental design, precisely, pretest posttest control group design. The population of the study was 21,367 SSII Students. Stratified random sampling technique was used in selecting the sample of schools used. 370 students were used as sample for the study. One hundred and eighty six (186) students consisting of 109 male and 77 female students were randomly selected for the experimental groups while One hundred and eighty four (184) students consisting of 102 male and 82 female were randomly selected for the control groups. Two hypotheses were formulated and tested at 0.05 level of Significance. The results revealed that there was significant difference between the experimental and control groups. There was no significant difference found between male and female students taught Biology in Hausa Language. It was concluded that the use of Hausa Language as a medium of instruction in Biology enhances performance among students.

2.3.3 Empirical studies on students' perception

Maisamari and Akinsola (2020) brought about issues of identity, linguistic diversity, cultural diversity, intercultural dialogue, social integration, among others. Thus, People acquire second language (or more than one language) in addition to their First Language (L1) with a view to stay relevant, compete favourably among peers and reach out to a wider audience. To this end, the role of First language in second language acquisition has become an issue. Many researches that have been done in this area have focused on the effect of First language (Mother Tongue) on Second language acquisition, (Interference and Error Analysis). So far, the study of the influence of First language (mother tongue) on second language acquisition has not been exhausted. Thus, this study examined the

influence of Timap language on English language proficiency of senior secondary school students (SSS3) in Amo land, Plateau State. This was with a view to determining whether proficiency in mother tongue (Timap) could enhance proficiency in English language among Amo speakers of Plateau State. In order to do this, the study first determined the level of English language proficiency and Timap language proficiency of the selected Amo students. Forty SSS 3 students were selected from four Government Secondary Schools in Amo land using simple random technique. Students were given instruments to test their Reading, Speaking and Writing skills in the two languages (English and Timap). The results of the test of proficiency in English and Timap language were used to determine whether proficiency in Timap Language has significant influence on the English language proficiency of the students. Robert Lado's (1950) Contrastive Analysis (CA) constituted the conceptual framework for the study. Findings showed that the overall level of English language proficiency of SSS3 students in Amo land is high, with an observed score of 3,943 which represent 65.72% of 6000. In Writing skill, they cannot be assessed because out-rightly they presented themselves as being unable to write in their mother tongue. However, they demonstrated some level of Reading skills (14.75%, very low). In Speaking skill, they demonstrated high level of proficiency (76.65%) of their mother tongue. By and large, their overall level of proficiency, including their Speaking skill Timap was low (30.47%). In addition, the eta squared value ($\eta^2=0.090$) indicating the relationship between proficiency in Timap Language on the English Language Proficiency of the students was very low (less than 1%). Hence, the influence of Timap Language on English Language Proficiency of SSS3 students in Amo Area of Plateau is very negligible.

2.3.4 Empirical studies on mother tongue

Nathaniel *et al.* (2014) investigated the effect of using mother tongue in teaching and learning basic science in Delta State, Nigeria. Poor academic performance in science among primary school pupils is an issue that needs redress. Language is said to be one of the most important features that distinguish human beings from other living things. It is the basis of communication among humans, as teaching and learning depend effectively on the language of communication. There are various languages used in communicating to one another. Researchers in the field of education have carried out several studies which focused on means of finding solution to the problem of poor academic achievement in science among primary school pupils. Some of these studies have dealt with curriculum issues, teaching methods, study habit and so on. But no convincing evidence on the effect of using Mother Tongue in teaching basic science. Therefore, the purpose of this study is to determine the effect of Mother Tongue in teaching and learning basic science in primary schools. Quasi-experimental research design was adopted for the study. A total of 1037 primary five school pupils were selected for the study using a simple and stratified random sampling procedure. The instrument used for data collection is Basic Science Test for Primary School Pupils (BSTPSP) comprises English and Urhobo versions of 20 items each. Obtained data were subjected to T-test statistical analysis. Results show that there is a significant difference between English and Urhobo (Mother Tongue) performance among the primary school pupils in Delta Central, Delta State, Nigeria. Conclusion is therefore reached that the use of Mother Tongue has a significant effect on pupils' academic achievement when compared to the use of English Language. We therefore recommended that teaching in English language should be properly developed and effective teaching strategies in English be adopted for teaching basic science, as some of the formulae and concepts have no equivalent in the mother tongue. The use of Mother

Tongue should also be encouraged as a means of teaching and learning basic science especially in rural areas.

Buhari *et al.* (2020) investigates the Impact of Mother-Tongue Augmented Instruction on Secondary School Students' Achievement in Physics in Bida Local Government Area of Niger State. The study adopts a quasi-experimental research design. The sample size of this research consist of 270 students from two 2 selected co-educational senior secondary schools in Bida Metropolis. The selected co-educational schools were randomly assigned each to experimental group (using mother tongue as augmented instruction) and control group (using non-augmented instruction method). One instrument used for collecting data in this study and its titled Physics Achievement Test (PAT). It is a 30 – item instrument covering topics in physics, a Pearson product moment correlation formula was used to determine the reliability coefficient of PAT which yielded 0.83. The data were analyzed using descriptive statistics of mean and standard deviation and inferential statistics of Analysis of variance (ANOVA). The hypotheses were tested at 0.05 level of significance. The results of the study revealed that Mother-Tongue Augmented Instruction enhances secondary school students' achievements in Physics. It was therefore recommended that students and teachers should be exposed to language augmented instruction in order to improve teaching and learning activities especially students' performance among other benefits.

Abdulrahman (2014) investigate the awareness about the use of the mother tongue (MT) in the Saudi EFL university classrooms. The use of MT can be a cause of encouraging or de-motivating source in the discourse of Saudi EFL Preparatory Year Program (PYP) classrooms. This phenomenon is investigated from the teachers' viewpoint in the present study. Focusing on the perceptual nature of the study, a survey was conducted to assess the significance of MT use amongst male and female teachers in EFL classes within the

context of Saudi PYP. The participants consisted of 100 EFL teachers [males & females] drawn from PYP Taif University English Language Centre (TUELC). A 22-item Likert-scale questionnaire was developed to elicit their perceptions of various academic uses of MT in an EFL context of Saudi universities. The findings of the present study reflect that EFL teachers within the context of Saudi PYP represented by the cohort of this study bears quite positive perceptions towards the use of MT. It is also concluded that they believe that teaching/learning a foreign language is easier if teaching is not merely limited to the target language (TL). Moreover, the results of the present study reflected that the cohort of both groups approved the significance of different functions of MT in the Saudi EFL university classrooms. However, male and female EFL teachers' perceptions about the use of MT were not on the same-line.

2.3.5 Empirical studies on teaching and learning Biology using Mothe Tongue

Francis and Eucharia (2019) examine parents, teachers, and students' beliefs about the use and study of mother tongue (MT) in selected secondary schools in Akinyele Local Government Area, Oyo State, Nigeria. Descriptive survey design was adopted. Twelve public senior secondary schools were randomly selected. Purposive sampling technique was used to select at least 15 literate parents, 12 teachers from different subject areas, and 20 students from each school. Overall, 211 literate parents, 195 teachers and 237 SSII students participated. Three instruments used were: Parents' Questionnaire ($r=0.87$), Teachers' Questionnaire ($r=0.90$) and Students' Questionnaire ($r=0.87$). Data were analyzed using frequency count, percentage, mean and standard deviation. Results show that parents, teachers and students have strong beliefs that using the MT to teach will facilitate the learning of English and other subjects and enhance participation in lessons. They also believe that studying the MT as a school subject would promote students' sense of identity and positive attitude towards the Nigerian culture. Students believe that the

MT remains the best language to learn with. The study has shown that the participants have strong beliefs about the pedagogical and sociocultural relevance of the MT in education. There is a positive indication that the main stakeholders (parents, teachers and students) are ready to embrace the study of MT as a subject in the secondary school. It is therefore recommended that the governments should endeavour to invest in the development of the orthographies of the Nigerian languages to make them usable in education.

Adedayo and Babalola (2021) investigated the influence of mother tongue as a supplementary medium of instruction on secondary school students' learning outcome in physics. Two research questions were generated while there were three hypotheses formulated to guide the study. The research adopted a quasi-experimental design of the pretest, post-test non randomized control group type. The sample consisted 120 secondary school Physics students class 2, who were selected through multistage sampling technique across the 16 Local Government Areas of Ekiti State, Nigeria. The selection of the sample put into consideration those with Yoruba (a native language) as their mother tongue since the students are from multiethnic groups. The instrument used for data collection was a test instrument titled 'Physics Students' Achievement Test' (PSAT) which was subjected to face and content validity and reliability tests. The reliability test of re-test method yielded a reliability coefficient of 0.73, making the instrument to be reliable for the study. The data obtained were subjected to descriptive analysis of frequency counts and percentages to answer the research questions raised which t-test statistics was employed to analyze the hypotheses formulated at 0.05 level of significant. The findings of the study revealed that the performance and attitude of students can be improved when mother tongue is used as a supplementary medium of instruction in Physics and that there is no

significant difference in the performance of male and female students when mother tongue is used as supplementary medium of instruction in Physics.

Khejeri (2014) examines the attitudes of teachers towards the teaching and use of Mother Tongue as a language of instruction in lower primary schools based on a study conducted in Hamis District in Western Kenya, East Tiriki Division. The research design was a descriptive survey selected because surveys gather information from relatively large areas by employing sampling procedures hence cutting down on costs. The study sample included 12 schools randomly selected from the 40 primary schools in East Tiriki Division. The instruments used for data collection were observation, tape-recording and questionnaires. The data was analysed using descriptive statistics. The study revealed that Mother Tongue is less valued than English. English is highly valued both for its instrumental and integrative purposes. It is recommended that there's need for the government to encourage the publication of instructional materials for the teaching of Mother Tongue and that the educational language policy makers review their position with regard to Mother tongue with a view to promoting it both as a language of instruction and a subject.

Yusuf *et al.* (2016) find out the perception of lower basic school teachers on the use of mother tongue as a medium of instruction. A total of two hundred and twenty-one (221) lower basic school teachers were randomly selected from eighty-one (81) Basic Schools in Ilorin West Local Government Area of Kwara State. One hundred and one (101) teachers were male while one hundred and twenty (120) teachers were female. A researchers' designed questionnaire titled, "Questionnaire on Caregivers' Perception of Play as a Way of Learning (QCPPWL) was used to obtain the data for this study. The data were collected using a researcher-designed questionnaire and was analysed with the use frequency count, percentage, t-test and Analysis of Variance (ANOVA). The findings

revealed that lower basic school teachers had positive perception on the use of mother tongue as a medium of instruction. The findings also showed that there was no significant difference in the perceptions of male and female lower basic school teachers on the use of mother tongue as a medium of instruction. It was also unfolded that school type and teaching experience had significant influence on the perception of lower basic school teachers

Isah *et al.* (2017) investigates the effects of mother tongue usage on student's academic performance in Biology senior secondary schools Toro LGA, Bauchi state, Nigeria. One research question was formulated to guide the study. Quasi-experimental research design with the population of 850 students was the methodology of the study. Two schools with the population of n80 students were sampled using simple random sampling to select the school and purposive sampling for the students. The results indicated that there is a significant difference in performance of students taught Biology in the mother tongue.

Alimi *et al.* (2020) determine the effectiveness of mother tongue instruction on the achievement of primary five (V) pupils in literacy and numerical skills in Osun state. It also examined the moderating effect of gender. The Cummins interdependence theory provided the framework, while the pre-test/post-test control group quasi experimental design was adopted. Two Local Government Areas in Osun state were randomly selected. From each LGA, three public primary schools were randomly selected, while an intact class of primary V pupils was selected from each school, totalling 233 pupils. The instruments used were Pupils literacy ($\alpha=.82$), Pupils numeracy skills ($\alpha=.89$) Questionnaires and instructional guides. Data were subjected to Analysis of covariance at 0.05 level of significance. 53.5% of the participants were females. There was a significant difference in the achievement of pupils taught with mother tongue and conventional strategies in literacy and numeracy skills ($F(2,232)=27.94$; $p<.05$, partial

$\eta^2=.20$). Pupils exposed to mother tongue strategy had highest post mean literacy and numerical skills (70.47). Mother tongue strategy enhanced pupils' literacy and numerical skills in primary schools in Osun state, regardless of their gender. Teachers should adopt these strategies to improve pupils' achievement in literacy and numerical skills.

Olu (2017) find rate of failure recorded every year in most external examination constitutes a major concern to the education sector. Every year government recruits more teachers into the system, capacity of various kinds is conducted at all time, yet the failure rate continues to increase. On this basis this study investigates influencing mother tongue on students in teaching and learning of English language in Secondary Schools in Ondo State, Nigeria. Survey research design was adopted, 100 secondary school teachers were randomly selected from secondary schools in Ondo State, Nigeria, to complete the self-designed instrument constructed for data collection in this study. The study employed frequency counts, percentages and chi-square statistical tools for the analysis of the collected data. The findings show that mother tongue interference has impact on the writing and spoken of English language among secondary school students. Another finding shows that, mother tongue hinder effective communication among students in class. It also shows that, Mother tongue influence students' academic performance. Lastly, mother tongue hinders students from mastering the grammar of other languages. This study however concluded that, interference of Mother tongue on Secondary School Students' of Yoruba language or other languages competence cannot be overemphasized

Elvira *et al.* (2017) ascertained the implications of the utilization of mother tongue as a medium of instruction to the pre-service teachers in teaching mathematics and science to Grade 3 learners. The study was conducted at Bukidnon State University Elementary Laboratory School during the SY 2014-2015. It utilized the descriptive method. The result revealed that learners performed well when the medium of instruction used in teaching

science and mathematics was English. Therefore, Grade 3 learners achieved high score in Science and Mathematics subjects when they are taught using the English language as the medium of instruction. This result implies that English language is the preferred medium of instruction of the Grade 3 learners and that in-service teachers should encourage the pre-service teachers to utilize English as the medium of instruction when teaching science and mathematics to young learners, or should also consider the language of the learners when they teach these tool subjects during their practice teaching.

Tess and Helen (2022) determined the preparation level of the teachers in teaching Mathematics using Mother Tongue-Based instruction and also explore the teachers' feedback in the implementation of MTB instruction. The Philippine curriculum in kindergarten to Grade 3 emphasize the used of mother-tongue in teaching and learning. Elementary Mathematics is very important in the life of the learners. The teacher performs a vital position within the coaching and gaining knowledge of process. Educationists were locating sensible answers to the sensible issues within the Philippine Educational System particularly on literacy and comprehension of students. Methods: This study utilized mixed methods of quantitative and qualitative design. Mean was utilized to determine the level of preparations of the teachers in teaching MTB. Thematic analysis was also used in determining the teachers' feedback about teaching mother tongue in Mathematics. Results: Findings revealed that the teachers are well-prepared in terms of content and instructional materials in teaching Mathematics using MTB. Contextualization and innovation are the core strategies in teaching Mathematics. In contextualized teaching, it connects the learning of basic skills that focuses teaching and learning on the concrete applications in a specific context that is of interest to the student. Conclusion: Thus, contextualized and innovative model in teaching Mathematics using mother-tongued based instruction is essential in the delivery of instruction.

2.3.6 Empirical studies on teaching experience in biology class

Batool *et al.* (2021) examined the teaching-learning issues related to the language in the biology classroom. It has explored the main issues of biological language that encounter students and teachers in the teaching-learning processes. The objectives of the study were to explore the perceptions and experiences of secondary school teachers about language issues in the biology classroom. Therefore, a case study approach within qualitative research methods is used to explore the language issues in biology classrooms. The participants of the study were recruited through the purposive sampling technique. The observations were conducted to get familiar with the teaching practices of teachers. Further, semi-structured interviews were conducted to get in-depth information. The data were analyzed through thematic analysis. The study findings revealed that students and teachers face language issues in biology classrooms. It includes the structured vocabulary of biology, long spellings, and difficult processes, difficult to pronounce the long words. Most of the time, students write incorrect spellings due to the wrong word pronunciation that also leads to misconceptions of biological concepts.

2.4 Summary of Related Literature

Language is said to be one of the most features that distinguish human beings from other living things. It is the basis of communication among human beings, it is the most important and effective key to human achievement. Researchers have carried out studies on identifying ways and means of reversing the decline rate of students' academic achievements in science. Abijo (2014) carried out investigation on students and teachers' perception of the cause of poor academic performance in Ogun State Secondary Schools, Nigeria. These research studies have dealt with curriculum issues, effective teaching methods, study habit, students-friendly instructional materials and so on. Of all these studies, there is no convincing evidence on the impact as well as the effect of using mother

tongue on students' academic achievement in basic science. Therefore, the question this study will address is "perception of teachers and students' on the use of mother tongue in teaching and learning of Biology concept in secondary schools in Minna, Metropolis, Niger State

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Research Design

This study employed descriptive survey research design involving the use of questionnaires as a source of collecting data for this study. This design was considered appropriate for this study as it explored the perception of teachers and students on the use, impact and ease-of-use of mother tongue in teaching and learning of Biology. Furthermore, descriptive survey research is often used when the goal is to gather information about a subject's current conditions, characteristics, or practices. It is not focused on proving causation but rather on understanding the existing situation.

3.2 Population of the study

The population of this study comprised all science teachers and students in the Senior Secondary Schools in Bosso and Chanchaga local government area which constitute the Minna municipal. There were seventeen thousand nine hundred and fifty-seven (17,957) senior secondary students in the metropolis and 126 science teachers. The target population used for this study were 5,372 Senior Secondary School two (SSII) students in Bosso and Chanchaga Local Government Areas consisting of two thousand four hundred and twenty-three (2,423) male and two thousand nine hundred and fourth nine (2,949) female students during 2018/2019 academic session (Niger State Ministry of Education, 2022).

3.3 Sample and Sampling Techniques

The composition of the sample size encompassed a total of 359 participants drawn from four carefully chosen secondary schools. In order to assemble this sample, this study employed a multistage sampling methodology, a systematic process that involved several distinct steps.

Initially, the study randomly selected four secondary schools from the pool of eligible options. From these chosen school, identified and selected sixteen teachers hailing from the Bosso and Chanchaga Local Government Area within Niger State were considered. The selection of these teachers was through, combining both simple random and purposive sampling techniques. This approach was meticulously designed to ensure representation while also capturing specific expertise within the field of education.

Furthermore, our sample included a total of 357 students, who were drawn from the pool of teachers initially selected. The Study decision regarding the sample size was thoughtfully determined through consultation with a sample size advisory table. This table factored in considerations such as the overall population and a margin of error set at 5%, all while maintaining a confidence level of 95%.

It is important to highlight that, due to the limited number of Biology teachers in the selected schools, this study considers all available Biology teachers. This decision was made to ensure that the research comprehensively captured the perspectives of all Biology teachers within the selected schools, given their unique role in the study context.

Table 3.1: Sample Distribution of the Study and Gender

S/ N	Name of School	Number of Teachers			Number of Students		
		Male	Female	Total	Male	Female	Total
1	Govt, Day Sec. Sch. Minna	1	3	4	42	43	85
2	Bosso Sec. Sch. Bosso	3	1	4	43	44	87
3	Ahmadu Bahago Sec. Sch. Bosso	2	2	4	45	42	87
4	Hill Top Model Sch. Minna	2	2	4	48	50	98
Total		7	9	16	179	178	357

Source: Niger State Ministry of Education (2022)

3.4 Research Instruments

The instruments used for this research were two researcher self developed questionnaires namely: Teachers' Perception of the Use of Mother Tongue in Teaching Biology Questionnaire (TPMTTBQ) and Students' Perception on the Use of Mother Tongue in Learning Biology (SPMTLBQ) questionnaire. They were designed by the researcher considering the variables under study and the items were all drawn from the dimensions of the constructs. Section A of the TPMTTBQ contains the bio-data of the respondents which include name of school, gender. While Section B contains the items. The second instrument SPMTLBQ also has two sections, Section A demographic information and section and B contains the items. The TPMTTBQ and SPMTLBQ have similar dimensions, and both consist of thirty items scaled with Likert scale (with five options of Strongly Agree, Agree, Undecided, Disagree and Strongly Disagree respectively).

3.5 Validity of the Instrument

The face validity was assessed by three experts in Science Education Department of Federal University of Technology, Minna, Niger State. Abijo (2014) maintained that validity is the extent to which the contents of a test correspond to that of the subject matters and their associated behavioral outcomes. The corrections pointed out were corrected in the final drafts of the questionnaires, and finally the validators adjudged the two instruments to be valid and appropriate for data generation.

3.6 Reliability of the instrument

In order to determine the reliability of the research instruments, a pilot study was carried out in Zarumai Model School, Minna using 10 biology teacher and 30 students who were not part of the selected sampled schools, Minna Metropolis. The data generated were analyzed using Cronbach Alpha for internal consistency. The reliability coefficient for SPMTLBQ was 0.839. and 0.856 for TPMTTBQ. This implied that the two instruments

were reliable as ascertained by Adeleke (2016) reliability rule of thumb who indicated that reliability index of 0.70 to 0.90 are strong.

3.7 Method of Data Collection

A letter of introduction was collected from the school through the Head of Department (HOD), Department of Science Education, FUT, Minna, and taken to the selected schools. The administration of the questionnaire was carried out by the researcher. The researcher distributed the questionnaires to the respondents. Adequate time was given to the respondents to respond to the questionnaire. Completed questionnaire was collected on the spot.

BREAKDOWN

Week	(Activity)
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1 st week.....	collection of letter of introduction from the head of the department and giving out introduction letters to the principals of sampled schools
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2 nd week.....	Administration of questionnaire to the sampled schools (teachers and students) with the help of research assistance from the selected secondary schools
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3 rd week	collection and analyzing the data's
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3.8 Method of Data analysis

The data that was collected from the sampled teachers and students and was analyzed using both descriptive and inferential statistics. All the research questions were answered using descriptive statistics, precisely mean and standard deviation. The research hypotheses were analyzed using independent sample t-test. The arithmetic mean of the scales computed as $5+4+3+2+1=15/5=3.00$, hence the decision mean of 3.0 was used. The items with average mean of 3.00 and above were considered agreed and items with weight mean less than 3.00 were considered disagreed as a decision rule. All analyses were conducted using Statistical package for the social Sciences (SPSS) version 23.00.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

This chapter present analysis of data obtained using appropriate tables according to the research questions of the study. Table 4.1 present the demographic information.

Table 4.1: Demographic Information

Gender of the Respondents			
Students	Frequency	Percent	Cumulative Percent
Males	179	50.1	50.1
Females	178	49.9	100.0
Total	357	100.0	
Teachers			
Males	7	43.8	43.8
Females	9	56.2	100

Table 4.1 above presents the number of respondents of the study. From the table, it shows that there were 179 (50.1%) Male Students, 178 (49.9%) were Females. This gave rise to a total of 357 (100%) respondents of the study. On the lower bound, there were 9(43.8%) Male Teachers, and 7(56.2%) Female Teachers who participated in the study.

4.1 Answers to the Research Questions

4.1.1 Research question one

To answer this research question, mean and standard deviation were used as indicated in Table 4.2.

What is the teachers' perceived use of Mother tongue in teaching biology in secondary schools in Minna?

Table 4.2: Teachers Mean and Standard Deviation Responses on the Perceived use of MT in Teaching Biology of Secondary Schools in Minna

S/N	Item	Mean	S.D	Remark
1	Mother tongue encourages participation and achieving learning goals of Biology	3.81	0.981	Agreed
2	Mother tongue enriches student's understanding of Biology concepts	3.31	0.602	Agreed
3	Students' concentration is enhanced by using mother tongue in teaching Biology	3.75	0.683	Agreed
4	I have the ability to teach Biology using mother tongue	3.44	0.892	Agreed
5	Mother tongue have negative effect on teaching Biology	2.4	0.894	Disagreed
6	The use of MT in teaching Biology requires resources like textbooks, diagrams and text books in mother language	3.81	0.911	Agreed
7	Using mother tongue in teaching Biology entails discussion in native language	3.94	0.854	Agreed
8	Use of mother tongue requires language translator device and appliances to cater for multilingual classrooms	3.87	0.806	Agreed
9	I don't have the ability to teach Biology in mother tongue	2.06	1.063	Disagreed
10	The use of MT discourages teachers active interaction during instruction	2.30	0.966	Disagreed
	Grand mean	3.80	0.87	Agreed

Table 4.2 describes the mean and standard deviation of responses of the teachers' perception of the use of mother tongue in teaching Biology. From the table, considering the bench mark of 3.00 mean, the grand mean of 3.80 with standard deviation of 0.87 revealed that teachers have positive perception of the use of mother tongue in teaching Biology in secondary schools in Minna. Teachers perceived that the use of mother tongue influences active participation in teaching and learning, requires the use of language translator, native textbooks and lesson notes, discussion in native language during the classroom instruction.

4.1.2 Research question two

What are the teachers perceived impact of MT in teaching Biology in secondary school in Minna?

To answer this research question, mean and standard deviation were used as indicated in Table 4.3.

Table 4.3: Teachers Mean and Standard deviation of responses on Perceived Impact of MT of secondary school students

S/N	Item	Mean	S.D	Remark
1	Students learn Biology better when taught in Mother tongue	3.63	1.147	Agreed
2	Students learn Biology faster when taught in mother tongue	3.63	0.957	Agreed
3	Teaching Biology using mother tongues put students to the disadvantage in the class	3.5	0.966	Agreed
4	Teaching Biology in mother tongue influences teachers self-esteem during instruction.	4.19	0.981	Agreed
5	Teaching Biology with mother tongue influences students' performance in the class	3.69	0.873	Agreed
6	The use of mother tongue has no impact on students' performance in the continues assessment	2.81	0.75	Disagreed
7	Teaching with mother tongue always discourage students in the classroom interaction.	2.31	0.704	Disagreed
8	The use of mother tongue in teaching Biology distracts students from learning	2.19	0.655	Disagreed
9	Use of mother tongue in teaching Biology influences students/teachers attitude towards learning	3.31	0.602	Agreed
10	Use of mother tongue in teaching Biology makes learning with language resources easier	4.19	1.047	Agreed
Grand mean		3.65	0.87	Agreed

Table 4.3 reports the mean response of teachers perceived impact of mother tongue in teaching and learning Biology in secondary schools in Minna. From the table, considering

the criterion mean score of 3.00, the grand mean was 3.65, and the standard deviation was 0.87, indicating that teachers perceived mother tongue as a positive medium of instruction for teaching Biology in secondary schools in Minna. Teachers perceived that teaching with mother tongue makes learning faster, easier; improves performance and self-esteem; and influences appropriate use of language applications and facilities.

4.1.3 Research question three

What is the teachers' perceived ease of use of MT in teaching Biology in secondary schools in Minna?

To answer this research question, mean and standard deviation were used as indicated in Table 4.4.

Table 4.4: Teachers Mean and Standard deviation of Responses on Perceived Ease of Use of MT in Teaching Biology in secondary schools in Minna

S/N	Item	Mean	S.D	Remark
1	It is easier to use language apps and translator in Biology classroom instruction	3.81	0.834	Agreed
2	The use of mother is simple and it makes teaching and learning Biology easier	3.5	0.73	Agreed
3	Use of mother tongue makes teaching of Biology effective and less burden	3.31	1.138	Agreed
4	Use of mother tongue helps teachers in assessing students performances easily	4.06	0.772	Agreed
5	Use of mother tongue simplifies the achievement of teaching and learning objectives	4.06	0.574	Agreed
6	Use of mother tongue in teaching Biology facilitates effective evaluation of learning	3.38	0.885	Agreed
7	Use of mother tongue simplifies the spelling and use of abstract words, pronunciation of botanical and generic names	3.88	0.806	Agreed
8	Teaching Biology in mother tongue makes it difficult to understand botanical names	2.00	1.155	Disagreed

9	The use of mother tongue simplifies content coverage of syllabuses in schools	3.56	1.209	Agreed
10	Teaching Biology in mother tongue makes teaching and learning more attractive and less tasking	4.06	0.998	Agreed
Grand mean		3.67	0.91	Agreed

Table 4.4 presents mean responses of teachers' perception of the ease of use of mother tongue in teaching Biology in secondary schools in Minna. From the results, using the bench mark of mean score of 3.00, the grand mean score was 3.67, standard deviation was 0.91, which was above the criterion. Hence, it is evident that teachers had positive perception of the ease of use of mother tongue in teaching Biology. Teachers perceived that the use of mother tongue simplifies teaching and learning and with the use of language applicator and translators, students 'assessment, achievement of learning objectives, effective evaluation of learning, content coverage and makes teaching and learning less burdening and tasking.

4.1.4 Research question four

What is the students perceived use of Mother tongue in learning Biology?

To answer this research question, mean and standard deviation were used as indicated in Table 4.5.

Table 4.5: Students Mean and Standard Deviation of Responses on the Perceived use of MT in learning Biology in Secondary School

S/N	Item	Mean	S.D	Remark
1	I can learn best with the use of mother tongue	3.81	0.951	Agreed
2	I can read and write Biology terminologies better with the use of mother tongue	3.31	0.584	Agreed
3	I cannot perform better in Biology practical if taught with mother tongue	2.75	0.661	Disagreed
4	Learning Biology in mother tongue is a good idea	3.44	0.856	Agreed
5	Teaching in mother tongue is all about using native language during classroom instruction	3.99	0.866	Agreed
6	The use of mother tongue in learning Biology entails analysing concepts, organs, systems and functions in native language	3.81	0.886	Agreed
7	Mother tongue is the most appropriate medium of instruction for teaching and learning Biology	3.94	0.829	Agreed
8	Using mother tongue in teaching Biology seems awkward	2.87	0.782	Disagreed
9	The use of mother tongue in teaching and learning Biology might influence problem solving skills in students	4.06	1.033	Agreed
10	The use of mother tongue can lead any country to achieve its educational goals	3.99	0.937	Agreed
	Grand mean	3.80	0.84	Agreed

Table 4.5 describes the mean and standard deviation of responses of the students perceived impact of mother tongue in teaching and learning Biology. Based on the criterion mean score of 3.00, the obtained grand mean score was 3.80, and standard deviation was 0.84, hence, it indicates that the students had positive perception of the use of mother tongue in teaching and learning of Biology. Students perceived that the use of mother tongue entails using native language in teaching and learning, it makes learning of Biology better, it improves students' problem solving skills and it's the most appropriate medium of instruction and it leads to the achievement of learning objectives.

4.1.5 Research question five

What is the students' perceived impact of MT in learning Biology in secondary school?

To answer this research question, mean and standard deviation were used as indicated in

Table 4.6:

Table 4.6: Students Mean and Standard deviation of responses on Perceived Impact of MT in Learning Biology in secondary school in Minna

S/N	Item	Mean	S.D	Remark
1	Student learns better and faster when they learn in their native language	3.63	1.116	Agreed
2	The use of mother tongue in teaching and learning makes the instruction interesting and motivating	3.62	0.928	Agreed
3	Students' self-esteem is increased by the use of mother tongue in learning Biology	3.5	0.939	Agreed
4	The use of mother tongue impacts students' performance in biology	4.19	0.945	Agreed
5	Teaching and learning in mother tongue improve active participation in the class	3.69	0.844	Agreed
6	High students attendance to schools can be achieved by the use of mother tongue in teaching and learning Biology	3.81	0.73	Agreed
7	Students attitudes towards learning Biology is influenced by the use of mother tong in classroom instruction	3.31	0.678	Agreed
8	Use of mother tongue is stressful and distracting in teaching and learning Biology	3.19	0.637	Agreed
9	The use of mother tongue in Biology classroom instruction is disgusting	2.31	0.584	Disagreed
10	The use of mother tongue in Biology instruction confuses learners	2.19	1.015	Disagreed
	Grand Mean	3.65	0.8416	Agreed

Table 4.6 describes the mean and standard deviation of the students perceived impact of mother tongue in teaching and learning Biology. Based on the criterion mean score of 3.00, the obtained grand mean score was 3.80, and standard deviation was 0.84, hence, it indicates that the students had positive perception on the impact of mother tongue in

teaching and learning of Biology. Students perceived that mother tongue impacts faster and better learning, makes learning is enhanced, interesting and motivating, improving performance, attendance and participation also increases students' self-esteem and influences students' attitudes towards learning

4.1.6 Research question six

What are the students perceived ease of use of MT of secondary school students?

To answer this research question, mean and standard deviation were used as indicated in

Table 4.7

Table 4.7: Students Mean and Standard deviation of Responses on Perceived Ease of Use of MT in Teaching Biology in secondary school in Minna

S/N	Item	Mean	S.D	Remark
1	It is easier to use language translator and applications in mother tongue for learning Biology	3.81	0.812	Agreed
2	The use of mother simplifies learning of Biology	3.5	0.709	Agreed
3	Students understand faster and better when learned in mother tongue	3.32	1.105	Agreed
4	The use of mother tongue makes abstract concepts easier and concrete among students	4.06	0.751	Agreed
5	Use of mother tongue influences assessment of Biology learning	4.06	0.558	Agreed
6	Use of mother tongue improves students' performance in Biology examinations	3.37	0.86	Agreed
7	Spelling and pronunciation of generic names appears easier when mother tongue is adopted	3.87	0.784	Agreed
8	The use of mother simplifies the whole teaching and learning activities of every term	3.01	1.116	Agreed
9	The use of mother tongue facilitates easier further studies using learning resources	3.56	1.174	Agreed
10	Use of mother tongue caters for challenges of language barrier in learning	4.06	0.97	Agreed
	Grand mean	3.67	0.88	Agreed

Table 4.7 describes the mean and standard deviation of responses of the students perceived ease of use of mother tongue in teaching and learning Biology. Based on the criterion mean score of 3.00, the obtained grand mean score was 3.67, and standard deviation was 0.88, hence, it indicates that the students agreed that mother tongue impacts fast understanding, had positive perception of the use of mother tongue in teaching and learning of Biology. The students perceived that mother tongue was simplified by the use of language translators/applications in the teaching and learning Biology, Biology abstract terminologies, concepts in a multilingual class instruction and assessment.

4.2 Answers to the Research Hypothesis

4.2.1 Research hypothesis one

There is no significant difference between male and female teachers perceived use of Mother tongue in teaching and learning Biology.

To answer this research hypothesis, independent t-test was used as shown in Table 4.8.

Table 4.8: T-test analysis of the gender difference in teachers perceived use of Mother tongue in teaching and learning Biology

Gender	N	df	Mean	S.D	t- value	P
Male	7	14	39.00	2.08	1.187	.225*
Female	9		37.22	3.49		

***Not Significant at 0.05**

Table 4.8 reports t-test statistics of the gender difference in the teachers perceived use of mother tongue in teaching and learning Biology. From the results, $t(14) = 1.187$, $p = .225$, which is greater than 0.05. hence the null hypothesis is accepted. There is no significant difference between the mean response of male and female teachers' perceived use of Mother Tongue in teaching and learning Biology

4.2.2 Research hypothesis two

There is no significant difference between male and female teachers perceived impact of Mother tongue in teaching and learning Biology.

To answer this research hypothesis, independent t-test was used as shown in Table 4.9.

Table 4.9: T-Test Analysis of the Gender Difference in Teachers Perceived Impact of Mother Tongue in Teaching and Learning Biology.

Gender	N	df	Mean	S.D	t- value	P
Male	7	14	36.4286	2.82000	.012	.990*
Female	9		36.4444	2.40370		

***Not Significant at 0.05**

Table 4.9 reports t-test statistics of the gender influence on the mean responses of perceived impact of mother tongue in teaching and learning Biology. From the results, $t(14) = .012$, $P = .990$, which is greater than 0.05. hence the null hypothesis was accepted. Hence, there is no significant difference between the mean response of male and female teachers perceived impact of Mother Tongue in teaching and learning Biology.

4.2.3 Research hypothesis three

There is no significant difference between male and female teachers perceived ease of use of Mother tongue in teaching and learning Biology.

To answer this research hypothesis, independent t-test was used as shown in Table 4.10.

Table 4.10: t-test analysis of the gender difference in Teachers' perceived Ease use of Mother tongue in Teaching and Learning Biology.

Gender	N	df	Mean	S.D	t- value	P
Male	7	14	37.00	2.65	0.476	.641*
Female	9		36.33	2.87		

*Not Significant at 0.05

Table 4.10 depicts t-test results of gender difference in the Teachers' perceived ease of use of Mother tongue in teaching and learning Biology. From the results, $t(14) = 0.476$, $P = 0.641$, which is greater than 0.05. Hence the null hypothesis is accepted, as There is no significant difference in the Teachers' perceived ease of use of Mother tongue in teaching and learning Biology.

4.2.4 Research hypothesis four

There is no significant difference between male and female students' perceived use of Mother tongue in teaching and learning Biology.

To answer this research hypothesis, independent t-test was used as shown in Table 4.11.

Table 4.11: t-test analysis of the gender difference in students' Perceived use of Mother tongue in teaching and learning Biology.

Gender	N	df	Mean	S.D	t- value	P
Male	179	355	37.99	2.89	.043	.966*
Female	178		37.97	2.95		

*Not Significant at 0.05

Table 4.11 reports t-test statistics of the gender influence on the students' mean responses of perceived usefulness of Mother Tongue. From the results, $t(318) = 0.154$, $p = .878$, which is greater than 0.05. hence the null hypothesis is accepted. There is no significant

difference between the mean response of male and female students' Perceived use of Mother tongue in teaching and learning Biology.

4.2.5 Research hypothesis five

There is no significant difference between male and female students' perceived impact of Mother tongue in teaching and learning Biology.

To answer this research hypothesis, independent t-test was used as shown in Table 4.12.

Table 4.12: t-test analysis of the gender difference in students' perceived impact of Mother tongue in teaching and learning Biology

Gender	N	df	Mean	S.D	t- value	P
Male	179	355	36.4581	2.46334	.129	.897*
Female	178		36.4218	2.40981		

***Not Significant at 0.05**

Table 4.12 reports t-test statistics of the gender influence on the mean responses of perceived impact of Mother Tongue. From the results, $t(318) = 1.204$, $p = .230$, which is greater than 0.05. hence the null hypothesis was accepted. There was no significant difference between the mean response of male and female students' perceived impact of Mother tongue in teaching and learning Biology.

4.2.6 Research hypothesis six

There is no significant difference between male and female students' perceived ease of use of Mother tongue in teaching and learning Biology.

To answer this research hypothesis, independent t-test was used as shown in Table 4.13.

Table 13: t-test Analysis of the Gender Difference in Students' Perceived Ease of Use of Mother Tongue in Teaching and Learning Biology.

Gender	N	df	Mean	S.D	t- value	P
Male	179	355	36.7161	2.60558	0.567	.571*
Female	178		36.5442	2.66183		

***Not Significant at 0.05**

Table 4.13 depicts t-test results of gender difference in responses on the influence of perceived ease of Mother Tongue. From the results, $t(318) = 0.713$, $p = 0.476$, which was greater than 0.05. Hence the null hypothesis is accepted, as there was no significant difference between the mean response of male and female student' perceived ease of use of Mother tongue in teaching and learning Biology.

4.3 Summary of Findings

From the analysis of results, the following are the findings of the study: -

1. The teachers perceived that the use of mother tongue influences active participation in teaching and learning, requiring the use of language translator, native textbooks and lesson notes and discussion in native language during the classroom instruction.
2. The teachers perceived that teaching with mother tongue makes learning faster, easier by improves performance, self-esteem; and influences appropriate use of language applications and facilities.
3. The teachers perceived that the use of mother tongue simplifies teaching and learning with the use of language applications and translators, students 'assessment, achievement of learning objectives, effective evaluation of learning, content coverage and making teaching and learning less burdening and tasking.

4. The students perceived that the use of mother tongue entails using native language in teaching and learning, it also makes learning of Biology better. It improves students' problem solving skills, it's also the most appropriate medium of instruction leading to the achievement of learning objectives.
5. The students perceived that mother tongue impacts faster and better learning, also making learning interesting and motivating by, improving performance, attendance and participation which increases students' self-esteem and influences students' attitudes towards learning
6. The students perceived that mother tongue simplifies the use language translators and applications, teaching and learning Biology. Using mother tongue also simplifies Biology abstract concepts and terminologies in a multilingual class instruction and assessment.
7. There is no significant difference between the mean response of male and female teachers' perceived use of Mother Tongue in teaching and learning Biology
8. There is no significant difference between the mean response of male and female teachers' perceived impact of Mother Tongue in teaching and learning Biology.
9. There is no significant difference between the mean response of male and female teachers' perceived ease of use of Mother Tongue in teaching and learning Biology
10. There is no significant difference between the mean response of male and female students' perceived use of Mother tongue in teaching and learning Biology
11. There is no significant difference between the mean response of male and female students' perceived impact of Mother Tongue in teaching and learning Biology

12. There is no significant difference between the mean response of male and female students' perceived ease of use of Mother Tongue in teaching and learning Biology

4.4 Discussion of Results

The study surveyed the teachers and students' perception of the use, ease of use and impact of mother tongue in teaching and learning of Biology in secondary schools in Minna Niger state. The results of the first research question indicated that teachers perceived that the use of mother tongue influences active participation in teaching and learning, requires the use of language translator, native textbooks and lesson notes, discussion in native language during the classroom instruction. This is in line with Abdulrahman (2014) who investigated the awareness about the use of the mother tongue (MT) in the Saudi EFL university classrooms and found out that there was positive perception towards the use of MT amongst teachers and students. It also corroborates the finding of Francis and Eucharia (2019) who examined parents, teachers, and students' beliefs about the use and study of mother tongue (MT) in selected secondary schools in Akinyele Local Government Area, Oyo State, Nigeria whose results indicated that parents, teachers and students have strong beliefs that using the MT to teach will facilitate the learning of English and other subjects (Biology inclusive) and enhance participation in lessons. It is also in support of Yusuf *et al.* (2016) who discovered that lower basic school teachers had positive perception on the use of mother tongue as a medium of instruction.

The second finding of the study indicated that teachers perceived that teaching with mother tongue makes learning faster, easier; improves performance and self-esteem; and influences appropriate use of language applications and facilities. This corroborates the finding of Adedayo and Babalola (2021) whose findings revealed that the performance

and attitude of students improved when mother tongue is used as a supplementary medium of instruction in Physics and that there is no significant difference in the performance of male and female students when mother tongue is used as supplementary medium of instruction in Physics. It also strengthens the finding of Isah *et al.* (2017) who studied the effects of mother tongue usage on student's academic performance in Biology. The results indicated that there is a significant effect of mother tongue on students' performance in Biology. It further supports the finding of Alimi *et al.* (2020) who determined the effectiveness of mother tongue instruction on the achievement of primary five (V) pupils in literacy and numerical skills in Osun state and found significant effect. It is contrary to the finding of Olu (2017) who discovered that the use of mother tongue inhibits students' communication skills in English and performance. Also the finding contradicts that of Elvira *et al.* (2017) who discovered that mother tongue use affects students' performance in science and mathematics.

Results for the research question three revealed that teachers perceived that the use of mother tongue simplifies teaching and learning, use of language applications and translators, students' assessment, achievement of learning objectives, effective evaluation of learning, content coverage and makes teaching and learning less burdening and tasking. It is in parallel with the finding of Batool *et al.* (2021) examined the teaching-learning issues related to the language in the biology classroom and found out that students and teachers face language issues in Biology classrooms. The difficulties identified include the structured vocabulary of Biology, long spellings, and difficult processes, difficult to pronounce the long words and most of the time, students write incorrect spellings due to the wrong word pronunciation that also leads to misconceptions of biological concepts as a result of the use of mother tongue. It supports the finding of Nathaniel *et al.* (2014) who investigated the effect of using mother tongue in teaching and learning basic science in

Delta State and found out that the use of Urhobo (Mother Tongue) appeared more effective than English in teaching basic science in primary school.

Finding of the research question four revealed that students perceived that the use of mother tongue entails using native language in teaching and learning, it makes learning of Biology better, it improves students' problem solving skills, it's the most appropriate medium of instruction and it leads to the achievement of learning objectives. This rhymes with the position of Adeleye and Ogunremi (2017) who opined that mother tongue is an individual language possessed consciously or unconsciously. indispensable cultural legacy with which all forms of human interactions are carried out and as the most effective engine of a people's culture. It is also in line with Oyewole (2017) who submit further that education through the indigenous languages in Nigeria will stimulate learners' productivity more than the foreign language, and making learning more functional.

The fifth finding indicated that students perceived that mother tongue impacts fast and better learning, makes learning interesting and motivating, improves performance, attendance and participation; increases students' self-esteem and influences students' attitudes towards learning. It is in support of Elvira *et al.* (2017) who discovered that mother tongue use affects students performance in science and mathematics. It also corroborates the findings of Adedayo and Babalola (2021) whose findings revealed that the performance and attitude of students improved when mother tongue is used as a supplementary medium of instruction in Physics with no gender effect. It also supports Isah *et al.* (2017) who discovered that Mother tongue strategy enhanced pupils' literacy and numerical skills in primary schools in Osun state, regardless of their gender

Results of the sixth research question revealed that students perceived that mother tongue simplifies the use language translators and applications, teaching and learning Biology, Biology abstract concepts, multilingual class instruction and assessment. It contradicts

the findings of Sam (2015) examined teachers' perceptions of factors that hinder students' achievement in Biology and found mother tongue to be one of the key hinderers of performance. It also supports Chebet *et al.* (2018) who studied the influence of teacher preparation in mother tongue/first language usage as a medium of instruction Classroom instruction and found that good preparation enable teachers to implement the language policy effectively and mother language influences classroom instruction.

The results of the first hypothesis revealed that there was no significant difference between the mean response of male and female teachers' perceived use of Mother Tongue in teaching and learning Biology. Which implies that there was one directional perception from all teachers on the impact of mother tongue on performance of students. Eventhough differences in the perception was not reported in most of the findings, this is in line with the finding of Wushishi *et al.* (2016) investigated the effects of Hausa Language as a medium of instruction on academic performance of secondary school Biology Students in Sokoto State and found no gender difference in the performance of students in Biology. It also supports Buhari *et al.* (2020) who investigated the impact of Mother-Tongue Augmented Instruction on Secondary School Students' Achievement in Physics which was found to enhance secondary school students' achievements in Physics.

The results of the second hypothesis revealed that there was no significant difference between the mean response of male and female teachers perceived impact of Mother Tongue in teaching and learning Biology. It also supports the findings and conclusion reached by Adedayo and Babalola (2021) as the authors confirmed the influence of mother tongue as a supplementary medium of instruction on secondary school students' learning outcome in physics, with no gender differences in the performance. It also supports Isah *et al.* (2017) who discovered that Mother tongue strategy enhanced pupils' literacy and numerical skills in primary schools in Osun state, regardless of their gender

The results of the third hypothesis revealed that there was no significant difference in the Teachers' perceived ease of use of Mother tongue in teaching and learning Biology. The supports the finding of Adedayo and Babalola (2021) whose findings revealed that the performance and attitude of students improved when mother tongue is used as a supplementary medium of instruction in Physics with no gender effect. It also supports Isah *et al.* (2017) who discovered that Mother tongue strategy enhanced pupils' literacy and numerical skills in primary schools in Osun state, regardless of their gender

The results of the fourth hypothesis revealed that there was no significant difference between the mean response of male and female students' perceived use of Mother Tongue in teaching and learning Biology. This is in line with the finding of Wushishi *et al.* (2016) investigated the effects of Hausa Language as a medium of instruction on academic performance of secondary school Biology Students in Sokoto State and found no gender difference in the performance of students in Biology. It also supports Buhari *et al.* (2020) who investigated the impact of Mother-Tongue Augmented Instruction on Secondary School Students' Achievement in Physics which was found to enhance secondary school students' achievements in Physics.

The results of the fifth hypothesis revealed that there was no significant difference between the mean response of male and female students' perceived impact of Mother Tongue in teaching and learning Biology. It supports the findings of Adedayo and Babalola (2021) confirmed the influence of mother tongue as a supplementary medium of instruction on secondary school students' learning outcome in physics, with no gender differences in the performance. It also supports Isah *et al.* (2017) who discovered that Mother tongue strategy enhanced pupils' literacy and numerical skills in primary schools in Osun state, regardless of their gender

The results of the sixth hypothesis revealed that there was no significant difference between the mean response of male and female students' perceived ease use of Mother Tongue in teaching and learning Biology. This supports the finding of Adedayo and Babalola (2021) whose findings revealed that the performance and attitude of students improved when mother tongue is used as a supplementary medium of instruction in Physics with no gender effect. It also supports Isah *et al.* (2017) who discovered that Mother tongue strategy enhanced pupils' literacy and numerical skills in primary schools in Osun state, regardless of their gender

From the results of the study, its evident that gender did not influence the perception of both teachers and students on the use, impact and ease of use of mother tongue in teaching and learning Biology in secondary schools in Minna Municipal. This indicated that all and sundry have positive perception as far as the use of mother tongue in teaching and learning is concerned. Despite the limited report in gender influence on perception, the discussion of results from the empirical studies strengthens the results of the study as most of the empirical evidences indicated that gender had no effect on the performance of students and pupils taught using mother tongue in different experiments.

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 Summary

The study investigated the teachers and students' perception of the use, impact and ease of use of mother tongue in teaching and learning of Biology in secondary schools in Minna/Metropolis. In order to obtain the pertinent information, 6 research objectives, 6 research question and 6 research hypotheses were formulated. The study adopted survey research design and simple random sampling technique in getting the participants of the study. It centers on science secondary schools located within this city. The research is limited to investigating the perceptions of teachers and senior secondary (SS II) students regarding the use of the mother tongue as a medium of instruction in the teaching and learning of Biology. It is essential to clarify that the study focuses exclusively on the context of Minna Metropolis, and its findings may not be generalized to other regions or settings. The questionnaire included structured questions aimed at eliciting responses regarding the identified areas of focus. The data collected from the questionnaires were analyzed using descriptive statistics, particularly the calculation of Mean (average) and Standard Deviation (a measure of data dispersion). Additionally, the independent t-test may have been used to compare and assess potential differences in the perceptions of teachers and students, in line with that, six hypotheses were postulated and tested at 0.05 level of significance. The results indicated positive perception among teachers and students on the use of mother tongue in teaching and learning of Biology in secondary schools in Minna, Metropolis.

5.2 Conclusion

The research concludes that both teachers and students hold a positive perception of using the mother tongue in the teaching and learning of Biology in secondary schools. This suggests that both groups view the use of the native language as a beneficial and favorable approach to teaching and learning this subject. This positive perception is important as it indicates potential support for incorporating mother tongue into the classroom. The study found that gender does not have a significant effect on the perception of both teachers and students regarding the use of mother tongue in teaching and learning Biology in secondary schools in Minna. This conclusion implies that regardless of gender, individuals share similar views on the value of incorporating the mother tongue in the educational process. Gender neutrality in perception indicates that this approach to teaching and learning is broadly accepted and appreciated by various segments of the population.

This research further concludes that the use of the mother tongue is welcomed and seen as an idea capable of improving the teaching and learning of Biology in secondary schools. This suggests that there is a willingness and openness among teachers and students to embrace the integration of the native language into the classroom. The positive reception of this idea implies that it has the potential to enhance the educational experience and outcomes in Biology instruction.

These conclusions collectively provide valuable insights into the feasibility and desirability of incorporating the mother tongue into the teaching and learning of Biology in secondary schools. Additionally, the conclusion highlights the absence of gender-based disparities in these perceptions, reinforcing the notion that this approach is widely accepted across different demographics.

5.3 Recommendations

Based on the results of the study, its recommended that:

1. Teachers in secondary school should be encouraged by the school administrators to adapt the use of mother tongue in teaching biology.
2. Teachers, students and parents should embrace the use of mother tongue in teaching and learning of Biology and other sciences in secondary schools
3. Governments and stakeholders should make provision for continuous sensitization, trainings, workshop and training for teachers and supporting the learners through the use of language translator, this will encourage and enable learners in secondary schools on the use of mother tongue in teaching Biology.
4. Government should provide necessary instructional materials such as translated textbooks, charts, language translators and access different teaching materials that can aid learning and effective implementation of mother tongue in teaching and learning of Biology.
5. All stakeholders should embrace the development and give maximum cooperation in the implementation of the mother tongue policy in secondary schools
6. Training and re-training of teachers should be given much concern by the school administration with government support as enrich the teachers with effective skills in language of instruction for better teaching

5.4 Contributions to Knowledge

The findings of this research has added to the pool of knowledge in the following ways

- 1) It has succeeded in finding out teachers and students perception on the use of mother tongue in teaching and learning of Biology in secondary schools as positive.

- 2) Also, discovered from the study was a weak relationship between students perception of teachers effectiveness in the ease-of-use of mother tongue in teaching and learning biology in secondary schools.
- 3) The study revealed that teacher perceived the use of mother tongue simplifies teaching and learning, by the use of language translator and applicators in students assessments achievement and learning objectives are made effective during evaluation of learning objectives, it also make content coverage and teaching and learning less burden and tasking.
- 4) It helped in the development of an instrument for data collection on the use of mother tongue in Niger State.
- 5) It contributes by establishing mother tongue in teaching and learning biology in Nigeria.
- 6) It improves biology usefulness impact and ease-of-use of biology and understanding of the subject context than their counterpart.

5.5 Suggestion for Further Studies

The researcher suggests that:

1. The study should be replicated using different arears in the state
2. More experimental studies be conducted using various mother tongue in teaching sciences
3. Survey researches of this nature should adopt the use of non-parametric statistics as to see if there could be different results.
4. Experimental design method should be conducted in the further studies

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APPENDIX A

FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA, SCHOOL OF SCIENCE AND TECHNOLOGY EDUCATION, DEPARTMENT OF SCIENCE EDUCATION

QUESTIONNAIRE ON PERCEPTION OF USE OF MOTHER-TONGUE IN TEACHING AND LEARNING BIOLOGY (QPUMTTB)

Dear respondent,

This scale or questionnaire is designed to enable the researcher obtain information from you for pure academic research purpose. It surveys the perception of use of mother tongue in teaching and learning Biology in schools. You are hereby requested to Kindly respond to the items with utmost sincerity as all responses would be strictly used for research purpose and would be treated with utmost confidentiality. No one will mention you.

Thank you.

SECTION A DEMOGRAPHIC DATA

Status Teacher ()

Gender: Male () Female ()

Teaching Experience 1-5 years () 6-10 years 11-15 () 16 and above ()

SECTION B DEMOGRAPHIC DATA

Instruction:

Please, indicate your option by ticking (√) the correct options in the table from the following:

1. Strongly agree (SA). 2. Agree (A). 3. Neutral (N). 4. Disagree (D). 5. Strongly Disagree (SD)

Perceived Usefulness of Mother Tongue in teaching and learning of biology						
S/N	ITEM	SA	A	N	D	SD
1	Mother tongue encourages students' participation in achieving learning goals in biology					
2	Mother tongue enriched student understanding of biology concept					
3	Student concentration is enhanced using mother tongue to teach biology					
4	I have the ability to use mother tongue to teach biology					
5	Mother tongue have negative effect of teaching biology					
6	Using mother tongue in teaching biology require learning resources e.g. textbooks, notes, diagrams all translated in native language					
7	Using mother tongue as a language for instruction entails having classroom discussion in a native language					
8	The use of mother tongue in teaching biology requires language translator device/application for multi-lingual classroom instruction					
9	I do not have the ability to use mother tongue to teach biology					
10	The use of mother tongue discourages teacher participation in achieving learning goals and objectives in biology					
Perceived impact of Mother Tongue in teaching and learning of biology						

11	Student learn better and faster in a language they can understand					
12	Student enjoy attending biology classes when mother tongue is used					
13	The use of mother tongue endangers students' confidence during teaching biology					
14	Student tends to show increase self-esteem when mother tongue in teaching and learning situation					
15	Mother tongue used by teachers in teaching biology shows positive impact on student performance					
16	The use of mother tongue doesn't show any impact on student performance					
17	Teachers always discourage student conversation in mother tongue during teaching biology					
18	Use of mother tongue cause distraction and experience stress during learning					
19	There is no different in attitude of students taught using mother tongue than their counterpart					
20	The use of mother tongue is inappropriate in multi-lingual class					
	Perceived ease of use of mother tongue in teaching and learning biology					
21	It is easier to use learning resources translator in native language for teaching biology					
22	The use of mother tongue simplified teaching of biology theory and practical					

23	Teacher with understanding of mother tongue is needed whenever biology is to be taught					
24	The use of mother tongue has been very helpful and easier to access student performance in biology					
25	Use of mother tongue makes it easier for biology teachers to evaluate the lesson taught					
26	It is less difficult using mother in pronouncing botanical names during biology teaching					
27	Using mother tongue in teaching biology foster positive attitude towards the subject					
28	Use mother tongue in teaching biology enhances effective coverage of syllabus and arrest time waste					
29	Mother tongue help accomplish biology teaching task more successful					
30	mother tongue facilitate teaching and learning in multi-lingual class					

APPENDIX B

FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA, SCHOOL OF SCIENCE AND TECHNOLOGY EDUCATION, DEPARTMENT OF SCIENCE EDUCATION QUESTIONNAIRE ON PERCEPTION ON USE OF MOTHER- TONGUE IN LEARNING BIOLOGY (QPUMLB)

Dear respondent,

This scale or questionnaire is designed to enable the researcher obtain information from you for pure academic research purpose. It surveys the perception of use of mother tongue in teaching and learning Biology in schools. You are hereby requested to Kindly respond to the items with utmost sincerity as all responses would be strictly used for research purpose and would be treated with utmost confidentiality. No one will mention you.

Thank you.

SECTION A DEMOGRAPHIC DATA

Status Student ()

Gender: Male () Female ()

Class: SSII ()

SECTION B DEMOGRAPHIC DATA

Instruction:

Please, indicate your option by ticking (√) the correct options in the table from the following:

1. Strongly agree (SA). 2. Agree (A). 3. Neutral (N). 4. Disagree (D). 5. Strongly Disagree (SD)

Perceived Usefulness of Mother Tongue in learning biology						
S/N	ITEM	SA	A	N	D	SD
1	Mother tongue is the best language I can learn with					

2	I have better understanding of biology concept if mother tongue is used during learning					
3	If I can read and write biology using mother tongue I can read and write better					
4	If I learn biology using mother tongue I will not perform better in biology and practical					
5	Learning biology using mother tongue will affect my performance in examination					
6	Speaking English and learning biology using mother tongue can lead to confusion when writing					
7	I believe that mother tongue is the best medium for me to learn biology					
8	Learning biology using mother tongue makes me acquire and developed positive attitude in answering questions in biology					
9	Using mother tongue allow me to interact with my counterpart					
10	Learning biology increase my problem solving skills in biology					
	Perceived impact of Mother Tongue in learning biology					
11	I feel discourage in attending biology class when mother tongue is used during teaching					
12	I perform low in my assessment as a result of learning biology using mother tongue					
13	Inability to carefully read and strictly comply with guiding instruction using mother tongue hinders my achievement in biology					

14	I learn faster and understand better through the use of mother tongue in learning					
15	I feel encourage in attending biology class when using mother tongue in teaching					
16	I do not have any learning support, translator when learning biology using mother tongue					
17	Use of mother tongue during learning biology facilitate my achievement of education objectives					
18	I do not have concrete knowledge of use of mother tongue in learning biology					
19	Mother tongue improves my learning attitude in biology					
20	Inability to listen, comprehend and jot down correct note during biology lesson in mother tongue lower my performance in the subject					
21	Inadequate learning environment that lacks free discussion, creative listening and self-expression in mother tongue makes me perform low in the class					
22	Use of mother tongue influence the way I learn and pronounce botanical terminologies					
	Perceived ease of use of mother tongue in learning biology					
21	Mother tongue is easy for me to understand the concept of biology during learning					
22	Mother tongue enhance the learning of biology with less stress					
23	If biology lessons are taught using mother tongue I will participate more in class activity					

24	If most biology textbook are written in the mother tongue learning will be easier					
25	I believe I can learn English better if stop learning biology using mother tongue					
26	Biology cannot be learn in mother tongue because mother tongue is not fully developed					
27	Use of mother tongue ease learning and retention of botanical names in biology during learning					
28	I will more confident when allow to ask question in mother tongue					
29	Information using mother tongue cut across all classes of biology student					
30	Use of mother tongue will bridge the gap of literacy between urban and rural areas					

APPENDIX C

HAJIA LAMI RELIABILITY RESULT

RELIABILITY RESULT FOR STUDENTS PERCEPTION ON USE OF MOTHER

TONGUE IN BIOLOGY

GET DATA /TYPE=XLSX

/FILE='C:\Users\User\Desktop\ANALYSIS\Hajia Lami reliability\Pilot testing.xlsx'

/SHEET=name 'Sheet1'

/CELLRANGE=full

/READNAMES=on

/ASSUMEDSTRWIDTH=32767.

EXECUTE.

DATASET NAME DataSet1 WINDOW=FRONT.

RELIABILITY

/VARIABLES=Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8 Q9 Q10 Q11 Q12 Q13 Q14 Q15 Q16 Q17

Q18 Q19 Q20 Q21 Q22 Q23 Q24 Q25 Q26 Q27 Q28 Q29 Q30

/SCALE('ALL VARIABLES') ALL

/MODEL=ALPHA

/SUMMARY=MEANS.

Reliability

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	30	100.0
	Excluded ^a	0	.0
	Total	30	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.839	.880	30

APPENDIX D

DATA ANALYSIS RESULTS

TEACHERS

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
USE1	16	2	5	3.81	.981
USE2	16	2	4	3.31	.602
USE3	16	2	5	3.75	.683
USE4	16	1	4	3.44	.892
USE5	16	3	5	4.00	.894
USE6	16	2	5	3.81	.911
USE7	16	2	5	3.94	.854
USE8	16	2	5	3.87	.806
USE9	16	2	5	4.06	1.063
USE10	16	2	5	4.00	.966
IMP11	16	1	5	3.63	1.147
IMP12	16	2	5	3.63	.957
IMP13	16	2	5	3.50	.966
IMP14	16	2	5	4.19	.981
IMP15	16	2	5	3.69	.873
IMP16	16	2	5	3.81	.750
IMP17	16	2	5	3.31	.704
IMP18	16	2	5	3.19	.655
IMP19	16	2	4	3.31	.602
IMP20	16	2	5	4.19	1.047
EAS21	16	2	5	3.81	.834
EAS22	16	3	5	3.50	.730
EAS23	16	2	5	3.31	1.138
EAS24	16	2	5	4.06	.772
EAS25	16	3	5	4.06	.574
EAS26	16	2	5	3.38	.885
EAS27	16	2	5	3.88	.806
EAS28	16	1	5	3.00	1.155
EAS29	16	1	5	3.56	1.209
EAS30	16	2	5	4.06	.998
Valid N (listwise)	16				

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
UsePerception	Male	7	39.0000	2.08167	.78680
	Female	9	37.2222	3.49205	1.16402

Independent Samples Test

Levene's Test for Equality of Variances		t-test for Equality of Means						
F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper

UsePercept	Equal									
ion	varianc	1.74	.20	1.18					-	4.988
	es	7	7	7	14	.255	1.77778	1.49712	1.433	78
	assume								23	
	d									
	Equal									
	varianc			1.26	13.2				-	4.806
	es not			5	83	.227	1.77778	1.40499	1.250	50
	assume								95	
	d									

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
ImpactPerception	Male	7	36.4286	2.82000	1.06586
	Female	9	36.4444	2.40370	.80123

Independent Samples Test

	Levene's Test for Equality of Variances		t-test for Equality of Means							
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
								Lower	Upper	
ImpactPerception	.120	.734	-.012	14	.990	-.01587	1.30540	2.81567	2.78393	
			-.012	11.857	.991	-.01587	1.33343	2.92505	2.89330	

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
EasetPerception	Male	7	37.0000	2.64575	1.00000
	Female	9	36.3333	2.87228	.95743

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
EasetPerception	Equal variances assumed	.031	.862	.476	14	.641	.66667	1.39971	-2.33541	3.66874
	Equal variances not assumed			.482	13.521	.638	.66667	1.38444	-2.31256	3.64589

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
USE1	302	2	5	3.81	.951
USE2	302	2	4	3.31	.584
USE3	302	2	5	3.75	.661
USE4	302	1	4	3.44	.856
USE5	302	3	5	3.99	.866
USE6	302	2	5	3.81	.886
USE7	302	2	5	3.94	.829
USE8	302	2	5	3.87	.782
USE9	302	2	5	4.06	1.033
USE10	302	2	5	3.99	.937
IMP11	302	1	5	3.63	1.116
IMP12	302	2	5	3.62	.928
IMP13	302	2	5	3.50	.939
IMP14	302	2	5	4.19	.945
IMP15	302	2	5	3.69	.844
IMP16	302	2	5	3.81	.730
IMP17	302	2	5	3.31	.678
IMP18	302	2	5	3.19	.637
IMP19	302	2	4	3.31	.584
IMP20	302	2	5	4.19	1.015
EAS21	302	2	5	3.81	.812
EAS22	302	3	5	3.50	.709
EAS23	302	2	5	3.32	1.105
EAS24	302	2	5	4.06	.751
EAS25	302	3	5	4.06	.558
EAS26	302	2	5	3.37	.860
EAS27	302	2	5	3.87	.784
EAS28	302	1	5	3.01	1.116
EAS29	302	1	5	3.56	1.174
EAS30	302	2	5	4.06	.970
Valid N (listwise)	302				

Group Statistics

	GENDER	N	Mean	Std. Deviation	Std. Error Mean
Usefulness	MALE	155	37.9871	2.89197	.23229
Perception	FEMALE	147	37.9728	2.94922	.24325

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Useful Perception	Equal variances assumed	.074	.786	.043	300	.966	.01431	.33617	-.64724	.67585
	Equal variances not assumed			.043	298.420	.966	.01431	.33634	-.64760	.67621

Group Statistics

	GENDER	N	Mean	Std. Deviation	Std. Error Mean
Impact perception	MALE	155	36.4581	2.46334	.19786
	FEMALE	147	36.4218	2.40981	.19876

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Impact Perception	Equal variances assumed	.073	.787	.129	300	.897	.03630	.28062	-.51593	.58852
	Equal variances not assumed			.129	299.708	.897	.03630	.28045	-.51561	.58820

Group Statistics

	GENDER	N	Mean	Std. Deviation	Std. Error Mean
Ease of use	MALE	155	36.7161	2.60558	.20928
Perception	FEMALE	147	36.5442	2.66183	.21954

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Ease of use Perception	Equal variances assumed	.120	.730	.567	300	.571	.17191	.30314	-.42464	.76847
	Equal variances not assumed			.567	298.343	.571	.17191	.30331	-.42500	.76882