A SURVEY OF MOTHER TONGUE INTERFERENCE IN THE LEARNING CHEMISTRY AMONG SECONDARY SCHOOL STUDENTS OF CHANCHAGA LOCAL GOVERNMENT AREA OF NIGER STATE

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ABSTRACT

The aim of this study is to find out the survey of mother tongue interference in learning chemistry among secondary school students of Chanchaga local government area of Niger State. The study adopted a descriptive Cross sectional survey design. The sample random sampling techniques was used to select 370 senior secondary school students. A research questions were raised Survey of mother tongue interference in learning chemistry among secondary school students of Chanchaga local government area of Niger State. Concept questionnaire were used for data collection and administer to 370 senior secondary school students in Minna Niger State the reliability of the instrument was determined using the result from the "Yaro yamane" formula yielded a reliability coefficient of 0.80. The data collected were analyzed using the mean and standard deviation was used to analyzed data. The finding from the study implies that despite the enormus benefit derived from using mother tongue in the teaching and learning of science subject, there are adequate respondent for teaching chemistry in the sample school. Mother tongue is less valued than English language Recommendation is that the use of mother tongue should be encourage for the teaching and learning chemistry to improved students academic achievement due to the fact that it is the first language.

CHAPTER ONE

1.0 INTRODUCTION

1.1 BACKGROUND TO THE STUDY

Mother tongue is the language which a group of people considered to be inhabitants of an area acquired in the early years and which eventually becomes their natural instrument of thoughts and communication (Awoniyi, 2016). Mother tongue is the first language that a person learned. In terms of that view, the person is defined as a native speaker of the first language, although one may also be a native speaker of more than one language if all of the languages were learned without formal education, such as through cultural immersion before puberty. GuyOften a child learns the basics of the first language(s) from family (Wikipedia, 2007).

It is therefore generally accepted that in teaching and learning processes, the mother tongue of the child is of utmost importance. For one thing, it categorizes a large part of the child's environment, that is, it has names for most of the objects, actions, ideas, attributes and so on that are so important to him, as well as to any society. In many developing countries today, this is either local language or the language of the previous colorizing power. The mother tongue is the child's environment and is the natural basis on which verbal skills can be built, children learn through communicating in a language, which they understood.

It was in recognition of the importance and contributions of mother tongue to education that made the Federal Ministry of Education in Collaboration with other educational statutory agencies include in the National Policy on Education published in 2003, revised in 2013, the use of mother tongue as a medium of educating students at the pre-primary and primary level throughout the country.

According to the National Policy on education published in2003 revised in 2013, Section 2(ii) which stated that

"Government will ensure that the medium of instruction will be principally the mother tongue or the language of the immediate community" also in section 3(xx) of the same National Policy on Education stated that:

"Government will see to it that the medium of instruction in the primary school is initially the mother tongue of the immediate community and at a later stage English".

The importance of Nigerian language in the educational process is stated in section 1

"In addition to appreciating the importance of language in educational process, and as a means of preserving people's culture, the government considers it, and the best interest of national unity that each child should be encouraged to learn one of the three major languages other than his mother tongue"

The mother tongue therefore, is a part of the Nigerian culture; it conveys or transmits culture and itself in subjects to culturally conditioned attitudes and beliefs (Awoniyi, 2015). The positive results of the experiment in Mother Tongue Medium in Yoruba carried out at the University of Ife empirically demonstrated the great advantages of mother tongue in primary education for scholastic attainment (Bamgbose, 2004) and even in the successful mastery of English as a second language.

Experience shows that chemistry learning poses substantial challenges at all levels of instruction (from secondary school to university) and for all the aspects – understanding concepts, experimental procedures and problem solving procedures, and being able to relate experimental procedures and observations, or problem solving procedures, to concepts. Learning challenges largely derive from the nature of chemistry as the science of substances, where the understanding

of properties and events of the microscopic world of atoms and molecules is the key to understanding the macroscopic behaviours of substances (broader reflections on the relationships between the nature of chemistry and the learning challenges will be incorporated in a separate, philosophy-based work). Students' difficulties with regard to understanding the particulate nature of matter, or relating it to macroscopic descriptions and phenomena, have been the objects of numerous studies in the last decades; a meaningful review would go beyond the size and the scope of the current work; some pioneering works like those by Ben-Zvi, Eylon& Silberstein (2006), Gabel, Samuel &Hunn (2010) and Gabel (2011) might be recalled as examples of investigation questions and approaches.

The major challenge for educators is the design of options that can help facilitate students' understanding of chemistry. This work focuses on the utilization of language analysis as a tool to provide clarifications and to engage students actively.

A number of studies (e.g., Munby, 2006; Carre, 2008: Muralidhar, 2010; Sutton, 2012 Lahore, 2013 Wellington & Osborne, 2001; Brooks, 2006; Fang, 2006; Mammino, 2010a, 2010b, 2012a, 2013a; Marshall et al., 2011) indicate the crucial role of language mastery in determining learning success. Teaching and learning depend on teacher- learner communication (including the communication realised through a textbook or other learning resources) and on the learners' ability to develop thoughts. Language is the most fundamental instrument of thought (Bruner, 2010) and, therefore, of cognitive processes (Chomsky, 2015), as well as the most fundamental communication tool. Communication is a two-side enterprise and its effectiveness depends on crucial aspects for each side. The communication effectiveness of language in education depends on the degree of rigour and clarity (Mammino, 2000) with which sentences are built and assembled to form a text (where the term *text* includes both written and verbally-expressed

sentences or sets of sentences) and on the learners' ability to identify all the information conveyed by the text, which, in turn, depends on the learners' language mastery. Therefore, language mastery is a major key for the teaching and learning process and for conceptual understanding.

1.2 Statement of the Problem.

Before the advent of British traders, missionaries and colonialists, indigenous Nigerian language defined every aspect of the speech community from its religious, cultural, political, Economics, social to whatever else that can be through of the language functioned effectively to deal with every thing relating to the day existence of the people. The arrival of the British, concomitant with the English language provided a language contact situation with an attempt to a language shift in the population.

New sets of ideas, concepts and values were introduced to the system where indigenous local language had previously been self-sufficient, rendering them inadequate to deal with the new concepts introduced by the British, particularly in the areas of formal education, Western law etc. The result was the initial subtle and later blatant intrusion & influence of English language on domains that were the exclusive preserve of indigenous language.

Now, the English language is generally an accepted language which was introduced into Nigeria through colonialism and missionary activities is now spoken, thought and learned in Nigeria. Where English language sentence are made, they are characteristically uttered with variation in pitch often referred to as intonation. This is often an area of difficulty for second language, users of English language who have tonal? Language as their first language. This is one of the major problems encountered by learners of English language. Other areas of problem encountered are',

Sentence and word stresses, vowel sounds and English suprasegmental of pitch. The study intended to survey the interference of mother tongue in the study of Chemistry in Senior Secondary Schools in Chanchaga local government area of Niger State.

1.3 Aim/Objective of the study

The major purpose of this study is to find out how mother tongue interferes with chemistry in Senior Secondary Schools in Chanchaga local government area of Niger state

The specific objective is;

To find out the level at which mother tongue can interfere in the learning of chemistry in secondary school.

To determine the attitude of chemistry students towards the use of mother tongue in learning chemistry in secondary schools

To find out the effect of mother tongue on chemistry students academic performance

To find out how does teachers make use of mother tongue when teaching chemistry

1.4 Research Question

The following research questions were formulated to guide the study

1. Does mother tongue actually interferes in the learning of chemistry in secondary school
2. What are the attitude of mother tongue on students academic performance in chemistry
3. What are the effect of mother tongue on students academic performance in chemistry
4. Does teachers make use of mother tongue when teaching chemistry

1.5 Significance of the Study:

It is hope that the results of the study will assist chemistry teachers to develop new learning experiences for the students and to reorganize these learning experiences in ways enough around the interest of the students. This study will enable teachers to identify their problems in chemistry. This study will also enable students to understand how to make use of chemistry words especially in pronunciation.

1.6 The Scope of the Study.

This research is the survey of mother tongue in the teaching of chemisry in senior secondary schools. The study will focuss on Senior Secondary Schools (SS Class) students in five selected secondary schools in Chanchaga Local Government Area Of Niger State

1.7 Definition of Terms

Mother tongue: is the language which a group of people considered to be inhabitants of an area acquired in the early years and which eventually becomes their natural instrument of thoughts and communication**.**

Second language: Foreign language, any language other than the native language or mother tongue. A second language usually learnt and not acquired through interaction with other.

Interference: The errors native made by carrying over the speech habit of the native language or dialect into a second language or dialect. The interference can be noticed in features of pronunciation, grammar and vocabulary when a person is learning to master the pattern of second language.

Transfer: The process or result of carrying over speech habit from one language to another e.g. language teaching, the patterns of the mother tongue or when translating lexical items may be

borrowed from the native language. Negative features that are not available in the mother tongue are to features that are present in the second language. This means that there are some distinctive features inherent in the mother tongues that are transferred to the second language.

Positive common features: Are those features that are present both in first language and the second language.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Theoretical framework

2.1.1 Social constructivism

Constructivism proposes that individuals construct individual interpretations of their experiences and learners engage in a meaning making process to develop conceptions of knowledge (Applefield, Huber and Moallem, 2000). The term can be traced to Bruner (2009) with his description of discovery learning and Piaget (2012) who explained that knowledge proceeds from successive constructions. He suggested that as children learn more about their environment they become better adapted, a process he referred to as "equilibration" (Driver, 2011). In contrast to the Piagetian model of child development which is based on physical interaction with the environment, social constructivism emphasizes language and discourse (Edwards and Mercer, 2014). Through social interaction learners refine their meanings and help others find meanings (Applefield, Huber and Moallem, 2000).

This viewpoint is heavily influenced by Lev Vygotsky(2015), a Russian developmental psychologist. He studied development of cognitive processes and roles played by social interaction and language. Vygotsky(2017) proposed language and thought combine to create a cognitive tool for human development. Language development and conceptual development are inextricably linked (Vygotsky, 2014) and difficulty with language causes difficulty with reasoning (Byrne, Johnstone and Pope, 2011) Students' linguistic abilities are critical to development of internal understanding and external articulation.

In addition, the teacher has a central role as a language user (Glasersfeld, 2005) leading students to more complex conceptual understanding than could be achieved by students working alone.

Vygotsky (2012) differentiated between “spontaneous” and “scientific” concepts. Spontaneous concepts emerge from a child’s reflection on everyday experience. Scientific (academic) concepts originate in the classroom activity and develop logically defined concepts. Vygotsky was interested in facilitating learning to enable a child to progress from spontaneous to scientific concepts. He argued scientific concepts do not come to learners ready-made, but work their way “down” whilst spontaneous concepts work their way “up”, meeting the scientific concept and allowing the learner to accept its logic (Fosnot and Perry, 2005). Vygotsky referred to the interface where a child’s spontaneous concepts meets the teacher’s scientific concepts as the *zone of proximal development* (ZPD) defining it as the distance between the actual developmental level achieved independently

and the level of potential development in collaboration with more capable peers (Vygotsky, 2016). Thus the teacher does not dispense knowledge but supports or “scaffolds” students progressing within their ZPDs; as new levels are attained scaffolding is altered accordingly.
Johnstone’s triplet Johnstone (2008, 2010) developed a view that chemistry learning occurs on three levels: macroscopic, that is what can be seen, touched and smelt; sub-microscopic, that is atoms, molecules, ions and their structures; and symbolic meaning, representations of formulae, equations, mathematical expressions and graphs. Inspired by a geologist’s diagram describing mineral composition, Johnstone arranged these levels at the apexes of an equilateral triangle to indicate equal, complementary significance. Teaching occurs “within” the triangle, under the assumption that all levels are equally well-understood. During chemistry learning, novice students must move between these three levels, often without notice or explanation. This introduces too much complexity for a novice chemist. A successful learner develops competence in and confidently inter-relates these three aspects.

In order to achieve this, the learner must develop chemical linguistic confidence. Taber (2013) revisited the triplet to address two confusions associated with Johnstone's model: firstly, the macroscopic level in terms of phenomenological and conceptual frameworks related to these phenomena; and secondly, the symbolic level and how this fits as a representational level with the macro and sub-microscopic levels. Taber argued that conceptual demand is high at the macroscopic apex as students deal with abstract notions relating to substances with unfamiliar names and classifications, for example, alkali metals, acids and reducing agents. He highlighted the role of specialized language in chemistry and how macroscopic concepts such as solution, element and reversible reaction or microscopic, including electron, orbital, hydrated copper ion need to be represented for a novice to think about them and communicate understanding with others. Taber (2013) argues the symbolic level should not be regarded as discrete in its own right but as a conduit for representation and communication of chemical concepts.

2.2. Conceptual Framework

2.2.1 Concept of Language

We are in a world of language. Hardly will a moment pass in our lives without the use of language to communicate with each other. Whatever people do when they meet, whether they fight, play, share love, they have to talk. We talk to colleagues, friends, enemies, students, some form of language is definitely used. Every day of our lives we are not free from words as we talk face-to-face, telephone, in our dreams or even alone when there is no one to answer. Language is equally a medium of communication within the family and society. Every tongue expresses the culture of the society to the complete satisfaction of its members.

The language an individual speaks is for him or her, the most expressive and the most beautiful of all languages (Fromkin, Rodman and Hyams, 2007). Several psychological studies have been proved that language is not only a product of human life it is the prerequisite of it. Or in other words, human beings require a human relationship to survive (sample is the experiment by Friedrich the second of Hohenstaufen (2005-2009) in Wikipedia, 2009). This is one basic reason why language is central to learning and life itself (Boyer, 2006) this may explain why it is said that the success of language education is generally the success of education. And it is equally true that educational failure is basically a linguistic failure. Language, therefore, is not just one of the subjects in the curriculum; it is the essential vehiclefor learning all other subjects in Nigerian schools (Oyetunde, and Muodumogu, 2010).

2.2.2 The Concept of Mother Tongue

Mother tongue (MT) is a language which a person acquires in early years and which normally becomes the person's natural instrument of thought and communication (Adeyanju, 2009). The statement suggests that a language is said to be the mother tongue of a person which he or she is 'born into', meaning it is the language of the parents of the child as such acquires it.

To Hellandendu (2007) and Maisamari (2003), MT is the language in which children obtain their first experiences, and one which they dream and think and in which they can most easily and conveniently express their feelings and emotions. A close view suggests that a mother tongue must not necessarily be the language of the parents of the child. This may suggest why D'souza (2001) see MT as language that a child learns from infancy and not necessary the language of the parents of such a child. They further state that an Indian child whose parents stay in England and who has not been exposed to Bengali will have English language as his MT and first language as

well. This seems to make a lot of sense since language cannot be inherited but can only be taught and learnt.

According to Odewumi (2001), 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. Here Odewumi (2001) 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 withDenga, (2007) who assert that students who commence school education in MT or LIC learn better and later learn other languages more effectively. Emenyonu (2017) 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. Krashen (2004) asserts that children learn English much more effectively if they continue to develop their proficiency in their MT. This follows that MT is not totally a negative phenomenon in the learning process (Mangvwat and Dimka, 2004). 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 (Olaofe, 2010).

This is why Selinker (2001) refers to the MT and or second language asinterlanguage. Baker (2000) and Akindele and Adegbite (2005) 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 (Onike, 2009; All Africa, 2012 and Norquist, 2013).

A close look at the concept of MT, it is obvious that such a language is acquired without formal education. As Gbenedio in Aziza and Emenanjo observe

> *In the process of learning MT, the child acquires the basics of the language through imitation and trial and error. During this period, the child acquires the intuitive grammar, vocabulary necessary for him to function properly in community as well as the uses to which he can put the language. These are acquired without formal training, what is learnt is basically oral. (Aziza and Emanenjo,1990 p.50)*

This implies that even as a child goes into school and eventually gets a job, the mother tongue remains with him or her. This may suggest why Gbenedio (2010:50) says that "the process of acquiring ones MT is an inseparable part of growing up as a normal being". It then follows that it should not be shocking when some traces of the mother tongue of a speaker manifests in his usage of a second language (a language that is learnt to fulfill necessary needs). This may inform why Baljit (2009) observes that the major difference between English languages spoken as second language in many countries is on the fact that speakers already have a native language while Nemser (2000) calls it "Approximate systems". As such, they find it difficult translating their thoughts from the MT into English because of lack of the knowledge of

the linguistic equivalent in the foreign language. This creates learning frustration and consequently ineffective learning.

Okpara (2001), see MT as a language that shapes a child's understanding of the world. Though taught without aids like blackboard, teachers, time table, classroom, and curriculum and so on, children tend to be 100% good users of their MT and can carry out their daily activities since it is language that culture, which is the total way of life of a people, is expressed. These suggest that the MT becomes a habit which is deeply embedded in a learner which also implies that he or she may, sometimes, inevitably, transfer some of the traits of the MT into a new language or second language. Walterstein, (2013:5) gives reason for the situation mentioned above, Ahe speech of an average Nigerian, even the well educated has, traces of cultural background. This is because the MT is more than a means of communication; it is a reflection of culture."

Mother tongue first: Children's right to learn in their own languages

Education is power and language is the key to accessing that power. A child who thrives at school and develops self-esteem and pride will have better employment opportunities and is more likely to realize his or her potential.

Ethnicity, language and culture aredeeply intertwined. They are also intertwined with inequity, discrimination andconflict. Since most countries in the world are multiethnic and multilingual,opinions about provision of education, curriculum content, and the language ofteaching and learning are often fiercely held and hotly debated.

The languages of elite groups or former colonizers often dominate the languages of others, particularly in official settings like the school. Yetit is now well established that when a child begins learning in his or herfirst language (also known as a home language or mother tongue)

that child ismore likely to succeed academically and is better able to learn additionallanguages.A child who begins learning in a second (or foreign) languagewill, at least initially, find learning anything that much harder. The barrierof school language is often enough for children not to enroll in school or, ifthey do, for them to experience difficulties, become discouraged, repeat years, or drop out of school.

What arethe challenges?

With almost7,000 languages worldwide, how realistic is it to expect every child to havethe opportunity to begin school in his or her first language? How difficult (and expensive) is it for a ministry or department of education to developwriting systems and provide curricula, teachers and materials for everylanguage in the country? If families of marginalized groups speaking non-dominant languages want their children to learn in a dominant language, should pedagogical arguments override their views?

Each article in this issue of 'id21 insights education' demonstrates the value for children (particularly those frommarginalized groups) of learning in their first language, while recognizing the challenges of turning sound educational principles into practice.

What are the benefits?

The United Nations Convention on the Rights of the Child states that all children have the right to education (Article 28) the right to learn and usethe language of their family (Article30). ToveSkutnabb-Kangas argues that wheneducation is in a language the child doesn’t know, whether due to family choiceor lack of an alternative, this is violating the child’s rights. She alsocontends that if languages are not protected, they will disappear (estimated rates vary), along with the knowledge held by their speakers.

Bolivia’s successful language model, Intercultural andBilingual Education, described by XavierAlbó, shows that indigenous children are lesslikely to repeat years and more likely to perform well. Evidence fromGuinea-Bissau, Niger and Mozambique, gathered by Carol Benson, shows that mother tongue-based primary schooling isparticularly beneficial for girls and leads to increased parental involvement in their education, reduced exploitation by male teachers and improved educational access and performance.

Can it be done quickly?

The evidence suggests that it can’t. KathleenHeugh has reviewed research from 29 Africancountries and concluded that short-term models (children learn in their firstlanguage for one to three years) are beneficial but, because children must switch too quickly to the second language, the benefits fade by year five. The fullbenefits of mother tongue-based education will only be achieved with long-term commitment of six to eight years; dramatic benefits will only be seenafter ten or more years, when the mother tongue foundation has promotedacademic learning and achievement in other languages.

Can it be put into practice?

Susan Malone outlines a framework to integrate minority languages into dominant language programmes, with five phases taking achild from spoken fluency and confidence in the first language to reading andwriting in the first and then additional languages.

Is it moreexpensive?

A recent review (see 'Mother tongue education is cost-effective') of cost-benefit analyses for the 2006 African Education Ministers’ Meeting shows that educationprogrammes starting with the

mother tongue and gradually moving into otherlanguages lead to cost savings compared to monolingual programmes. If they aremore expensive at the beginning, costs decrease over time and savings (not paying for children to repeat years, for example) far exceed initialinvestment.

Several languages in one classroom?

The government recognizes 54 minority languages. HelenPinnock, Dinh Phuong Thao and Nguyen ThiBichdescribe project that trains local classroom assistants (one for each language group in the classroom) to promote multilingual education, increasing the use of eachlanguage and understanding of the national language. Within a politicallyconstrained context such as VietNam, smallsteps are all that are possible, yet significant impact may not be seen for several years.

Will goodpolicy work?

Sheila Aikman shows the complexityand inter-relatedness of ethnic identity and language. With indigenous peoples'efforts to revitalize their languages entangled with larger struggles forsocial justice and self-determination, they wish to see educational programmesbased on their culture that also allow their children to participate in andbenefit from the multicultural and global world in which they are growing up.

But it is not just about establishinggood educational language policies. India's national policy recommends schoolsuse children's mother tongue in the classroom yet, as DhirJhingran and Shireen Miller outline, most children are still either completely 'submersed' into a second language or their mother tongue is used onlyunofficially in school. Language mapping, increased resources, research andtraining are also needed to turn policy into practice.

Is languagethe key to Education for All?

Poverty and discrimination are stillthe root causes of inequitable access to education; family background (including levels of education, social class and so on) is still the mainindicator of educational achievement. It is difficult to assess the impact oflanguage alone, while controlling for all other factors such as quality ofteaching and curricula and the availability of teachers and good teachingmaterials.

Yet mother tongue-based, bi- or multilingual education plays a significant role. Enablingaccess to education in the language in which the child feels most comfortablesignificantly increases that child's chances in life. From a right-based perspective, we know why it must happen. From a pedagogicalperspective, we know what should be done. From a practical perspective, thereare many success stories – from PapuaNew Guinea, Eritrea,Nigeria,Guatemala,Mali,Bolivia– demonstrating how it can work.

More isneeded, however:

Teachers, educators andnon-government organizations (NGOs) can increase awareness of and commitment tothe importance of language diversity and multilingualism in education.Donor agencies and NGOs can learnfrom the success stories and adapt them for countries without the same level ofpolitical support.Researchers need to find more effectiveways to convince policymakers and budget holders.Researchers can also raise the issuesat the annual international Education for All forum and monitor progress. National governments and donor agencies need to mobilize sufficient resources.

2.2.3 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 in extricable 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 beings 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 language spoken in Nigeria (INTER NET).

This linguistic heterogeneity promotes the continued use of English in Nigeria. Ethnologic include English amongst its list of Nigeria language this hardly supervising since the role of English language in Nigeria 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. Gregor (2009) 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 (Okpara, 2001 and Rahamtu, 2013).

Jenkins, Osgood and Underwood in Olaofe (2010) 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 (Imoleoyo, 2011; Sutra, 2010 and Adebisi, 2006). Okpara (2001), Onike (2009) and Nordquist (2011) 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 MT. 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 (Ellis, 2012; Dulay, Burt and Krashen, 2014). 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 (Ringbom, 2007; Brown, 2008; Kamis, 2010 Ifeagwazi, 2008; Eyisi, 2004).

Skiba (2017), Jarvis and Pavlenko (2008), Nitchete, Kidd and Serratrice (2010) and Chang and Mishier (2012), 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 Mwagavul 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 (Elnaeem, 2012).

2.2.4 Mother-tongue and Its Importance

Mother-tongue is the first language acquired by a child and it is successfully used for communication at that level. It is not the language of a child's mother as wrongly defined by some people, Mother in this context probably originated from the definition of mother as a source, or origin; as in mother-country or- land. It also describe as a first language (also native language, mother-tongue, arterial language, or L1) is the language a human being learns from birth. A person's first language is a basis for sociolinguistic identity. Language as a human institution presupposes communication. Individuals who are mute or deaf must learn how to speak by using sign language. One characteristic of language is finding names for objects and persons within the child's reach, so it is possible for a child to grasp, repeat and understand the world.

One's mother-tongue makes it possible for a child to take part in the knowledge of the social work. Another impact of the mother-tongue is that it brings about the reflection and learning of

successful social patterns of acting and speaking. It is basically responsible for differentiating the linguistic competence of acting. But there are also many people who prefer to speak and communicate in their second language because their mother tongue might be very limited and does not provide a large number of words or expressions. Language is a medium of communication within the family and society. Every tongue expresses the culture of society to the complete satisfaction of its members. The language an individual speaks is for him or her most expressive and often the most beautiful of all languages (Wikipedia, 2009).

Mother-tongue is of immense importance to the educational foundation of learners. The Nigerian National Policy on Education stipulates that from Pre-Primary to the first three years of Primary education, mother-tongue should be the medium of communication or language of the immediate community (NPE, 2004). This is because the background experience is needed to make learning conducive for learners.

2.2.5 Role of Language in the Teaching and learning of Science

Language is a medium of communication. Communication, according to Rowland and Birkett (2012), 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 (Kuria, 2010; Jones, 2011).

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, $2Na + Cl2 \rightarrow 2NaCl$). 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 (Jones, 2000).

Carin and Sund (2013) note that the language of science, like all other languages, has its own rules, structure, easy and difficult parts and peculiarities. Parkinson (2014) notes 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 chemistry that refers to a chemical compound formed when a metallic ion combines with a non-metallic ion. For example;

$Na^+ + Cl^- \rightarrow NaCl$, (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 (2016) 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 (Carin and Sund, 2014).

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" (Glaxton, 2009).

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 (Schofield, 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).

Farmery (2002) identifies 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. According to the author;

(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.

Bell and Freberg (2015) assert 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 34 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. According to Mallet and Newsome (2008), Piaget recognizes language as an important means of crystallizing and communicating thinking. Vygotsky maintains that once a child gains control of language as an instrument of organizing thinking his or her whole intelligence is transformed (Mallet and Newsome 2017:8). 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. 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… It is essentially a process of cognitive socialization through language (Edwards and Mercer, 2008:67). Language, thus unlocks the fountain of scientific knowledge hence due emphasis should be accorded to it. A primary school student according to the National Policy on Education, 3 Edition (2018) 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 Obanya (2009:19), 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 according to Olayemi (2010), refers to any language indigenous to Nigeria.The National Policy on Education (2018) 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 Agagu (2011), 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 etc. 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, Abingbola (2015).

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, Munonye (2011). 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, Adekeke (2016). Various educationists including the former Minister of Education, Professor BabsFafunwa 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. Also, Psychologists such as Baker (2000) and Cummins (2009 said that: "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".

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 are 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, Maxwell (2004). Mother tongue can be any of the indigenous languages in the country. The three major languages – 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.

2.2.6 Effect of Mother-tongue Interference on the teaching and learning of chemistry

From the foregoing so far, the importance of mother-tongue in the learning of chemistry 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 Chemistry among students.Errors may occur due the fact that some of the chemistry 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 conductive 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 (Onuigbo, 2006 cited in Aladeyomi and Adetunde, 2007).

Bhelda (2011) 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 (Idowu, 2012).

In general, the overall performance in science subjects is generally low, with Chemistry being the least performed of the three at all levels. This low performance in science subjects in general and Chemistry in particular could be attributed to several factors. For instance, Muwanga-zake (2011) reported that;

a) Teachers and learners generally perceive science as difficult.

b) Teachers misrepresent their own content in the science classrooms.

c) Students‟ attitudes towards science (Chemistry) 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 Atwater (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 (Atwater, 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 Henderson and Wellington (2014) 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. Nigeriansuffer 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 example Cleghorn (2009) notes, 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 (Cleghorn, 2012).

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 Chemistry teachers when presenting science concepts, principles and skills during the process of instruction may attract students to the study of chemistry (swing towards Chemistry) or may discourage them (cause a swing away from Chemistry). 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, Gardner (2012) gives a list of such words that were found to present problems to students. Such include disintegrate, random, spontaneous, rate, symmetrical, average, partial, reverse. Cassels and Johnstone (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 (Gardner, 2010).**'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.

2.2.8 Language Use in the Chemistry Classrooms

Language of instruction plays a crucial role in the classroom activities. This is particularly true in chemistry where the introduction of new terminology to describe chemical processes, for

example can be a cause of confusion (Levinson, 2014). Chemistry classes are linguistically rich environment in which students are exposed to a wealth of vocabulary. It is therefore necessary to use simple scientific language to develop clear scientific thinking than it is to employ „anthropomorphisms". Proper use of scientific language as well as the common English language in the Chemistry classroom discourse influences the performance of students in examinations (Reed, 2013). Das (2015) poses some questions: (a) Are the choice of words and phrases such that students are likely to understand? (b) Does the teacher take into account the maturity level of the students?

Sometimes teachers present specialist words without care, either because they assume to be known by the learners or because the teacher seems unaware of using them. Bloom (2011) notes that the language used should be suitable to the student mental age to be able to enhance the development of intellectual abilities and skills. Teachers are required to assist students in developing a functional science vocabulary by teaching them to examine words and by consistently relating words to the processes, classifications and concepts to which they refer. Taking the small amount of time needed to examine the prefixes, stems and suffixes of a word makes many difficult words easy to understand and use. For example, the word exothermic is often difficult for beginning chemistry students until it is broken into

Exo= liberate / release/ give out / produce.

Thermal = heat

Thus, **exothermic** means to give out / produce / release / liberate heat.

Other similarly difficult words that become relatively easy when broken into prefixes, suffixes and stems include endothermic, electrolysis, crystallization, and chromatography. Unfortunately, many teachers don't realize the extent to which the structure of their

sentences and their choice of words may be incomprehensible to the majority of their less able students. Words such as „exhale“,predominate“, inflammable“,flammable,“ corrosive“, or fundamental“, may be understood by only a minority. For example, repeating to students that ice, water and steam are the same compound, when to a student who has not grasped the elementary kinetic picture of matter, they are obviously not the same thing, since they neither feel the same nor look the same. Osborne and Fregberg (2015) suggest that abstractions should always be accompanied by concrete examples of what they represent to avoid misunderstanding.

2.2.9 Mother Tongue Instructions and Achievement in Science

The use of the mother tongue in teaching and learning of Science and Technology, especially at lower basic levels, has posed quite an interesting challenge to educators in diverse cultures and societies. While the choice of the language of teaching and learning was not an issue for the developed nations such as the United States, Russia, United Kingdom, France, China, Japan, and even among older nations like Iran, Greece, etc., the reality in developing nations is in stark contrast to that of their colonial masters. In the developing nations the language of Education is often the language of a colonizer for whom education was merely a tool for administering conquered peoples and territories; not for development. Fafunwa and Bliss (2015) observed that no other nation in the world except most of the former colonies and those under colonial rule prepare their children for citizenship in languages foreign to them.

They further observed that if the Nigerian child is to be encouraged to develop curiosity , manipulative ability, spontaneous flexibility , initiative, manual industry and dexterity, mechanical comprehension…, he should acquire these skills through the mother tongue as

the medium of instruction which after all., is the most natural way of learning. They further argued that, the German, Italian, English children spend their first six years acquiring new skills in their mother tongue while the African child spends these formative years struggling with a foreign language. The Ife Six Year Primary Project (SYPP), 2009-2013, was undertaken to prove the above point. After six years of instruction in their mother tongue, Yoruba, the Experimental Group who were taught in Yoruba as the medium of instruction while English Language was taught as a subject and the Control Group was taught in English as the medium of instruction, the Experimental Group taught in Yoruba 68 returned superior academic performance in all the subjects taught: Yoruba, English, Mathematics, Science and Social Science. This superior performance by the Experimental Group held constant whether the schools selected were in the urban areas or in the rural setting. Perhaps even more impressive was the outcomes of the follow up studies of the SYPP products into their secondary school education where their examination results showed performances well above the average in most of the school subjects. They were also said to be better behaved, had better leadership and social skills. The project writers argued that the SYPP has proved that primary education conducted in the mother tongue leadsto greater result in permanent literacy and numeracy; it has greater surrender-value and makes the child an integrated and adjusted citizen in his community. It is, therefore, not surprising that educators, scholars and administrators of nations, where the language of teaching and learning is not the mother tongue but the language of the former colonial master, devoted considerable resources to study the implications of teaching science and technology in the mother tongue both from the pedagogical perspectives and the necessary policies needed to undergird them so as to accelerate the pace of science and technological developments of their nations. Reyes (2010)

conducted a research with the objective to determine which language is more effective in teaching science in Grade 4. The study attempted to find out how two classes one, taught the concept of radiation in Filipino and the other taught in English compared in terms of the following criteria;

I. Number of words used/richness/quality of ideas conveyed in these words in the student discourse
II. length of response time before expression of answers
III. Enthusiasm/eagerness of students to participate indicated by their actuations and behaviour/words
IV. Summative 69 assessment scores. Additionally,

The study also sought to obtain the teacher‘s and students‘ points of view regarding which language they consider more effective for use in the teaching and learning of science. From her findings she concluded that Grade 4 students can understand and express themselves better in Filipino than in English. They can respond faster when asked, perform readily when told to do something and get higher scores in a test. They are also more relaxed, were more confident, more enthusiastic and eager to answer and participate when the LOLI in science is Filipino. Both the teacher and her students expressed the opinion that Filipino is more effective in teaching and learning science. Nolacso (2013) explains that many studies indicate that students first taught in their L1 and then later in the L2, outperform those taught exclusively in an L2. He cited the LabuaganKalinga First Experiment in Philippines which showed the L1 experimental classes scoring nearly 80% in Grades 1, 2 and 3 science tests compared to just over 50% scores by the L2 control classes (taught in English).On the basis of these findings he concludes that using Filipino, an L1, would be more effective than

using English, an L2, in Philippines. This only goes to give support to Tapang‘s (2012) observation that despite the prominence of English as a language of instruction, it is not a requisite for excellence in Math’s and science pointing out that countries that rank high in Math’s and science tests in the Transcends International Mathematics and Science Study (TIMSS) carried out by the International Association for the Evaluation of Educational Achievement all have basic instruction in their local tongue. Mufanechiya and Mufanechiya (2011) conducted a study which focused on language use and challenges teachers and students face in the classroom in their attempts to use the mother tongue in the teaching and learning of science in Grades 4- 70 7 levels. The study comprised 32 teachers from 8 primary schools purposively sampled from Mavingo urban area. Thirty \two of their lessons were observed and learners form the 32 classes participated in the study. Observation protocol and a structured questionnaire were the data collection instruments used. Zimbabwe‘s two major languages- ChiShona and IsiNdebele were used alongside English in an additive multilingual classroom setting. The researchers reported that teachers and students used extensive code-switching, resorting to the mother tongue when maths concepts became incomprehensible to the students. The researchers reported that the students found the mother tongue learner friendly and helpful in learning math.

Teachers in the study reported that the mother tongue is a critical player, called upon when the going gets tough for learners in understanding mathematical concepts. ―You make use of what they know in their immediate environment and in their language. During one mathematics lesson one student use this Shona analogy about improper fraction, Mwanamuhombeakatakurwa ne mwanamuduk‖‘ (literally translated, A big child being carried by a small child). This was the language the students used in mathematics lesson and

it seems mathematical communication was achieved even when ChiShona was used. The Zimbabwean classroom situation continues to be dominated by English from primary to tertiary level and ChiShona and IsiNdebele are not officially used as medium of instruction (Chimhundu, 2008). The language of instruction should help create mutual dialogue between the teacher and the students as well as among the students themselves.

The argument is based on the theory that children who learn to read and write in their mother tongue do better than children obliged to learn to read and write in a second language (Africa News, 2003). According to SIL UK (2003), Studies in Kenya, Botswana, South Africa, Malawi and Mali have shown that mother tongue 71 instruction is the best policy, arguing that when the language of instruction is not the mother tongue, it places double demand on the students: first, the demand on language acquisition and second, concept learning and meaning making. The language experience of the students should be harnessed in formal learning situations so that the students become active rather than passive participants in the learning process (Gondo, Nyota and Mapara, 2005). The argument rests on creating a friendly language environment in the classroom. Researchers and studies, agree that the use of mother tongue as a medium of instruction makes it possible for numeric achievement and development. Johnsen (2011), reports that results from pilot projects on mother tongue in education in Mozambique, show that children who are taught in their mother tongue do better in schools than those taught in Portuguese. Nababan, (2009) in a study conducted by the Ethiopian Ministry of Education in conjunction with the USAID covering 2000-2004 to determine the extent to which the use of mother tongue versus English as a medium of instruction affect students‘ overall achievement reports that students‘ performance in Mathematics and sciences was far better for those taught using the

Mother tongue as a medium of instruction than those taught using English. From this study Bogale (2009) concludes that in Ethiopia, the use of mother tongue as medium of instruction (MOI) for mathematics and sciences in upper primary education (grades 7&8) has a positive impact on students‘ achievement scores. Nomlomo (2007) in a comparative longitudinal study conducted from 2003 to 2005 on science teaching and learning through the medium of English and isiXhosa language in Western Cape in two primary schools in Grades 4-6 concludes, among other findings, that there were more learners with writing difficulties in the control 72 (English) class than in the experimental group. The research data also showed that those who were learning science through isiXhosa had better understanding of concepts than those who were taught in English. The researcher also argued that her research showed that learners in the experimental group had more confidence than those in the control group. They could express themselves more fluently and clearly in their mother tongue and surprisingly in English as well. Perhaps more importantly was the researcher‘s claims that the experimental group learners aspired for better jobs such as being the first black astronauts, medical doctors, social worker while the majority of the control group learners were shy and they could not express themselves freely in English. The researcher therefore argues that there is a positive correlation between the use of the learner‘s mother tongue as a medium of instruction and learner‘s understanding and academic performance in science. Nomlomo (2007) also drew attention to her findings that the more proficient the teacher and the learners are in the language of instruction, the more effective the teaching and learning process would be, as classroom interaction is free of breakdown in communication or misunderstandings if both the teacher and the learner are speaking the same language. Besides, teachers seem to mediate learning better in L1, especially if the learners speak the

same language with the teacher. The point clearly made by the research findings was that teaching and learning through a second language is difficult for both the teachers and the learners if they are not proficient in it. This point of view was supported by Nomlomo,(2007) pointing out that stress and uncertainty that usually arise from the mismatch between the language used at home and the language used at schools leads to more barriers to learning. Researchers such as Okoro, et al, (2012) have carried out studies on the relative effects of national languages as a supplement on students‘ learning outcomes 73 in different subject areas. Little if any of such studies have been done in the area of Basic Science and Technology in Borno State primary schools in Kanuri or any Nigerian National Language. In Nigeria Okoro, (2011) compared the relative effects of the use of Igbo and English Language for the teaching of a national language (Ibo) and English.

The purpose was primarily to find out which of the two media leads to better understanding among the students in the Eastern part of the country. A total of thirty six students randomly divided into matched classes of eighteen students were used. Class A was taught using Igbo as a supplement and class B was taught same topic using English.

The two groups were tested after two weeks of instruction.

The null hypothesis tested for this study was, ―there was no significant difference in the understanding and performance of students taught using Igbo and those taught using English language as media of instruction.‖ A chi-square X2 statistics was used to test the hypothesis which was significant at 0.05 level of significance with X2 value of 5.90 in favour of Igbo language speaking students. Based on the findings, Okoro recommended that students in the junior secondary schools be taught using Ibo language as a medium of instruction.

The English language should be introduced later after the students have had a firm grasp using Igbo language. Amaefule (2009) investigated the effects of three communication media on students‘ achievement in chemistry.

The purpose of the study was to find out the effects of Igbo, Yoruba and English on students‘ academic achievement in chemistry at the senior secondary school level. The design of the study was the pretest-posttest control group experimental design. Four hypotheses were formulated for the study and tested at 0.05 level of significance. Three schools were used for the study.

There were three experimental and one control groups in each school. Analysis of variance 74 and the t-test were the statistical tests used to test the hypotheses. The researcher used chemistry achievement test as an instrument for collecting data for the study. The results indicated significant differences in the mean scores of Igbo, Yoruba and English groups in chemistry achievement test with Igbo language having the highest mean, followed by Yoruba and lastly English Language.

There was no significant difference in the mean scores of Yoruba and English in the chemistry achievement test although the mean score for Yoruba was slightly higher. The implications of the study were as follows: firstly, the significant difference in chemistry achievement score of students taught using Igbo, Yoruba and English language indicated that students‘ achievement in chemistry is a function of national language as a supplement used by the teacher in the teaching process.

This calls for a greater attention on the part of science teachers in general and chemistry teachers in particular to be careful in selecting the medium to be used in teaching any topic in science. Secondly, Igbo language is the most favoured of these media in

students‘ achievement in chemistry test which implies that Igbo language should be used in preference to both Yoruba and English languages. Thirdly, that Yoruba and English languages of instruction have some influence on students‘ achievement in chemistry indicates the non-superiority of these media over each other. It implies that effective use of any of the two national languages i.e. Igbo and Yoruba will produce some learning experience in science and chemistry in particular. Based on the above findings, Amaefule, (1998) gave the following recommendations that: i) Igbo language as a medium of instruction in science be used by Science and English teachers ii) Teachers teaching science in general and chemistry in particular adopt the use of national language at the primary and junior secondary schools levels. 75 iii) Science teachers in general and chemistry teachers in particular should not limit their use of language to Yoruba and English languages alone. These media should be supplemented by the Igbo language too. iv) Government should organize workshops and in-service training programmes for science teachers to acquaint them with innovations in the use of Igbo language for teaching science. Banu, (1992) conducted an investigation on the effects of Hausa language on students‘ achievement in Biology. The purpose of the study was to compare the performance of students who were taught biology using Hausa language as a medium of instruction and those taught using English language.

The researcher used a total of forty students. Three schools were selected for the study. Thus there were two groups in each school. The experimental groups were exposed to Hausa Language as a supplement while the control groups were exposed to English language only. For both groups, continuous assessment and the final achievement test were given at the usual interval as practiced in these schools. Marks for the experimental groups were

assigned on group basis. Grades of members were averaged and assigned to each member to ensure the group‘s efforts. The marks of the control group were assigned to each student as normally practiced on individual basis. One teacher was used to teach both experimental and control groups in each school to ensure coverage of the same content. At the end of term, a post-test was conducted.

The results obtained showed that the pre-test scores of the experimental and control groups of each set of school were compared and the entry behaviour seems to be the same. Using t-test the experimental group posttest score and the control group posttest scores were compared separately for each of the schools. The results indicated that there were significant differences between the control groups and the experimental groups. The 76 results however showed no significant difference between the experimental groups at the 0.05 level of significance.

The results obtained from this investigation confirm the effectiveness of Hausa as a supplement in learning of science in schools, thus students taught using the Hausa language as a medium of instruction in teaching and learning did better than the students that were taught using English language only. Similarly, Obioma, (2014) conducted a study to investigate the effects of English and Yoruba in presenting school physics tasks. Hypothesis on teaching media and sex as significant factors on the physics performance were tested beyond the 5% level of significance. Two initially equivalent groups of a random sample of 120 class three secondary students were randomly assigned to two treatments in English and Yoruba respectively taught a unit on optics. The two groups were post-tested after four weeks for any significant differences in their physics scores.

Data were analyzed using the 2x2 (teaching x sex) Analysis of Variance test and the Scheffe‘s multiple group comparison tests. Major findings indicated that the Yoruba language group performed significantly better (at P = 0.05) than the students taught in English language. Obioma then recommended that secondary schools physics teachers should explore the use of Yoruba language as a supplement for presenting various physics tasks. In this study the effect of Kanuri language as a medium of instruction will be used to teach lower basic the concepts of making soap in order to determine the effect of the media used on students‘ academic achievement. Osungbemiro et al (2013) conducted a study into the use of indigenous languages as media of instruction in teaching Biology case-studied some selected secondary schools in Ondo West local Government in Ondo State. The research was conducted in four schools in Ondo West local Government Area. 77 The research tested the following null hypotheses: Ho1: There is no difference in the post test achievement scores of the experimental groups and the control group Ho2: There is no significant difference in the posttest achievement scores of students taught in Yoruba and those taught with English Language as medium of instruction Three groups of students from different schools were used. There were two experimental groups and one control group designated A, B, and C respectively. The three groups were randomly selected from school in Ondo Local Government Area of Ondo State. Group A was exposed to a topic called Nervous System in Yoruba Language while Group B was taught only in English Language. Group C was not taught in order to cater for the lack of relevant reference material. Reading texts in both Yoruba and English languages were prepared in three sub-topics. (1) The meaning and structure of the skeletal system (2) the functions of skeleton, the tissue and its components (3) anatomy of the skeleton of a mammal. The reading material was validated

by three biology teachers and suggested for amendments and which were corrected. The Yoruba version of the text was produced and validated by three experts in Yoruba language for Yoruba English Group (YEG) and in English language for the English Group (EEG). It was ensured that none of the topics to be treated in the study had been dealt with in any of the schools. After the administration of the pretest the experimental groups were taught the lesson while the control group was not taught at all. The posttest was administered to the students after the lessons had been taught. The test which was administered to the students for the pretest was also administered again for the posttest after teaching the experimental groups using English language as the medium of instruction for the EEG and Yoruba Language as the medium of instruction for the Yoruba Experimental Group. 78 The results show that the Yoruba Experimental Group has the highest mean (13.32) followed by the English Experimental Group and the Control Group with the mean of 8.47 and 5.75 respectively. Hypothesis one which stated there was no significant difference in the post test achievement scores of the experimental groups and the control group was rejected because the data showed there was a significant difference between experimental and control group because they performed better than the control group. This seems s to signify that both English and Yoruba languages are effective media for instruction. The second hypothesis which states that there is no significant difference between the Yoruba Experimental Group and the English Experimental Group was tested and rejected because those who were taught in Yoruba performed significantly better that those who were taught in English Language. The researchers claimed that the use of Yoruba as a medium of instruction placed the Yoruba Experimental students at an advantage over the English Experimental and Control

Group. They further claimed that the use of Yoruba as a medium of instruction contributed to the higher achievement of the experimental group.

They further pointed out that skeletal system known to be difficult to teach and learn due to its being too wide in nature was taught and learnt with relative ease using Yoruba Language as a medium of instruction. An earlier study was conducted by Alabi (2002), in which she evaluated the implementation of using Yoruba as a medium of instruction in the teaching of primary science. 25 primary science teachers in 20 randomly selected schools in Ilorin Township formed the sample for the study. The relevant data for the study were collected using a questionnaire tagged Yoruba Language and Primary Science Teaching Questionnaire (YLSTQ). The instrument was face and content validated and 79 its reliability coefficient of 0.091 was determined through a test-retest technique using five primary science teachers in the schools outside the study sample. Simple percentage and rank ordering statistics were used to analyze the data collected. Two research questions were asked: Research question: which of the language-Yoruba and English- do the science teachers find more convenient to teach science lessons? The results show that English language is found to be more convenient and hence, more frequently used (76%) in the teaching of Primary Science. The researcher explained that the reason for this strong preference for the use of English in teaching lower basic Science could be due to the relative ease of getting appropriate words for science concepts in English Language (92%) than in Yoruba language (8%) Research question 2 sought to find out how effective is Yoruba Language in teaching of science in terms of students‘ understanding and interest? The findings revealed that Yoruba Language is more effective in imparting knowledge of lower basic science to students-heightening students‘ interest (80%), participation (72%) and

understanding (76%), and ability to relate learnt concepts to the environment. As the researcher pointed out relating concepts to the environment is a requisite for meaningful learning in science. And that is possible only when instruction is given in a language that the students understand fluently.

The researcher further reports that majority (72%) of the respondents suggested the use of Yoruba Language to teach lower basic science. This study attempts to examine whether the teaching of Science and Technology concepts in Kanuri in middle basic levels would be more effective in academic achievement and retention than teaching same concepts in English Language or not. It also attempts to examine whether gender would be an important 80 influence in academic achievement and retention when Science and Technology concepts are taught in Kanuri Language. Mbabah, (2011) conducted an experimental study of the effects of three national languages on students‘ performance in beginning shorthand.Positive and Negative Effects of Mother-tongue Knowledge on the Interpretation of Figurative Expressions1)Masumi Azuma

POSITIVE AND NEGATIVE EFFECT OF MOTHER TONGUE

In a previous investigation (Azuma, 2005), it was demonstrated that culturalelements generated from the mother tongue (Japanese, in this case) were significantly related to the understanding of English metaphorical expressions in the case of Japanese students who learned English as a foreign language (EFL, hereafter). It was a by-product of the study, the main investigation of which was the aspects of metaphorical competence of Japanese EFL students. The study showed the strong correlation between EFL students' knowledge of English vocabulary and their metaphorical competence (ibid.: 134; 288), and it indicated that the issue of metaphor and culture would be a new focal point. To develop this, a new

study was started in 2006). It aimed to find out what interpretation aspects of metaphorical expressions were revealed by different language users. With regard to that aim, this paper describes the cultural and cognitive aspects of interpretations affected by two different groups of mother-tongue users: one being Japanese speakers and the other being English speakers.

The study attempts to compare the similarities and dissimilarities in interpretations of metaphorical expressions between different mother-tongue users. It seeks to contribute to promoting the language proficiency of Japanese EFL students and identifying safe or unsafe areas for the use of metaphorical expressions and suggests how to avoid communication discrepancies between different mother-tongue users. Language users consciously or unconsciously take advantage of knowledge or schemas of their mother tongue. What expressions are strongly affected by the knowledge of the mother tongue and what interpretation strategies are prominent?

1.1 The term 'figurative expressions' in this study

The title of this paper incorporates the term 'figurative expressions.' This is because figurative expressions are usually translated into 'hiyutekihyogen.' Although the term 'hiyutekihyogen' includes a wide range of figures of speech, the figurative expressions in this study refer to metaphorical and metonymic expressions. One of the reasons for limiting the expressions mainly to metaphorical and metonymic expressions is to keep the contents

2.3 Empirical Framework

This section highlighted on some studies related to the present research study. This enabled the researcher to establish a basis on which to carry out the present study. Kamau (2016) noted that very little has been done regarding classroom language use, especially the scientific language. The author attributed this to the fact that in Africa countries emphasis is laid on what is taught at the expense of how it is taught. Maritim (2004) mainly dwelt on structured interaction studies similar to that of Muthwii (2011). Maritim particularly dealt with the classroom interaction and use of language. In the study, the author found that students who initiate interaction with their teachers in the classroom achieved higher grades than those who did not. Muthwii (2007) observed that what is common to teachers‟ verbal discourse patterns from most cultures (Africa, Britain, or Canada) is teachers‟ dominance in classroom talk. Muthwii also noted from the findings that the practices were dominated by questions of the lowest cognitive level (recall of knowledge) .Cleghorn (2009), in his studies on language use in teaching of science in Kenyan Primary schools, noted that teachers have difficulty expressing science concepts via English and especially in relating the abstract world being created in the classroom to the concrete world outside.

Problems relating to English as a second language as well as matters of cultural inaptness play important role in the science classrooms. Nigeria teachers are faced with the challenge of „dual translation‟, that is, in addition to teaching in a medium that is a second language for both teachers and students, teachers also have to help students find connections between the concrete cultural world outside of school and the semantic organizations of the abstract scientific world that is being constructed through classroom lessons. For students to comprehend science subject matter in English there is need for precision, reformulation of thought or clarification. Kamau

(2006) observed that language offers and develops concepts. Subjects traditionally have their technical vocabulary and characteristic ways of expressing things. Kamau noted, The success of the secondary school can be said to depend very considerably on the level of performance on language use. Unless learners can read, write and talk competently, they cannot benefit from the range of learning that the secondary school provides (Kamau 2006).

Many teachers tend to use language that might not be comprehended by some students. If the students‟ access to technical terms is limited they will not acquire the prerequisite concepts that lead to understanding. Barnes affirms, Much of the language encountered in school looks at the learners across a chasm. Some fluent children… adopt the jargon and whole stretches of lingo. Personal intellectual struggle is made irrelevant and the personal view is never called for. Language and experiences are torn asunder (Barnes, 2015).

Eshiwani (2004) in his studies on language and mathematical concept learning noted, One difficulty with making the translation from vernacular to English and vice-versa for formal mathematical instruction in the schools is that there are no explicit vernacular words to express certain mathematical concepts (Eshiwani 2004).

This might also apply to chemistry, as noted earlier in this study. It is evident from the studies cited that little has been done concerning the conceptualization of the influence of mother tongue in teaching and learning of chemistry . Kamau (2006) pointed out that many factors influence classroom language use – some general to various subjects while others are unique to a given subject. If the unique factors are identified and tackled appropriately, it may lead to the improvement of an individual subject. In view of this, the present study intended to find out the influence of mother tongue interference in the teaching and learning of chemistry in secondary school.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

This study was designed to examine the survey of mother tongue interference in the teaching of Chemistry in Chanchaga/Boss local government area. This chapter is concerned with the process with look which the research was carried out. It includes the following sub-headings.Research design, Population of the study, Sample and sampling techniques, Instrument for data collection, Validation of the instrument, Reliability of the instrument, Administration of the instrument, Data analysis techniques.

3.1 Research design

The researcher used survey design of the research for this study. The researcher considered that this type of design was suitable for the study because it allows a wide coverage within a limited time. In a survey study, the researcher selected the sample from the segment of population, for an exploratory study to enable her to have a representative opinion of the characteristics of the subjects. It is the most widely used type of descriptive research. Survey design is very useful because it has a wide range of scope and coverage; hence generalization is possible (Omirin, 2008).

3.2 Population of the study

The population of this study comprises of all the public Senior Secondary School in Chanchaga local government area. The total population for all the public Senior Secondary School in Chanchaga local government were seventeen thousand nine hundred and fifty seven (17957). The target population used for this study was Senior Secondary School two and three (SS2) students in Chanchaga local government area which comprises of five thousand three hundred and seventy two (5372) students consisting of two thousand four hundred and twenty three (2423)

male and two thousand nine hundred and fourth nine (2949) female students during 2018/2019 academic session (Niger State Educational Data, Ministry Of Education, 2019).

3.3 Sample and sampling techniques

The sample for this study comprises of three hundred seventy (370) respondents. The sampling techniques that was used for this study is sample random sampling techniques. The sample cuts across five randomly selected secondary school in Chanchaga local government area of Niger State. The "yaro Yamane" formula n=N(1+Ne^2) where n=sample, N=the target population, e=level of significance or limits of tolerable error and 1=unity constant (Gambari 2017). This techniques is used so that every student in the population is given equal chance of being selected. Therefore, the five schools that were randomly selected are

1. Government day science college Tunga.
2. FR.O' Connell science college Minna
3. AhmaduBahago secondary school, Minna
4. Day secondary school limawa
5. Zarumai Model School Minna.

3.4 Instrument for data collection

The instrument that was used for this research is a questionnaire named "Survey mother tongue interference in teaching Chemistry (SMTITC). It was designed by the researcher along with the variables under study and the question it contains was drawn from the research questions
The self-developed questionnaire is an instrument designed for the study. Section A contains the bio-data of the respondents which include name of school, gender. Section B was used to elicit information on the research topic.The questionnaire is in four point, which are as follows:
Strongly Agree (SA) Agree (A) Disagree (D) Strongly Disagree (SD)

3.5 Validation of the instrument

The face and content validity of the instrument was done by two experts in chemistry department. The corrections pointed out were effected in the final draft of the questionnaire. Abiri (2006) maintained that validity is the extent at which the contents of a test correspond to these of the subject matters and their associated behavioral outcomes.

3.6 Reliability of the instrument

The reliability of the instrument was carried out on 20 respondents who did not form part of the final subjects that was used for this study at two-week interval. The test-retest method of reliability was used. The two sets of data was analyzed using Pearson product moment correlation (PPMC) to get the value of (r) 0.80 for this study.

3.7 Administration of the instrument

A letter of introduction was collected from the school through the Head of Department (HOD) which was taken to the selected schools. The administration of the questionnaire was done 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.

3.8 Data analysis techniques

The data that was gotten from the study was subjected to statistical analysis of frequency counts, mean and standard deviation for demographic data while Chi-square was used to test the study at 0.05 level of significance.

CHAPTER FOUR

4.0 DATA ANALYSIS, RESULTS AND DISCUSSION OF RESULTS

The study was designed to find out the survey of mother tongue in teaching chemistry in senior secondary schools in Chanchaga local government area of Niger state. This chapter focuses on the data analysis and presentation of data collected for the purpose of this study.

4.1 Research Question One: Does mother tongue actually interferes in the learning of chemistry in secondary school?

Table 4.1: Mean and standard deviation ofmother tongue actually interferes in the learning of chemistry in secondary school

	Items	N	Mean	Sd	
Q1	Teachers need to teach chemistry using mother tongue at secondary school level	370	2.91	1.04	Agree
Q2	Students will participate in the class activity more if mother tongue is used to explain the subject	370	2.87	1.08	Agree
Q3	Mother tongue should be used as a medium of instruction	370	2.97	1.01	Agree
Q4	All students are required to learn their mother tongue	370	2.94	0.98	Agree
Q5	There is need to have chemistry textbook for teaching in mother tongue	370	2.94	1.01	Agree
	Grand mean		**2.92**		

Decision Rule =2.5

Table 4.1 shows the mean and standard deviation of mother tongue actually interferes in the learning of chemistry in secondary school. The respondents are in agreement with the items stated in the research instrument on mother tongue actually interferes in the learning of chemistry

in secondary school. Also the items mean rating which ranged between 2.87 and 2.94 are all considered accepted based on the decision mean of 2.5. The implication is that, mother tongue actually interferes in the learning of chemistry in secondary school is favourable, since all items agree on mother tongue actually interferes in the learning of chemistry in secondary school show agreed based on decision mean of 2.5.

4.2 Research Question Two: What are the attitudes of chemistry students towards the use of mother tongue in learning chemistry?

Table 4.2: Mean and standard deviation of attitude of chemistry students towards the use of mother tongue in learning chemistry

S/N	Items	N	Mean	Sd	Decision
Q1	Our mother tongue is less useful to known than English	370	1.58	1.01	Disagree
Q2	It is easier to teach chemistry in mother tongue than in English language	370	2.90	1.08	Agree
Q3	There is adequate chemistry terms in mother tongue that can be used to teach chemistry	370	1.53	0.55	Disagree
Q4	The National policy on education need to emphasize teaching in mother tongue	370	2.85	1.09	Agree
Q5	Teaching chemistry in mother tongue would retard development	370	1.17	0.39	Disagree
	Grand mean		**2.00**		

Decision Rule = 2.5

Table 4.2 shows the mean and standard deviation of attitude of chemistry students towards the use of mother tongue in learning chemistry. The respondents are in disagreement with the items stated in the research instrument of attitude of chemistry students towards the use of mother

tongue in learning chemistry. Also the items mean rating which ranged between 1.17 and 1.58 are all considered rejected based on the decision mean of 2.5. The implication is that, attitude of chemistry students towards the use of mother tongue in learning chemistryis not favourable, since three items out five disagree on attitude of chemistry students towards the use of mother tongue in learning chemistryshow agreed based on decision mean of 2.5.

4.3 Research Question Three: What are the effect of mother tongue on students' academic performance in chemistry?

Table 4.3: Mean and standard deviationon mother tongue on students' academic performance in chemistry

S/N	Items	N	Mean	Sd	Decision
Q1	Teaching taught with English Language makes the subject more difficult	370	1.68	0.57	Disagree
Q2	Students taught with mother tongue will perform better in chemistry	370	2.96	1.05	Agree
Q3	There is positive change of attitude towards learning chemistry more when taught with mother tongue	370	2.83	1.05	Agree
Q4	There is more zeal in student to learn chemistry more when taught with more difficult	370	2.91	1.08	Agree
Q5	Mother tongue should be used in teaching of chemistry	370	2.48	0.18	Disagree
	Grand mean		**2.57**		

Decision Rule = 2.5

Table 4.3 shows the mean and standard deviation **on mother tongue on students' academic performance in chemistry**. The respondents are in agreement with the items stated in the research instrument on **mother tongue on students' academic performance in chemistry**. Also the items mean rating which ranged between 2.83 and 2.96 are all considered accepted, since three out five items show agree based on the decision mean of 2.5. The implication is that, **on mother tongue on students' academic performance in chemistry**is favourable, since all items agree **on mother tongue on students' academic performance in chemistry** show agreed based on decision mean of 2.5.

4.4 Research Question Four: Does teachers make use of mother tongue when teaching chemistry?

Table 4.4: Mean and standard deviation of teachers Make use of mother tongue when teaching chemistry

S/N	Items	N	Mean	Sd	Decision
Q1	Chemistry should be taught using our mother tongue	370	3.02	1.01	Agree
Q2	Mother tongue should be used to teach in secondary school	370	2.89	1.02	Agree
Q3	We owe it to our forefathers to preserved our mother tongue	370	2.99	1.02	Agree
Q4	Does your mother tongue exist in written form?	370	2.98	1.03	Agree
Q5	People who understand English well easily understand chemistry	370	2.96	1.01	Agree
	Grand mean		**2.96**		

Decision Rule = 2.5

Table 4.4 shows the mean and standard deviation of teachers make use of mother tongue when teaching chemistry. The respondents are in agreement with the items stated in the research instrument on teachers make use of mother tongue when teaching chemistry. Also the items mean rating which ranged between 2.89 and 3.02 are all considered accepted based on the decision mean of 2.5. The implication is that, teachers make use of mother tongue when teaching chemistryis favourable, since all items agree on teachers make use of mother tongue when teaching chemistry show agreed based on decision mean of 2.5.

4.5 Discussion of finding

The finding of this study on the use of mother tongue actually interferes in the learning of chemistry in secondary school indicate that the respondents are in agreement with the items stated in the research instrument on mother tongue actually interferes in the learning of chemistry in secondary school. This finding is in line with the earlier finding of Njoroge and Cathigia (2014) and Charanchi (2011) who found out that the used of learners mother tongue is beneficial to the learner's compare to English language.

The finding in table 4.2 on the attitude of chemistry students in secondary school indicate that the respondents are in disagreement with the items stated in the research instrument of attitude of chemistry students toward the use of mother tongue in learning chemistry. This study contradict the earlier finding of Khejeri (2008) who found out that mother tongue is less valued than English language.

Table 4.3 address the effect of mother tongue on students academic performance. The respondents all agreed that chemistry taught using the mother tongue has a great effect on students academic performance with mean ranging between 2.48 and 2.96 this finding collaborate with the work of Onike 2009 and Nordquist 2011 who found out that students

performed better generally in science when taught concept in science. Several literature Okpara 2001 and Olaofe 2010 further opined that young people understand science better when explained in the natural mother tongue.

The research question 4.4 addressed item boundary on the frequency of the used of mother tongue in teaching chemistry. Finding from this research question showed that chemistry teachers from the secondary school seldom used mother tongue to teach science subject at the grass root Onuigbo 2006cited in Slade yomi and Adetunde 2007 also agreed that despite the enormous benefit derived from using mother tongue in the teaching and learning of science subject, science teacher at primary and secondary school hardly engaged when teaching science.

4.6 Summary of finding

From the data collected, computed,analyzed and interpreted in this study, the finding are summarize as follows:

The students in secondary school in Chanchaga local government area of Niger State have positive agreement about the used of mother tongue actually interferes in the learning of chemistry.

Despite the enormous benefit derived from using mother tongue in the teaching and learning of science subject science teachers at primary and secondary school hardly engaged when teaching science.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENATIONS

5.0 Introduction

This chapter gives summary of the findings, conclusions and recommendations for policy and areas that require further research. Based on the broad objectives, the study reports the summary, conclusion and recommendations of the study.

5.1 Summary

The study is the survey of mother tongue in teaching chemistry in senior secondary schools in Chanchaga local government area of Niger state. Five selected secondary schools and fifty teachers were used as the sample of the study. four research question and were formulated to guide the study. The study made use four scale like to analyzed the research questions. Findings from the study implies that despite the enormous benefit derived from using mother tongue in the teaching and learning of science subject, science teachers at primary and secondary school hardly engaged when teaching science, there are adequate respondent for teaching chemistry in the sample school. Mother tongue is less valued than English language.

5.2 Conclusions

On the basis of the findings emanating from this study, the following conclusions are drawn: This study has confirmed the effectiveness of learning with the mother tongue in Nigeria. It suggest not only that the policy of providing senior secondary education in the mother tongue is appreciate, but also that it should be maintained. Moreover, as very many of the local language have not yet be used for instruction; efforts are needed to enable all children to have the same opportunity. Since the study identified that learning with the mother tongue is one of the most decisive factors in student achievement, a proper implementation of the language policy in

Nigeria education is required. This study, therefore, provides clear evidence for adopting a positive approach towards plurality of language in education. More also students learn chemistry in English better as they masters chemistry concept better in the first language (mother tongue). Talking about chemistry in their first language could help them to understand chemistry better and then learning chemistry in English would be smoother for them. This finding is supported by studies which shows that chemistry knowledge is not developed in the first language (mother tongue).

5.3 Recommendations

Recommendations On the basis of the findings emanating from this study, the following recommendations are made:

1. The use of mother tongue should be encouraged for the teaching and learning of chemistry to improve student academic achievement due to the fact that it is the first language of the learner.
2. Curriculum planners should examine the efficacy of mother tongue and recommend it for use in translating the curriculum at the classroom level
3. There is need for a more robust implementation of the National Policy on Education (2004, Section 4; pp. 16) which provides that the medium of instruction in the lower basic level should be in the language of the immediate environment at both the state and local government council levels.

5.4 Suggestion for Further Study

The researcher suggests the following for further study

1. Similar research works should be done in other subject area.
2. Similar studies should be done in other states of the country, Nigeria

3. Further studies should be carried out in other mother language
4. Chemistry teachers should be train on how to use mother tongue to promote the understanding chemistry explicitly in our school.
5. Further study should be conducted in other area of the Niger State and the federation.

REFERENCE

Abdu-Raheem, B. O., (2012) Gender Differences and Students‘ Academic Achievement AndRetention in Social Science Studies Among Junior Secondary Schools in Ekiti, European Journal of Education Studies, 4(1), 2012

Abdu-Raheem, B.O. (2010). Relative Effects of Problem-Solving and Discussion Methods onSecondary School Students Achievement in Social Studies.UnpublishedPh.D Thesis, University of Ado-Ekiti, Ado-Ekiti.

Abdullahi A. (1982) Science Teaching in Nigeria.Ilorin; Atato Press Ltd.

Abdullahi, M. (1998). An Introduction to Media and Methods . Kano, GidanDandabino Publishers

Ademowo, A. (2010). Mother Tongue Education: Lessons Learnt From the Yoruba Experience. Languages Of Instruction For Emancipation Focus on Post-Colonial Contexts and Considerations.Dar-Es-Salaam.NkukiNyota Publishers. pp. 231-255

Awoniyi 2016 mother tongue National Policy on Education Language Policy.

Charmaz K (2010). Grounded theory, objective and constructivist. Okegu(2013) child hood teacher thinking and classroom practice. Teacher and Teacher Education 20(4).

Cherian, L. And DU Toit, C.(2008) literacy learning in Limpopo a multilingual environment, perspectives in Education, 26(4),108-114.

Chomsky N(2012) language and mind. New York: Horcourt, Brace and world.

Fafunwa A. B, Macauley, J. I, and Soyoya, J. A (1989) Education in mother tongue. The ife primary.

Hovens M (2012) children learn better in their mother tongue international journal of Bilingual Education and Bilingualism 5(5),1-3.

Language A. I and Woodward W. P (2013). They Smith (2008) Researching mathematics education and language in multilingual world, UNESCO.

Lewelling V. W (2008). Academic Achievement in second language Eric clearing house on language and linguistic. Washington DC. Eric Document Reproduction Service. No ED.329130

Mery Khejery (2014), (2008) teacher attitude towards the use of mother tongue as a language of instructions in lower primary school in him is I district international journal of humanities and social science Kenya. Vol 4 (1).

Mother tongue (2015). The free Dictionary Retrieved from http://www.the free dictionary. Com/mother + tongue.

Ndamba,G. T(June,2008) mother tongue in learning new York. Rutledge, Chapman and Hall,inc. Zimbabwe. Journal of pan African studies.

Oliver J (2013). The accommodation of multilingualism through blended learning in two information. Technology Classes. Perspective in Education, 31(4),43-57.

Owolabi T (2004) A diagnosis of students difficulties in physics. Education. Perspective, 7,15-20.

Sabbah, S.(2015). The Negative Transfer; Arabic language interference to English learning.Arab world English Journal.

UNESCO (2010) Enhancing learning of children from diverse language background; mother tongue-based bilingual or multilingual education in the early years. 2010/ED/BAS/ECCE/PI/1.

Young R (2000),Hong Kong official students benefit from mother tongue teaching. People daily online (www.people daily. Com