A Case Study Survey of Students' Perception on the Use of Mother Tongue Interference in Chemistry

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Abstract

This study investigated how students perceive and respond to the influence of their mother tongue in Chemistry. Mother tongue interference involves the interpretation of Chemistry concepts through the native language. Notwithstanding its overlooked status, understanding these students perceptions is of paramount importance. This study adopted descriptive survey research design. Two research questions and one hypothesis were formulated to guide the study. The population for this study consisted of all science students in Education District V in Lagos State. The samples for this study are seventy (70) chemistry students. In selecting schools for the study, stratified sampling technique was used. The study used a self-structure questionnaire to collect data from respondents. The results revealedthat use of a mother tongue does not interfere with the teaching and learning of Chemistry. Also, there was significant relationship between the students' gender and perception on the use of mother tongue interference in the teaching and learning of Chemistry. ($r= 0.35$; $p<0.05$). The results show students appreciate mother tongue interference in Chemistry as it fosters comprehension and personal relevance. Yet, translating technical terms poses challenges. The study recommends further research to explore its impact on learning outcomes and develop strategies to address the identified challenges.

Keywords: Mother tongue interference, Mother tongue, Student perceptions, Chemistry.

Introduction

During pre-colonial Nigeria, the indigenous Nigerian language covered every aspect of the speech community, including religious, cultural, traditional, political, economic, and social domains. However, with the advent of British traders, missionaries, educators and colonialists, new ideas, knowledge, concepts as well as values were introduced. Consequently, resulting in the previously self-sufficient indigenous language inadequate in dealing with these new concepts, particularly in formal education, canonical laws, and practices. This intrusion however led to the complete dominance by the British influence, impacting sectors that were once exclusively governed by the indigenous language. Since Chemistry holds great importance as a subject taught in Senior Secondary Schools, It enables students to comprehend the workings of the world and its contributions to enhancing the quality of life on our planet (Ware, 2011). It was decided that it should be included in the curricula for senior secondary school students as it often incorporates abstract concepts that are pivotal for further learning in chemistry and other sciences. Therefore, many students find Chemistry challenging, because it primarily revolves around the structure of matter and some Chemistry teachers in Senior Secondary Schools tend to avoid certain topics due to their lack of mastery in the subject.

According to the findings derived from previous SSCE examinations, it has been observed that chemistry failure is widespread, primarily attributed to a lack of comprehension of the subject and its related concepts. To address this issue, researchers have conducted a number of studies aimed at identifying the root cause of this massive failure at the secondary school level, as well as suggesting strategies to checkmate these challenges in the teaching and learning of chemistry.

This study proposes that employing the use of students' mother tongue can serve as an effective approach in delivering chemistry lessons. Research has consistently demonstrated that students often grasp concepts more easily when they can relate them to familiar ideas and experiences in their own unique way. This principle should likewise be applied to the study and comprehension of the intricate aspects of chemistry as a subject.

Scholars define the mother tongue as an individual's native language, which they acquire and understand from an early age. In this study, the term mother tongue represents the language that a child grows up speaking and understanding.

However, it is paramount to note that utilizing the mother tongue in education also presents a disadvantage in the form of interference. The influence of the native language of the learner on his/her acquisition of the target chemistry knowledge is known as mother tongue interference.

While Chemistry is known mainly as one of the branches of pure science, it is commonly regarded as a 'central science' by world scholars and academicians. Ababio (2001) in his new school chemistry, defined chemistry as a branch of science that deals with composition, structure, properties and uses of matter. In doing so, he has contributed greatly towards interpreting chemistry by providing us with a basic understanding of the concept and improving the quality of our lives. As a matter of fact, many job opportunities are available for students with knowledge of chemistry, such opportunities or careers are the noble teaching services, food processes, laboratory services, medicine, petroleum and petrol-

chemical industries, manufacturing industries, textile industry, mining industry, etc. But all these positions depend on the student that performs creditably well.

"According to Nigeria Policy on Education, Federal Republic of Nigerian and UNESCO, (2004), Chemistry education should be emphasized in the secondary schools in terms of teaching and learning because Chemistry as an academic discipline plays a significant role in unifying other science subjects".

Therefore, the primary goal of this research is to investigate students' viewpoints regarding the influence of their native language on their learning experience in chemistry. More specifically, its objectives include:

To Understand how students, perceive the impact of their native language on their chemistry education.

To Investigate any correlations between a student's gender and their perception of how their native language affects their chemistry learning experience.

Nelson Mandela the great freedom fighter once said "If you speak to a man in a language he understands, it hits his mind. If you speak to him in his language, it touches his heart."

Also, the Oxford English Dictionary defines language as the primary method of human communication, involving structured and conventional use of words, expressed through speech, writing, or gestures. It is a gift every human possesses, with the mother tongue being the first language he/she learns. This first language is often learned from the family which defines a person as a native speaker.

Language is more than just a communication tool; it's undoubtedly a significant part of our cultural heritage, reflecting our individual culture. Therefore, it is crucial for human interaction, cultural preservation, and the continuation of our species. Studying the language of a community reveals insights about their way of life, occupation, patterns, habits, and interests. The mother tongue, being the first language of instruction in schools, will be an indispensable tool in all fields. Barring it, the outcome is undeniably that intellectual pursuits may face significant obstacles.

Chemistry, often seen as a challenging subject, might become more accessible if taught in the mother tongue. Without this approach, students in Senior Secondary School may continue to struggle with the subject, potentially discouraging them from majoring in Chemistry or related fields. This will in turn slowdown the advancement of science and technology in a nation.

This research aims to explore perception of students on use of mother tongue interference in the teaching and learning of Chemistry

Research Questions

The following research questions were formulated to guide this study:

1. What is the perception of students on use of mother tongue interference in the teaching and learning of Chemistry?
2. Is there a significant relationship between gender and students' perception on the use of mother tongue interference in the teaching and learning?

Research Hypothesis

H0:$_1$ There is no significant relationship between gender and the use of mother tongue interference in the teaching and learning of Chemistry.

Methodology

The descriptive research design was adopted in conducting this study. The population studied are science students in Lagos State. Focus in this study are science (chemistry) students in Education District V in Lagos State. A total of seventy respondents were selected in all from the population to participate in the study. The stratified random sampling technique was used in drawing respondents to participate in the study.

A self-developed questionnaire was used for data collection in this study. This questionnaire consisted of two sections. Section A was designed to elicit information on the demographic characteristics of respondents such as gender. Section B consist of twelve (12) statements designed to obtain opinion of students on the use of mother tongue in teaching and learning of chemistry concepts. This section was developed on a four-point Likert scale. This required the respondents to tick one of the alternatives to express their opinion on each item. ***Strongly Agree (SA) Agree (A) Disagree (D) Strongly Disagree (SD).***

Data collected were analyzed using descriptive statistics of frequency counts, mean and standard deviation. The hypotheses were tested using Pearson Product Moment Correlation analysis.

Results

The results presented as follows:

Respondent's Characteristics and Classification

Table 1: Sex of Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	37	52.8	53.0	53.0
	Female	33	47.1	47.0	100.0
	Total	70	99.9	100.0	

Interpretation: Table 1 classifies respondents by sex. As revealed in the above analysis 53.0% of the respondents were male while the remaining 47.0% were female. This implies that more male respondents participated.

Table 2: Age of Respondents

		Frequency	percent	Valid percent	Cumulative percent
Valid	15years	57	81.0%	81.0	81.0
	16years	12	17.0%	17.0	
	17years	1	1.0%	1.0	
Total		70	100.0		100

Table 2 classifies the respondents by age group. The table shows that respondents between 15 years are 82.0%, 16years are 17.0% while 17 years are 1.0%. This implies that respondents between the ages of 15 - 16 years participated more in the research study.

Table 3: Class of Respondents

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid SS1	70	100.0	100.0	100.0

Table 3 reveals that SSS 1 students were the only ones that participated in this study.

Analysis of Research Questions

Research Question One

RQ 1: What is the perception of students on the use of mother tongue interference in the teaching and learning of Chemistry?

Table 4: Mean and Standard deviation of students' perception on mother tongue interference in the teaching and learning of Chemistry.

*ITEMS	Valid	mode	Mean	Std. dev
Teaching with students' mother tongue makes learning easy for students.	70	4	2.86	.905
Student understand better when taught with their mother tongue.	70	4	2.86	1.040
Lack of understanding and utilization of the mother tongue makes students reject being taught with their mother tongue.	69	4	2.43	.992
Mother tongue interference creates retentive memory for students.	70	4	2.59	1.083
I understand better when taught with mother tongue.	70	4	2.67	1.188
Students don't like to be taught with mother tongue because they don't understand the language.	70	3	2.47	.737
Students don't use mother tongue to communicate at home	70	4	2.80	.942
Some students can't speak their mother tongue because they don't like to be taught in their mother tongue.	70	4	2.41	1.123
Some parents don't relate their children with their native language hence makes learning with their mother tongue difficult.	70	4	2.69	1.174
Teachers can't relate with their mother tongue due to the different tribal system of the students to teach.	70	4	2.74	1.073
Poor usage of mother tongue affects students' academic performance.	70	4	2.91	1.100
Teachers' discourse in the class determines language to use in teaching the subject.	70	4	2.86	1.067

Based on the table above, "Teaching with your mother tongue makes learning easy for students and "Student understand better when taught with their mother tongue" had the highest mean of 2.86, which suggests that most students find it easy to learn when their mother tongue is used." This implies that students generally have a positive perception toward using their mother tongue in the teaching and learning of Chemistry and it does not interfere with the teaching and learning of chemistry.

Research Question Two

RQ 2: Is there a significant relationship with gender and students' perception on the use of mother tongue interference in learning of Chemistry?

Research Hypothesis:

HO_1.There is no significant relationship involving gender and the use of mother tongue interference in learning of Chemistry.

Table 6: Correlation showing the relationship between students' Gender and students' perception towards mother tongue interference in the teaching and learning of Chemistry in public senior secondary schools.

Variables	N	Mean	SD	R	Sig.	Remark
Mean of Perception	70	2.7731	.41911	.351	.003	
Gender	70	1.47	.503			Significant

The table above reveals that there is a positive significant relationship between gender and students' perception towards the use of mother tongue interference in the teaching and learning of Chemistry. It was further revealed that the relationship was statistically significant at ($r= 0.35$; $p<0.05$).

Discussion of Findings

The first research question investigated students' perception on mother tongue interference in the teaching and learning of chemistry. It was revealed that the use of mother tongue does not interfere with students' perception in the teaching and learning of Chemistry. This finding agrees with that of (Oludipe, 2017). The study investigated the. The researcher found that the use of Yoruba language in chemistry instruction had a positive impact on students' perception of chemistry and their interest in the subject. They suggested that using the mother tongue can help to create a more engaging and inclusive learning environment, which can enhance students' perception of chemistry. Also agrees with the findings of '(Olaniyi, & Akinyemi, 2017). This study investigated the perceptions of chemistry students in Nigeria regarding the use of Yoruba language in chemistry instruction. The researchers found that most of the students had positive attitudes towards the use of Yoruba language in chemistry instruction, and that this helped them to better understand the subject matter. They concluded that the use of mother tongue can enhance students' perception of the teaching and learning of chemistry.

The second research question investigated whether there was a relationship between gender and students' perception on the use of mother tongue interference in the teaching and learning of Chemistry. It was revealed that there was a positive significant relationship between gender and students' perception towards the use of mother tongue interference in the teaching and learning of Chemistry. This finding is in agreement with that of (Adeyemo & Adeyemo, 2013), who found that students' perception and attitude towards the use of mother tongue interference in the teaching of Chemistry was influenced by gender, with male students being more positive towards the use of mother tongue interference than female students. Similarly, Hamdan and Abu Hmaid (2019), concluded that the use of mother tongue interference in the teaching of Chemistry had a positive effect on students' learning, regardless of gender. However, female students were found to have a more positive attitude towards the use of mother tongue interference than male students.

Furthermore, Oluwole and Fakolade (2016) found that there was a significant relationship in the attitudes of male and female students towards the use of mother tongue interference in the teaching of Chemistry, with male students being more positive towards the use of mother tongue interference than female students. In the same vein, Osman and Al-Khalifa (2020) found that the use of mother tongue interference in the teaching of Chemistry had a significant effect on students' attitudes and achievement, with male students performing better than female students. The study recommended that teachers should consider the gender differences in their instructional practices and use a variety of teaching methods to cater for the different needs of male and female students.

Conclusion and Recommendation

The study concluded that the use of a mother tongue does not interfere with the teaching and learning of Chemistry. Also, there was significant relationship between the students' gender and perception on the use of mother tongue interference in the teaching and learning of Chemistry**.** The study recommends that teachers should consider the gender differences in their instructional practices. Also, recognizing and promoting multilingualism in the classroom and in society at large can help to create a more inclusive learning environment. Encouraging students to embrace and value their linguistic diversity can lead to increased cultural awareness and a deeper appreciation of different perspectives. This can ultimately contribute to a more positive learning experience for all students.

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