COMPARATIVE STUDY OF WRITING ERRORS OF SCIENCE STUDENTS IN SPECIAL SCIENCE SECONDARY SCHOOLS IN KADUNA STATE

BY

MOHAMMED HABIBA
M.Ed/Edu/10365/07-08
P14EDAS8123

BEING A THESIS SUBMITTED TO THE POSTGRADUATE SCHOOL OF AHMADU BELLO UNIVERSITY, ZARIA IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF EDUCATION TEACHING ENGLISH AS A SECOND LANGUAGE (TESL)

DEPARTMENT OF ARTS AND SOCIAL SCIENCE EDUCATION,
FACULTY OF EDUCATION
AHMADU BELLO UNIVERSITY, ZARIA

DECEMBER, 2015

DECLARATION

I declare that this study ***"Comparative Study of Writing Errors of Science Students in Special Science Secondary Schools in Kaduna State"*** was written by me in TESL Department of Arts and Social Science Education under the supervision of Prof. I.A Olaofe and Dr (Mrs) R.J Daura. The information derived from related literature has been duly acknowledged in the list of reference provided. To the best of my knowledge the study was not previously presented for the award of another degree at any institution.

…… …….

Habiba Mohammed Date

CERTIFICATION

This thesis titled "***"Comparative Study of Writing Errors of Science Students in Special science Secondary Schools in Kaduna State"*** by Habiba Mohammed meet the requirement governing the award of masters degree in Education of Ahmadu Bello University, Zaria and it is approved for its contribution to knowledge and literacy presentation.

……. ……..
Prof. I.A Olaofe Date
Chairman Supervisory Committee

……. ……..
Dr. Ramlatu J. Daura Date
Member Supervisory Committee

……. ……..
Prof. F.S.M Koya Date
Head of Department

……. ……..
Prof. K. Bello Date
Dean School of Postgraduate Studies

……. ……..
External Examiner Date

DEDICATION

This study is dedicated to my loving parents Alhaji Suleiman and Hajiya Hadiza Jibrin Lawal. It is also dedicated to my late uncle Alhaji Muhammad Alti (May his Soul Rest in Perfect Peace).

ACKNOWLEDGEMENTS

All praise and gratification goes to Almighty Allah who sustained me throughout the period of this study. My profound gratitude goes to my supervisors, Professor I.A Olaofe without whose Immeasurable contribution ad guidance the study would not have been completed.

I owe a debt of gratitude to my second supervisor Dr. (Mrs) Ramlat Daura, may Allah reward you abundantly. I wish to thank Dr. Mohammed Sadiq and Dr. Abdullahi Shika, Dr. Dan Audu, Mal. Umar for their professional advice on this study.

My sincere appreciation and thanks goes to my husband, Alhaji Abubakar Musa and other members of my family whose contributions toward the successful completion of this study cannot be quantified.

I also wish to thank Dr. M.I Maccido of Federal College of Education, Zaria who encouraged me into enrolling for the M.ed Programme. Finally, I wish to acknowledge my colleagues at the General Studies of Education Department, may Almighty Allah bless them abundantly.

ABSTRACT

The purpose of this study was to compare the written errors made by SS II Science students in English and chemistry subjects. This is to see if there was any significant difference in the type and frequency of errors made by the students in the two subject areas. The population covers SS II science students from special science secondary schools in Kaduna state, with total population of 960.10% of this population was the sample size. Data were collected using written test. The study used quantitative analysis to arrive at percentage to determine the frequency of errors committed by the students in English and chemistry subjects. It also employed chi-square to test all the hypotheses at 0.05 level of significance. Hypothesis one which stated that there as no significant difference in the type of lexical errors made by the students in English and Chemistry was retained. Hypothesis two was also retained. Hypothesis three which was used to find the difference in the frequency of errors made by the students in the two subject areas was also retained. From the findings it was discovered that there was no significant difference in the type and frequency of errors made by the students in English and chemistry subjects. Implications for students, teachers and the schools were also provided.

LIST OF FIGURES

Figure 1: Percentage of Error Types Committed by the Students in Essay Writing

Figure 2: Percentage of Error Types Committed by the Students in English and Chemistry Essay

Figure 3: Percentages of Total Error Types Committed by the Students in English and Science

ABBREVIATION USED IN THE STUDY

CLA:	Contrastive Linguistics Analysis
EA:	Error Analysis
ESL:	English as School Language
G.S.S.	Government Science Secondary School
IC:	Immediate Constituent
L1:	First Language
L2:	Second Language
L1:	Local Language
NSBE:	Near Standard British English
SNE:	Standard British English
STMB:	Science and Technical Schools Management Board
SSS:	Science Secondary School
TG:	Traditional Grammar
TGG:	Transformational Generative Grammar
TL:	Target Language
SS:	Senior Students

OPERATIONAL DEFINITION OF TERM

Error Analysis: This is referred to as the study of the learners' language errors in linguistic terms in order to find the features of the language which are causing learning problems (Corder 1973:257)

Fossilization: This refers to a state where a learner has mastered the wrong forms so much so that no amount of correction can immediately overcome them.

Global Errors: These are errors found in the overall sentence organisation which lead to complete breakdown of communication.

Performance: This refers to the way a person uses his knowledge of a language in producing and understanding sentences.

Source Language: Refers to the first Language, native language or mother tongue, i.e. the first language the child acquired at home.

Science: Science is an organized body of knowledge developed using the scientific method of observation and involves the experimental verification of fact.

Error: Systematic deviation from the norm or sets of norms.

Competence: It is a person's Internalized grammar of language.

Cohesion: It is the grammatical/Lexical relationship between different sentence, sentences or between different parts of a sentence.

TABLE OF CONTENTS

Title page - - - - - - - - - - - i

Declaration- - - - - - - - - - - ii

Certification - - - - - - - - - - -I ii

Dedication - - - - - - - - - - - iv

Acknowledgement- - - - - - - - - - v

Abstract- - - - - - - - - - - vi

List of tables - - - - - - - - - - vii

Abbreviation used in the study - - - - - - - - - viii

Operational definition of terms - - - - - - - - - ix

Table of contents- - - - - - - - - - x

List of tables - - - - - - - - - - xiv

CHAPTER ONE

BACKGROUND OF THE STUDY

1.1 Introduction- - - - - - - - - - 1

1.2 Statement of the Problem- - - - - - - - - 4

1.3 Objective of the Study- - - - - - - - - 5

1.4 Research Questions - - - - - - - - - 5

1.5 Hypotheses- - - - - - - - - - 5

1.6 Significance of the Study- - - - - - - - - 6

1.7 Basic Assumptions- - - - - - - - - 7

1.8 Scope and Delimitation - - - - - - - - 8

CHAPTER TWO: REVIEW OF RELATED LITERATURE

2.1 Introduction - - - - - - - - - 9

2.2 The Concept of Error Analysis - - - - - - - 9

2.3 Sources of Errors - - - - - - - - - 12

2.4 Significance of Errors - - - - - - - - - 15

2.5 Model of Error Analysis - - - - - - - - 16

2.5.1 Descriptive Models - - - - - - - - - 16

2.5.2 Analytical Models - - - - - - - - - 22

2.6 Lexical Errors - - - - - - - - - - 24

2.7 Grammatical Errors - - - - - - - - - 27

2.8 Importance of Writing Skill - - - - - - - - 29

2.9 Teaching English as a Second Language in Science Secondary School in Kaduna State- - - - - - - - - - - 33

2.10 Standard Norms - - - - - - - - - - 33

2.11 Previous studies Errors - - - - - - - - - 34

2.12 Gain's from the Review of Related Literature- - - - - 36

2.13 Theoretical Framework Adopted for this Study - - - - 37

CHAPTER THREE: METHODOLOGY

3.1 Introduction- - - - - - - - - - - 38

3.2 Research Design- - - - - - - - - - 38

3.3 Population- - - - - - - - - - - 38

3.4 Sample and Sampling Procedure- - - - - - - - 39

3.5 Research Instrument - - - - - - - - - 40

3.5.1 Data Collection Procedure - - - - - - - - 40

3.6 Pilot study - - - - - - - - - - 41
3.7 Validity - - - - - - - - - - 42
3.8 Reliability of the Instrument -- - - - - - - 42
3.9 Data Analytical Procedure- - - - - - - - - 42
3.10 Statistical Procedures-- - - - - - - - - 42
3.11 Categories of Errors- - - - - - - - - - 43

CHAPTER FOUR: DATA PRESENTATION, ANALYSIS AND DISCUSSION OF FINDINGS

4.1 Introduction- - - - - - - - - - 46
4.2 Data Presentation - - - - - - - - - 46
4.2.1 Collection - - - - - - - - - - 47
4.2.2 Lexical Repetition - - - - - - - - - 47
4.2.3 Wrong-Splitting of Compound Words- - - - - - 48
4.2.4 Inappropriate Choice of Lexical Items - - - - - - 48
4.2.5 Tenses - - - - - - - - - - 49
4.2.6 Concord - - - - - - - - - - 49
4.2.7 Prepositions - - - - - - - - - - 50
4.2.8 Auxiliaries - - - - - - - - - - 50
4.2.9 Determiners - - - - - - - - - - 51
4.3 Solution to research Questions - - - - - - - 51
4.4 Test of Hypothesis - - - - - - - - 56
4.5 Discussion of Findings - - - - - - - 60
4.5.1 Findings of Lexical Errors - - - - - - - - 60
4.5.2 Findings on Grammatical Errors - - - - - - 61

4.6 Overall Errors Profile- - - - - - - - 62

4.7 Summary of Findings- - - - - - - - 65

CHAPTER FIVE

SUMMARY, RECOMMENDATIONS AND CONCLUSION

5.1 Introduction- - - - - - - - - - 66

5.2 Summary of the study - - - - - - - - - 66

5.3 Implications- - - - - - - - - - 68

5.3.1 Implication for the Students- - - - - - - - 68

5.3.2 Implication for Teachers of English - - - - - - - - 68

5.3.3 Implication for Science Subject Teachers- - - - - - - 69

5.3.4 Implication for the Schools- - - - - - - - 70

5.4 Conclusion- - - - - - - - - - 71

5.5 Recommendations- - - - - - - - - 72

5.6 Suggestion for further Research.- - - - - - - - 73

References- - - - - - - - - - 74

CHAPTER ONE

BACKGROUND TO THE STUDY

1.1 Introduction

Science students' competence in written English is critical because English is the language of formal education as enshrined in the National Policy on Education (2004). It is written medium the dominant aspect used to test and determine knowledge (Shuaibu, 2008). The importance of Science in technological development cannot be over-emphasized. The National Policy on Education (1981), under secondary education section, stressed the teaching and learning of science subjects in Nigerian schools. One of the aims of the policy is to "equip students to live effectively in the modern age of Science and technology…" In line with this, science subjects are among the core subjects being taught at the senior secondary schools.

Writing is a purposeful selection and organization of thoughts, facts, opinion and ideas. A high proficiency is required from the science students in writing tasks. They should be able to express themselves fluently make inquiries, understand concepts and state findings in clear terms without ambiguity.

The crucial role English language plays in secondary school Education, notwithstanding effective written English is among the major problem both teachers and students continued to grapple with. This is evident in various WAEC and NECO Chief Examiners' Reports (2002, 2007). The general public outcry and various related academic works which describes the SS2 science students' performance in written English as poor testify to this unsatisfactory performance. According to Jegede (1987), some of the instructional problems perceived to be an impediment to learning of Science subjects, range

from inability to write, to lack of comprehension of the language used in texts. Researchers have variously described the performance of SS2 students' in written English as very poor, disappointing, incomprehensive and error packed (Olajide, 1980; Olaofe; 1987, Ama, 1988). This affects SS2 science students' performance because many of them bring their English language problems to their content subjects.

The important role of English in Nigeria gives it a central position in the school curriculum as a core subject and a medium of instruction. Without it, there will be little or no education above the elementary level (Tiffen, 1970). It will be impossible for SS2 science students' to succeed academically without it. They must be taught the English language skills necessary for academic pursuits. Specifically, the writing skill is very important. Science students need it for many scientific processes such as laboratory reports, experimentation, collection of data, making inferences, description and so on.

In science secondary schools, most subjects are tested through the writing medium, chemistry subject inclusive. There is then a need to determine reasons for lack of absolute intelligibility in writing English. An unintelligible text that is disjointed or distorted in terms of textual organization and arrangement of ideas can lead to communication break-down (Olaofe 1995.5).

Writing among science students' across SS2 level contains varying degrees of grammatical and lexical errors (Shaughnessy, 1997). Many Science students' find it difficult to perform effectively in contents subjects because of their poor performance in English language. It is assumed that investigating the written English errors of SS2 Science students' will reveal their areas of deficiencies.

Teachers of science subjects fail to emphasize the writing of good text. Although, they comment on the writing errors of their students, little or no effort is made to minimize the errors. This neglect makes the students' not to attach much importance to written English in their subject areas. Some of the students cannot see the reason why they should waste their time learning to write good composition as long as their teachers are able to decipher what they have written, even if it is with a lot of pains. Thus, there is need for a study like this to make science teachers and students aware of errors in written English and the importance of acquiring proficient writing skill.

Errors cannot be allowed to continue among science students. Kanobi (1976) observes that one step forward in improving science students' writing is to analyze their written work and identify areas of weaknesses. The study is constrained to analyze SS2 science students' written errors, find a way of minimizing the errors and improve the students' written English.

Of particular concern to this study are the unending complaints of teachers in Kaduna State about Science students' inability to express themselves clearly in writing. Teachers of science subjects often complain about the errors learners make which impair communication (Abroks, 2010). English teachers are themselves baffled by the ungrammatical expressions which characterize SS2 Science students' writing. They sometimes cannot comprehend a single sentence produced by the students.

SS2 students' inability to express themselves in clear and simple English is a great set-back in Science subjects. Grammar and lexical errors continued to be the weakest part, since little or no attention is paid to such things as using correct verbs with correct nouns and deficient use of content words (Chief Examiners Report, 1977). In view of the

foregoing, the study intends to carry out a comparative study of written English of SS2 science students in English classes and in their chemistry subjects. The written English will be examined for lexical and grammatical errors. Areas of common errors, different errors and errors that cut across will be analyzed. The findings of this study may help to show whether Science students' at SS2 are better when writing English in their English classes and become extremely careless with the language when writing in their subject areas or vice versa.

1.2 Statement of the Problem

It is obvious that the poor performance of science students in written English has caused a lot of concern for many people. This is reflected in studies in the area and comments on the issue. It is the same concern that has motivated the present study.

The role of English language in enhancing achievements in science subjects is very important because English is the main medium through which scientific ideas; skills and information are acquired and disseminated in science subjects. Thus, it is necessary to know the students' writing ability and how it can be use to facilitate learning science subjects. Ideally, science students across SS levels should be able to write comprehensible compositions and master the techniques such as relevance, organization of content, expression and mechanical accuracy. Unfortunately, the written English of SS2 science students contain a lot of errors. The errors are serious; they sometimes impair communication. The researcher, having taught English to some SS2 science students in Kaduna state (2005-2009) and marked WAEC and NECO (2006-date) observes that many SS2 science students could not express themselves adequately in written English. Many of the students' shy away from writing because they do not like the skill. Their negative

attitude contributes to their poor performance in written English. Therefore, this study is expected to examine the written English of SS2 science students in English classes and in their chemistry subjects with the hope of identifying their writing difficulties.

1.3 Objectives of the study

The objective of this study is largely pedagogical. It seeks to:

i. Find and discuss the written errors of SS II science students in English and Chemistry Subjects.

ii. Compare the error of SS 2 science student in English and Chemistry subjects.

iii. Determine the type of errors in the students written English; and

iv. Identify which type of errors is persistent in English and Chemistry subjects.

1.4 Research Questions

This study will address the following research questions

1. What are the types of lexical errors made by SS II sciences students in English and Chemistry subjects in writing?
2. What are the types of grammatical errors made by SS II sciences students in English and Chemistry subject in writing?
3. Was there any significant difference in the frequency of lexical and grammatical errors produced by SS II science students in English and chemistry subjects in writing?

1.5 Hypotheses

1. There is no significant difference in the types of lexical errors produced by SS II science students in English and Chemistry subject in writing.

2. There is no significant difference in the type of grammatical errors made by SS II science students in writing.
3. There is no significant difference in the frequency of lexical and grammatical errors made by SS II science students in English and Chemistry in writing

1.6 Significance of the Study

This study is significant in that the identification of SS2 science students' errors is a major step to improving the students' performance in written English. It is also significant because the study can serve as yardstick for teachers of English and science subjects to correct English errors written by science students through purposeful teaching and remediation. By involving science students the study offers them the opportunity to express their worth and their participation as a motivating factor to learning. Including the science teachers in this study would make them realize that they have a vital role to play in helping science students to learn the skill of writing and to know the strength and weaknesses of students' written English.

This study is to form part of numerous studies in error analysis. It is also meant to improve SS II science students' performance in written English. It is to collect and identity the types of lexical and grammatical errors. The information to be gathered in the study is expected to:

1. Inform chemistry students' and teachers, areas of teaching and learning difficulties related to written English;
2. Inform teachers of the possible causes of SSII science students' errors in written English and in their subject areas.

3. Suggest to teachers the ways to improve written English of SS II science students in English and in their subject areas.
4. It is hoped that the study would be of great interest to Kaduna State Ministry of Science and Technology in planning efficient method for teaching written English. The study also suggested a remedial teaching for minimizing science students' errors in written English.

1.7 Basic Assumptions

It is assumed that the analysis of errors of SS II science students' written English (i.e. grammar and lexis) will provide an insight into the common difficulties associated with learning written English of the students. Thus, the study is based on the following basic assumptions stated below:

1. Science students who experience problems in written English, especially grammar and lexis will find it difficult in expressing concepts or ideas in their subject areas.
2. Errors are indispensable to science students they provide a learner with a means of testing hypotheses about the language (Corder, 1981).
3. Errors may be a clear indication that science students are learning.
4. Science students' attitude towards learning written English may play a part in the errors they make. A positive attitude may facilitate the learning of written English, while a negative attitude may discourage it (Williams, 1970).
5. The frequency, persistence and gravity of errors are equal to the degree of learning difficulty.

1.8 Scope of the Study

The study is limited to SS II science students from three science secondary schools in Kaduna State. (GSSS B/ Gwari, GSSS Ikara, and GSSS Soba). The study was intended to represent the state, due to the following reasons:

i. It is limited to SS II level in order to have a thorough analysis of the types and frequency of error s produced by the students in the English and Chemistry subjects in writing.

ii. In other to have effective investigations and representatives, this study is limited to three sciences secondary schools because the SS II writing syllabus is the same in Kaduna State.

iii. The study focused mainly on the written component because writing encompasses the other three language skills reading, speaking and listening skills.

iv. Because student academics performance is mostly assessed through the written medium.

v. The study was concerned with classification and explanation of errors found in the written English of SS II science students in English and Chemistry Subjects.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter reviews related literature based on the concept of error analysis, its sources and significance. Teaching English as a second language in science secondary schools in Kaduna state, importance of writing, models of error analysis, lexical and grammatical error, accepted norm and studies of errors in written English are some other areas reviewed.

2.2 The Concept of Error Analysis

Committing errors is not just a recent happening but has been associated with learning and acquisition of any skill even though, it can be avoided with carefulness. Broughton et al (1928:138) opines that a learner must make errors as an unavoidable and necessary part of the learning process. Brooks cited in Ndukwe (2005) asserts that it is unrealistic to reckon with language learning without errors. The present study believes that SS2 science students commit errors when it comes to learning a language, even when learning under the best possible condition.

Corder (1981) views errors as utterances which are ungrammatical or otherwise ill formed, when judged by the generally accepted rules of the language being learnt. He added that errors were indispensable to learners since they learnt through errors and discovers the acceptable from the unacceptable. The above assertion is true because a learner who does not make error might be confining himself to areas already mastered (Abroks, 2010). Researchers now judge learners' errors as a stage of learning process instead of unacceptable

behavior that need to be corrected on the spot (Okamura, 1997). But, some errors are so embarrassing and they should be corrected on the spot.

Analysts (for example Anasudu 1983, Ofuaku, 1984 and Olaofe, 1986), among others studies, the grammatical errors made in written and spoken English by English users in Nigeria. They opine that errors vary in complexity and sources. The present study acknowledges the above claim but is concerned with the various errors science students produce in written English not those of spoken form.

According to Corder, (1973:278) errors are made by, Omission of some required elements, addition to some unnecessary or incorrect elements; selections of incorrect items, disordering of elements and assigning them to different linguistic levels. Corder (1973) sees them as not physical failure but the sign of imperfect knowledge that, the learner has yet initialized the formation rules of second language. Errors in written English, for instance, are caused by lack of students' competence in the grammar and lexis of English.

Allen (1974:73), in addition, attributes errors to the personality of the writer; He said that errors made depend greatly on personality factor and on what the learner believes to be attitude of other people such as the teacher and listener. The role of the teacher is very important here. This is because the students often believes that whatever the teacher writes or says is true and correct. Some errors made in written English, if not corrected, may affect the future written English of students. Pryse (195:1040) states that "many errors in writing arise because learners write as they speak and bad pronunciation can lead to errors in writing as well as in speech". The present study acknowledges the above claim by the analysts, but is concerned with errors students produce in written English.

Widdowson (1979) and Olaofe (1982) share the same view that in spite of the numbers of years of instruction in English, students still find it difficult to cope with language in its formal usage. The Chief Examiners' Reports, (WAEC, 1992) notes that candidates' show lack of familiarity with the required format in written English. Errors such as loose sentences, abuse of basic rules of concord, tense and word order were found in the students' written work. This study believes that SS2 science students' effective written English could be hampered by their linguistic incompetence. This makes cognitive processes like text generation and interpretation very difficult when written in their subject areas.

Some complains about the written English of science students is high incidence of deviant sentences. These sentences are characterized by some mechanical, structural, lexical and general incoherence due to lack of organization of material (Banjo, 1981 and Zamel, 1978). Since written English is an important activity of the students, it needs to be taught well.

Lawal (2004) views errors made by learners as due to complexities and rules used in teaching written English, to reduce science students' written errors especially at SS2 level, the level of difficulty can be adjusted based on the level of the students' (McGregor, 1997:130) An analysis of the written English gives the teacher not only fair idea of the progress of the learner but also indicates which part the course was not well understood. In fact, a proper kept record of all types of errors will be of value when the teacher prepares future lessons.

Jegede (1990) observes that error analysis may show a teacher the areas where his teaching has not been effective enough and teaching materials used are inadequate. The

error analysis of SS2 science students' written English is hoped to reveal the learners' weaknesses and strength in lexis and grammar.

Some studies see for example, Tsang, (1996) and Barnet, (2008), claims that, poor teaching habit of learners is affecting the learner's writing skill. This assertion could be applicable to SS2 science students. To reduce errors in written English, students need to read extensively to improve their writing skill.

2.3 Sources of Errors

Errors occur due to number of reasons. The following factors have been observed by various analysts, including the present study, to be the causes of science students' errors. The major ones include interference, intra-lingual transfer, developmental, overgeneralization, learning stage, inappropriate teaching methods, teaching materials, teacher and learner's carelessness, low motivation and writing apprehension (Abroks, 2010).

Evidence from various error analyses has shown that learners of second language display certain characteristics of their mother tongue or any other language imperfectly mastered (Coder, 1987: 85). Aliyu (2001) opines that forty five percent of errors made by Nigerian secondary students were due to mother tongue inference. It is known from observation of many cases that the grammatical structure of the learner's first language tends to be transferred to the target language and the structures that are different may be difficult. Interlingual errors are attributed to negative transfer, it may occur when a learner imports elements of the first language which the learner has a better command in his attempt to produce acceptable utterances in the language. It may be caused by overgeneralization, faulty application of rules by the learner (Richards, 1971).

Over-generalization covers instance where the learners create deviant structures on the assumption of the experience to the target language (Richards, 1974:174) Science students' may commit inductive generalization of the target language, due to ignorance of the exceptions to certain rules of grammar. They generalize and produce incorrect forms, for example: The use of adjectives as nouns, where it is not acceptable in singular form in general English but is commonly used in science writing (Roseline, 2009). However, if science students' attempt to generalize these features, they may commit errors, because words commonly used in everyday English acquire special meaning in scientific prose.

Developmental errors occur when learners are formulating hypothesis on the language from their limited experience in the target language. The teacher, by not presenting the lesson very well or by not giving learners enough explanation, may cause them to make errors. The role of a teacher is very important here. This is because students often believe that whatever the teacher writes or says is true, correct and perfect. Some errors made in writing if not corrected, affect the future writing of science students. Learner's themselves by not paying attention, careless, partial or wrong application of rules may cause errors. Selecting the wrong method or approach to language teaching can be a source of errors. Teachers themselves may indiscriminately distribute errors to students through their incompetence in the language (Mohammed, 2000)

Allen (1974:73), in addition, attributes errors to the personality of the speaker, He says … errors made depend greatly on personality factor and on what the learner believes to be the attitude of other people who matter; the teacher and the listener. Teachers may not be good models with regard to the way they speak or write the language; such errors are teacher-induced. The teacher may emphasize on one aspect of the language and neglect the

other. For example, teachers concentrate on the oral components of a language to improve science students' speaking ability but may lag behind in reading and writing skills.

Learner's carelessness and wrong application of rules may cause errors. Learners make errors when they perceive writing to be useless (McGoarty, 1996; Carson, 2001; Shin, 2006 and Abroks, 2010). The teaching materials that lack organization could also lead to errors. Teachers, by not using the teaching material appropriately, may mislead the learners and cause them to make errors.

Motivation and feedback are important in language learning. Motivation ensures success in second language learning process Shuaibu, 2008, Faruk 1991, observes that students are deficient in written English largely as a result of poor motivation from their teachers. The legendary red pen in students' written English does more harm than good, teachers still adhere to the traditional method of teaching written English which lay more emphasis on prescriptive grammar and heavy penalties on students' grammatical mistakes (Shuaibu, 2008). The corrections in students' written English could create genuine fears which may compound their ineffectiveness in written English and cause them to make errors. This becomes worse if time constraints are involved (Weigle, 2002:37).

There are many sources of errors. Some sources are peculiar to some groups of students. In the present study, students will be involved in determining the sources of errors. The errors found in the students' written work will be looked at and explained in connection with Richards (1977) sources of errors written below:

a. Overgeneralization
b. Ignorance of rule restriction
c. Incomplete application of rules

d. False concepts hypothesized

2.4 Significance of Errors

First to teachers, errors tell them how far learners have progressed and consequently what remains for them to learn (Etherton, 1977). It could show teachers areas where their teaching has been effective or ineffective and provide data for remedial programmes. It serves to evaluate and provide feedback on the quality of teaching materials (Etherton, 1977:69). Error analysis informs the teacher of the state of learner progress and areas where remedial teaching is needed. Thus, by analyzing the written errors of SS2 Science students' this study hopes to improve written English performance of the students.

Secondly, error is significant to the researcher. It provides the researcher with evidence on how language is learnt or acquired, what strategies or procedures learners are employing in their discovery of the language (Corder, 2000) when a learner makes an error, it is an evidence that learning is taking place (Abroks, 2010). This is to say the errors science students make in written English are evidence that they are progressing. The researcher can use the errors made by the learners to identify their sources.

Lastly, errors are regarded as a device which the learner uses to learn. This could be applicable to the subjects of this study. Language learning is characterized by a series of trials and errors. The making of errors is seen as inevitable and necessary part of the learning process. Learners use errors to test their hypotheses about the nature of the language they are learning (Corder, 1967:107). Error analysis provides the teacher and learners with immediate feedback on how learning has taken place, areas where help is needed. It is a classroom procedure which teachers could use to detect sciences students' problematic areas. For learning to be effective, teachers must recognize learners' errors and correct them.

It may not be possible to eradicate all errors, especially those that have been fossilized, yet a lot can be done to improve science students' performances.

Thus, by analyzing the written errors of SS2 science students the study hopes to identify the students' lexical and grammatical errors and show errors that is persistent. The study is also expected to be seen as a way of providing evaluation of the effectiveness of teaching materials and techniques.

2.5 Models of Error Analysis

Error analysis is basically a comparative study. It involves the process of comparing what the learner has learned with what is obtained in the target language. There are many descriptive and analytical models that can be used in error analysis.

2.5.1 Descriptive Models

The grammatical models used in error analysis are: traditional grammar, structural, IC analysis, transformational generative grammar, sector analysis and pedagogical grammar. In this study some grammatical models and their relevance to the present study are considered. At the end, an effective theoretical model will be selected.

Traditional grammar is a linguistic theory which dates back through the renaissance and the middle ages. Traditional grammar was greatly influenced by two ideas: that classical languages provided the best model for the description of English and secondly, the question of appropriate use in English could be settled by appeals to Latin and universal grammar (Manjuk, 2009).

In traditional grammar, word and sentences were defined based on semantic (meaning) instead of in structure (forms). Learners were given little practice and much was

given to writing. (Williams, 1990:31;Abroks, 2010:220). It also, identifies eight parts of speech, which were treated in isolation. Lamidi (2000) opines that, part of speech was established in traditional grammar. These are noun, pronoun, verb adverb, adjective, conjunction and preposition. Consequently most of the grammatical categories like gender (Masculine, femine and neuter) number (singular and plural) Person (first, second and passive) and mood (indicative, subjunctive and imperative) were developed by traditional grammarians.

Traditional grammar is the easiest and the most widely used form of teaching and understanding English especially in Nigerian schools. The grammatical terms and terminologies and some of the concepts used in modern linguistic theory were derived from traditional grammar. The model succeeded in providing a broad grammatical system which is still in use today in textbooks, especially at the senior secondary school level.

Various criticisms have been labeled against traditional grammar some of which are; they relied more on written work rather than on describing the language as used. Some of the traditional grammar rules and definitions are false and misleading (Allen, 1972). They overlook that what is correct in one context may not be correct in another. It is not based on the scientific study of the form and content of language. This model will not be used in this study because it sees learners as passive beings and it is rule governed. However, the written samples of the students will be used because the subjects of this study are to be tested by means of written English.

The short comings of traditional grammar leads to the development of structural form of language which stated that language should be described objectively and scientifically on the analysis basis of its structure. It considered classification of different

kinds of words and constructions. This model gave more regard to spoken words rather than written ones. The structuralists such as Fries (1952); Trager and Smith (1951) rejected traditional grammarians' ideas of the existence of grammatical universals. Yule (2002) observes that the main concern of structural analysis is to investigate the distribution of forms (e.g. Morphemes) in a language. A shortcoming of the early structuralist is that they were more interested in words than constructions give primacy to speech but offer little satisfactory analysis of written English. For that, it will not be used in the present study.

The immediate constituent analysis (IC) was also part of the structural model. It was based upon discovery of ultimate constituent of the sentence. It believes that all English constructions can be divided into two (binary) units of structure as part of the next layer (Allen, 1972:101) IC analysis can be used to remove ambiguity in a construction, this model will not be used in the present study because it does not go beyond the sentence level. There are possibilities of cross cutting as not all English constructions are binary and it may cause a problem in using this model in Error analysis.

Tagmemic grammar was also an offshoot of the Structural model. It was of the view that the basic unit of grammar was the correlation of a grammatical slot with mutually substitutable items that fill the slot (Allen, 1972:124) For instance; a sentence might contain two noun phrases, where one is the subject and the other the object of the verb. They have the same form but different functions (Mohammed, 2000). Tagmamic analysis was also designed to provide an analyst with discovery procedures for identifying grammatical units in previously unknown languages (Allen, 1972:131). This model does not provide space for unfilled positions and it ignores the obligatory and optional tagmemes by not realizing that

the ones that are optional may not be used in a construction. This model is good for teaching reading not writing. For that, it will not be use in this study.

Transformational generative grammar (TGG) Theory of language was propounded by Chomsky (1957) and later expanded in (1965). This theory is primarily concerned with the ideal speaker-listener in a completely homogeneous speech community, who knows the language perfectly and is unaffected by such grammatical irrelevant conditions as memory limitations, shift or attention, interest and errors in applying knowledge of the language (Chomsky, 1965:59). Chomsky draws a line between linguistic competence and linguistic performance. Competence refers to the speaker's knowledge of the language, while performance is the actual use of language in concrete situation. He maintained that it is only with the former that linguists must be concerned.

This model was concerned with the establishment of universal characteristics of all languages and looked at the syntax, semantics and phonology of all languages. It looked at the surface and deep structures of the language with the believed that meaning is embedded in sentences. The model deals with transformation of sentences. For instance, an active sentence can be changed to a passive one while a simple declarative sentence can be changed to a question through the use of transformations. These transformations follow linguistic rules. The model adds that, sentences off all language have both a surface structure which gives the form of the sentences as it is used in communication and a deep structure which gives the meaning of the sentence. A limitation of this model is that word boundaries were not given and there is no rationale for choosing constituent boundaries (Allen, 1972:120). Also, only good writers can make use of transformed sentences. Poor writers

(like the subjects of the present study) would find it difficult to use the model in written English.

Sector analysis is another grammatical model that goes beyond the sentence layer to the paragraph and other higher layers. Emphasis is placed upon the different kinds of positions that are to be found in sentences of different layers and upon different kinds of units that may occupy one or another of those positions (Allen, 1972:164). It is deductive in approach, from paragraph down to the morphological level, which can be used in a classroom, because it starts from the known to the unknown. It is good for teaching written English.

The weakness of sector is that the meaning inherent in language has not been considered and meaningless sentences can be analyzed. Since this model can analyze student's erroneous sentences and the correct ones, it is more appropriate for use in CLA rather than EA. The present study is not concerned with filled or unfilled positions in writing but sought to find out science students' errors and their sources in written English.

Functional systemic grammar focuses on the interaction between semantics, syntax and pragmatics (Halliday, 1985:30) It looked at the syntactic-semantic relationship in a sentence. The model focuses more on discourse and provides a descriptive model for discourse analysis. It is believed that some phenomena in language cannot be described accurately without reference to context. Halliday and Hassan (1976) defined cohesive relations in discourse as those relations between two or more elements in a text hold together, lexically and grammatically independence of the structure. The model provides five kinds of cohesive relations that can exist in a text. These are reference, substitution, ellipses, lexical and conjunction (Mohammed, 2000 and Abroks, 2010). This model has

gone beyond form to function in its analysis of cohesion. For ESL writers, it is more important that discourse strategies be mastered as this would enable students to see writing as a process which is what the present study also strives at.

A communicative pedagogical model was developed by Olaofe (1992) to account for why L2 learners who have a good command of the structure of a language cannot communicate effectively; while others are able to communicate but do not understand the structure of the language (Mohammed, 2000). Olaofe (1992) provide some parameters for assessing communicative competence at various hierarchical layers and gave two types of rating scales for measuring the performance of learners. This makes it possible for researchers or teachers to gain an overall impression of the performance of one student in relation to the other (Olaofe, 1992:125) In order to have an accurate assessment of L2 learners' performance, emphasis must not be only on linguistic competence but also on communicate competence. The model provided for an analysis that goes beyond the sentence. This model will not be used in this study because it looked at both speech and writing. The present study is using only written samples.

The grammatical model adopted in this study is pedagogic grammar extracted from grammars such as structural and transformational grammar. It was used as a basis for language teaching and enable the students acquire knowledge of a language and how to use it effectively (Allen, 1971:60). This grammatical model could be used successfully by the classroom teacher. Quirk and Greenbaum (1976) has used pedagogic grammar to describe the grammatical structure of English and discussed elements of grammar such as verb and verb phrase, adverb and adverbs phrase, nouns and noun phrase, adjectives, prepositions, prepositional phrase and conjunctions among others. These models have moved beyond

mere labeling of words like nouns, verbs and adjectives. They have noun phrase, verb phrases to take care of those words that are much more than just a noun or a verb (Mohammed, 2000). The present study adopts this grammatical model because it lends itself easy to pedagogic use. The study goes beyond grammar to lexical and it adopts Halliday and Hassan's (1976) functional systemic model for the lexical component of the study. But this study goes beyond grammer to lexical using Halliday and Hassan's (1976) model.

The present study adopts pedagogic grammar because it:

1. provides definitions, exercise and rules that can help learners acquire knowledge and fluency in English language;
2. incorporate other models; and
3. can be successfully applied by the classroom teacher. The model discussed the elements of grammar and moved beyond ordinary labeling of words to phrases.

Halliday and Hassan (1976) attempt to show the pattern of connectedness that exist in a text (i.e. linguistic cohesion) they identify five categories of cohesive ties namely reference, ellipsis, conjunction and lexical cohesion; these are linguistic classification.

The present study is interested in the ways science students' ideas are presented to form a coherent piece through the use of some cohesive ties, the study will consider the following cohesive ties when analyzing the students written English. These are registers, collocation and synonyms.

2.5.2 Analytical Models

Various studies have adopted models for error analysis; one of them is Corder (1974:126) who gave three stages for the analysis of errors. The first stage is recognition. In this stage, analyst tries to make accurate or correct interpretation of the learner's intending

meaning with the aim of arriving at authoritative interpretation. If the learner cannot be reached, it is then left for the analyst to make plausible interpretation and reconstruction of the writers intended meaning. The second stage is linguistic description of errors. It is here that the original sentence is compared with the reconstructed one. The third stage has to do with the explanation of errors. It has to do with why and how of the errors.

The present study acknowledges all the three stages in analyzing learner's errors, but only the last two would be used. The first stage will not be used in this study because the subjects in this study are from different linguistic backgrounds therefore, making it difficult to interpret their intended meaning in context.

Similarly, Abbot et al (1981) provided a syntactic model of error analysis. First, the errors were collected from students' written work. The second stage has to do with studying the errors to understand what the sources of the errors are lastly, the classification of the errors according to their types.

A method was developed by Omojuwa (1979:77). In the first step, the errors were identified by making the students' written work and underlining the erroneous items. The next stage is error classification. This stage is done either linguistically or (what area of language, those the error belong: tense, concord etc) or psycholinguistically (at what stage in the process of language learning has error occurred. the last stage is explanation of the errors identified (Mohammed, 2000). Abbot (1980:118) cautioned that any method that is adopted in error analysis should be verifiable by other scholars using the same method.

A good error analysis needs to be objective and make provision for the inevitable cases of doubt (Mohammed, 2000). The error analysis model to be used in the present study is developed from the models reviewed. The model includes the following steps:

1. **Identification**: The errors were identified from the students' written work underling the erroneous items.
2. **Classification:** The errors were classified according to their types and frequency of occurrence and what area of language does the error belong, for instance, in grammar (tense, concord) and lexical (collocation error).
3. **Description of error**: Comparing of errors in written English as a subject with English written in science subject area.
4. **Explanation**: An explanation of errors identified was given.
5. **Suggestion:** suggestions on what to do to reduce errors SS2 science students' made in written English.

2.6 Lexical Errors

Language learning starts with vocabulary words which are the first linguistic items' acquired by the learner both in L1 and L2 acquisition. It is basic for the development of communicative competence (Widdowson, 1995). Lexis involves the selection of words, construction and the organization of total expression.

Writing, like any other form of discourse is a social ability. The partial distance between a writer and the reader places on the writer certain demands (Adedeji et al, 2005) one of which is an explicitness, which may be achieved through appropriate choice of words and their relations. Learners make distinct and conscious choice of lexical and grammatical items' that best express the meaning they are to convey from the language. These are put together to form a single integrated structure that is regarded as text (Halliday and Hassan, 1985).

According to Taiwo (2001) the reason most ESL students have lexical problems in English language is because a lot of efforts in applied linguistics are being concentrated on the grammatical, phonological and orthographical level, while the lexical level does not arouse the same degree of interest. The present study assumes that science students' lack of lexical items makes them to be prone to all sorts of lexical errors which can be distractive in written communication than grammatical error. This is because lexis is the basic component of language, words are the means to express meaning without it grammar is just a meaningless abstract. Sonaiye (1988) observes that lexical errors are more disruptive than all other types of errors. It is the choice of word that effective communication can take place. Read (2004:146) opines that learners are typically conscious of the extent to which limitation of lexical knowledge hamper their ability to communicate effectively in the target language. The problem of defining the semantic boundaries that separate lexical items, as a result, they failed to observe the rule of restriction. (Taiwo, 2001). The present study believes that a clearer understanding of lexical items and their relation can provide greater precision guiding science students towards meaning and helping them to define boundaries that separate lexical items.

The present study tried to find the types of lexical cohesion errors made by SS2 science students' in their written English. The study focused on three linguistic sources; collocation, registers and synonyms, wrong choice of lexical items, repletion and wrong splitting of compound word.

Collocation is a crucial part of language use. It is the tendency of words to co-occur with one or more words. Taiwo (2001) argues that collocation deserves to be the central part of lexical learning. This is because performance of ESL learners in writing English depends

on their stock of conventional collocation. He attributed collocation errors to the neglect of conscious teaching of collocation in secondary language classroom. In the study, Taiwo (2001) found out that collocation errors are predominant in students' written English, accounting for 56% of the total lexical semantic relation errors. In English, for example nouns and verbs usually collocate with some prepositions and the knowledge of such nouns and verbs is incomplete without knowing which preposition usually accompanies them. For example:

1. We end our school in 1:30pm
2. The school was founded on 1960

The above sentences have shown improper mastery of prepositions that collocate with time in English. This is because the preposition "at" is used for precise timing, we end our school at 1:30pm. In the second sentence "on" is used when the day, week, or month is specified for example on January, 1960 but "in" is appropriate when the year alone is specified for example in 1960 (Taiwo, 2001).

Synonyms: the words that are similar in meaning can be interchanged. Partial synonym is sometimes responsible for the inappropriate choice of lexical items (Taiwo, 2001). For example:

1. My spoken English is gradually increasing (Improving).

The word increasing is used in relation to quantity as opposed to quality. Therefore ones English cannot increase in terms of number but rather in terms of quality. The context in which words are used will determine their specific meaning.

The present study believes that science students do not have high competence in the use of words reflected in their science subjects. This study intends to find the lexical errors

SS2 science students make in written English while writing English as a subject and their subject areas.

2.7 Grammatical Errors

To produce effective written English, lexis and grammar are important (Oliukpe, 1979). Grammar is seen as a set of rules governing the usage of a language. A written grammar in science is the one which aim to help science students solve certain problems of form and order that inevitably occur whenever they write (Evans, 1969;114). The present study views grammar as a body of rules prescribing and describing the formation of acceptable sentence structure (NTI, 2005). It is the science of language, analytical and terminological study of sentence (Sigh, 2007). In the old system of teaching, grammar occupied a very important place in the secondary school curriculum. Today, grammar is fast disappearing. Linguist has freely criticized it. Gurray (1965) sees phrasing and full analysis of grammar as a waste of time compared to effectiveness of many exercise.

Halliday (1976) condemns it by saying "many of English grammar are archaic, even erroneous". Teaching of grammar does not make students better writers. (Hohson, 1976 and Hartwell, 1985) Hillocks (1987) add that, traditional instruction in grammar result in significant decrease in writing ability. Adesonaye (1993) asserts that the knowledge of grammar will help students write better. The last view is in conformity with the present study. It sees grammar as essential component in written English. Science students need it to communicate effectively in English language, for language competence demand a competence in the grammar of that language. Unfortunately SS2 science student's proficiency in grammar is depressingly poor. This is evident in the way they have handled grammatical element that features so prominently in their written English.

Boadi et al (1990) attribute the problem to the progressive elimination for post primary English that might pass as the grammar of English. In science secondary school in Kaduna state, what is taught in the English subject is mainly general English. This provides for a good deal of teaching on grammatical aspects of the language. It is expected that certain grammatical errors common to students will be dealt with in order to improve the student's performance. One main characteristic of scientific writing which students should make use of is passivization. The function is to reduce focus on the agent or doer of action and allows the suppression of the writer from the text (Kress, 1994).

Scientific English is often in indirect speech, passive voice and impersonal in tone (Brooke, 1967). This makes room for objectivity. Science students need knowledge of the sentence patterns. Scientific writing emphasizes short sentences and paragraph to express single concepts. This is achieved by omission of words, phrases and by using participles instead of relative and adverbial clauses (Kwassau, 2002). Ideas are conveyed to readers effectively in clear written English (Booth, 1993). Akere (1990) opines that scientific English writing employs noun modification. This device of double and multiple noun modification is meant to achieve brevity and conciseness. The modifying nouns are used for different reasons. For instance, they can be used to indicate the substance of which something is made, for example: Glass bottle, glass window (kwassau, 2002).

The verb which science makes use is action verbs, for example:

1 Verbs of change (drill, apply)

2 Verbs describing the ways things happen (floats).

3 Verbs of observation (observe, watch).

4 Verbs describing sounds (buzz, bark).

Although the verb can be said to be complicated grammatically, the verb forms constitute the "life wire" of every construction. Therefore, any misuse or error in verb form can lead to a distortion of the message. Palmer (1974) confirms this by asserting that for almost any language, the part that concerns the verb is the most difficult. Learning a language is, to a very degree, learning how to operate the verbal forms of that language. Science students also need to know the concordial relationship between verb and their subject. There should be verb-subject agreement. The distance between verbs and their subjects would sometimes cause confusion in the mind of students in processing the meaning of particular texts.

The present study agrees with Aliyu (2006) who claims that the best way to attaining grammatical fluency is through a measure and systematic use of varieties of exercise. Since the knowledge of grammatical system of a language does not necessarily produce good writer. Science students should be provided with opportunities to practice written English in varied situations. The students should be taught grammar to enable them become skillful users of the language in writing. The experience of the present research as a teacher has exposed her to the subject's errors in the use of grammar and to find the types of grammatical error made by SS2 science students while writing English as a subject and English in their subject areas.

2.8 Importance of Writing Skill

Writing is a basic language skill. It involves putting words together for a particular purpose. It is the art learners use to explore their world, feelings, dreams, discoveries and perception for others to apprehend and enjoy (Richards 1975). Science students' ability to express themselves freely in written English is the ultimate goal of language teacher

(Kwassau, 2002). To attain this high level of free expression is quite a task particularly in science related subjects because the skill takes time and effort to develop (Obanya, 1982).

English Language like any other language is represented in the written form. Written English uses symbols to build words and the entire set of words is the language vocabulary. For users of English language, the way in which the word can be meaningfully combined is the grammar of the language. Consequently, whatever the writer wishes to convey via writing should be written in a proper and appropriate way to avoid misunderstanding or misinterpretation (Munjuk, 2009).

Science is an organized body of knowledge developed using the scientific method of observation and involves the experimental verification of facts (Ajalie, 2007). Language plays a very important role in the development of scientific ideas and investigations. With good use of English Language, concepts in scientific discourse are written and interpreted in ways that are not ambiguous. English is the language of science, the latest and most advanced discoveries and inventions in science and technology are being made in English Language. This indicates that English Language is very important to science students, it enhance their understanding and ability to perform well in all content subjects. They need to learn the language adequately to be able to comprehend, interpret, express and write down what they are taught or read on their own. The students should be able to access internet for current information in science.

Unfortunately, the performance of science students in English has been deteriorating and this has equally affected all other subjects in the curriculum (Ajalie, 2007). The researcher (who was formally an English teacher at G.G.S.S. Soba) observes that most of the students communicate in Hausa Language in the class and outside the class. Observations

show that the students' written English is characterized by lexical and grammatical errors. It becomes clear that if not studied critically, most SS2 science students will graduate with their written English still indicating traces of grammatical and lexical errors.

Writing skill has been described as a difficult process, laborious, time consuming and sometimes frustrating (Arikewe, 1998). It involves drafting, re-drafting and brain storming. For some students, it is the problem of getting started (Flower, 1989). Some students' problems on written English are the right tone, style, logical ordering of ideas, attitude toward the language in general and writing as a skill (Curtin, 1979 and Smith, 1981). To be able to cope with academic activities at the senior secondary school level, SS2 science students require a high level of proficiency in writing. At this level, the writing is not a mere collocation of string of sentences, it is the writing of paragraph into connected discourse (Williams, 1990 and Kwassau, 2002).

Writing in science is goal oriented. It involves the selection and presentation of lexical and syntactic features which commonly occur in the passages of English language dealing with students' field of specialization. According to Widdowson (1978), scientific English should not be thought of as a kind of text or a variety of English that is defined in terms of its formal properties but as a kind of discourse. From this observation, there is a shift in theoretical orientation of English of science, from being particular language to language in general and from linguistic form to communicative functions. The teaching and learning process of English to science students must reflect the communicative functions of language and not just the grammar, but also lexical features of various scientific disciplines.

Okannuga (1979) opines that general and scientific English differs only in vocabulary. He further buttresses that one of the main purposes for learning English is for

students to acquire the linguistic skills which are necessary for study of science and technology. Therefore, the teaching of scientific writing, should aim at equipping science students with the skills required in scientific discourse. These skills should provide them with the tools for acquiring and verbalizing scientific concepts (Kwassau, 2002: 54). Okannuga (1979) identifies three kinds of vocabularies: these are words and expressions derived from the special topics of science and technology, items described as words building devices and items used as substitutes to avoid over repetition of some important words. Science students writing should be in conformity with scientific conventions.

The present study agrees with Harbert (1970) who asserts that scientific facts are not expressed in language different from that of everyday life. However, some of the words and expressions are science specific (Akere, 1990 cited in Kwassau, 2002). These expressions or words are understood by scientists everywhere. Some of these words specific to science are mostly those from Latin or Greek roots and affixes, as for example, hydro-logy. The special words, terms and symbols in science belong to the noun word class which is specific names; (zinc) or general names (matter), names of processes (condensation), names of qualities (humidity), names of relations (compounds) and names of abstraction (gravity). He further categorizes the words into highly technical terms (halogens), moderately technical (gravity), commonly used technical terms (pressure) and terms with technical and other meanings (mass reflection). (Balogun, 1997 cited in Kwassau, 2002).

Some of the causes of poor writing in science as observed by Turk and Kirkman (1989) include wrong attitude, lack of proper focus for writing, lack of confidence in the use of language and discouragement. Therefore, science students need to be properly guided and encouraged by their teachers so as to perform better in written English.

2.9 Teaching English as a Second Language in Science Secondary School in Kaduna State

In science secondary schools in Kaduna state, English language is taught in a variety of ways. Firstly, it is used as a language of instruction Secondly, as a subject (NPE, 2004). The need to improve the English language proficiency of science students in senior secondary schools has become critical. Major deficiency in communication skills are quite obvious in the written works of SS II in science secondary schools since English is the language of academic expression, poor performance of the generality of students is traceable to their poor proficiency in English language (Kwassau, 2002) English language has been the major form of formal communication in Nigeria. In the educational system of Nigeria, English plays an instrumental role and it is crucial at all levels of learning. Science students' intending to reach the peak of their careers need to have proper knowledge of spoken and written English. The latest discoveries and inventions in science and technology are being made in English language (Ajale, 2007). This indicates that English language is very important to the science students to be able to participate in such discoveries. Obviously, the performance of written English by SS II science students in Kaduna state can be rated as low. There is a need to improve proficiency in the English language of science students.

2.10 Standard Norms

Standard English is associated with the ideal of the language as produced by the proficient and educated users of English, specifically the vocabulary, phonology and grammatical forms of the language (Wilkinson, 1995:33). Palmer (1971:14) sees correctness in language use as being a question of what is accepted in a society. For the user of ESL, standard implies conformity with a model based on widespread use of the language

in formal education and the mass media (Mohammed, 2000:33). All departures from such a given standard model are errors.

This study adopted the Near Standard British English model. Near British English variety makes room for those cultural items which have no synonyms in British English but which can be understood from the context internationally. This model is used in school textbooks and public examinations in Nigeria and many other ESL situations.

2.11 Previous Studies Errors

Much has been done in the area of written English errors of science students. Some of these studies include: Munjuk (2009), Adedeji et al (2005), Jamo (1992) and Mohammed (2000). An error Analysis was carried by Olaofe (1986) on the effect of proficiency level on errors production in English verb structures. The aim of the study was to describe error production in English verb structure across three proficiency levels. The levels comprise form 1 students level two, form IV and level III, advanced teachers college students and students of school of Basic Studies (Yoruba speakers). The finding shows that the proficiency levels of the students did not significantly affect the frequency of errors produced. The researcher recommended intensive teaching of English verb forms. Although the present study and Olaofe (1986) are comparative studies but at different levels as the focus differs. In the present research, the students are from different mother tongues while Olaofe (1986) used only Yoruba speakers.

A similar study was carried out by Mohammed (2000) on the written errors of ND I and ND II of the school of applied science in polytechnic Zaria. The study finds no significant difference between the errors of ND I and ND II students in the polytechnic. The findings of Mohammed (2000) have a direct relevance to this study because the analysis is

not based upon reinterpretation of the students' sentences. Both studies seek to compare the types and frequency of errors made by science students in their written English. They both went further to ascertain the possible sources of errors committed by the students. The sample population of the two set of students differ, the former population was at the tertiary level, while those of the present research are secondary school students. The study identifies the errors of students upon entry and compare with their errors upon graduation. The findings of the study established that the differences between ND I and ND II were similar in the frequency of errors.

A study into the lexical errors in the English technical college students in Osun state was carried out by Akande, Adedeji and Okonkwo (2005) of ObafemiAwolowo University Ile-Ife. The study found out that technical college student did not have high competence in the used of words related to their different areas of specialization. They normally made errors resulting from over generalization, wrong analogy and wrong spellings. The study suggested that English teachers in technical colleges should always tailor their teaching of English to reflect the lexical needs of their students.

A survey of science and engineering students of Kaduna State Polytechnic was carried out by Omale (2006). The aim of the study was to examine students' knowledge and competence in handling the passive at the Higher National Diploma level (HND). The researcher randomly selected 250 students from the entire population. The findings of the study established that the students' grammar is poor, as far as the passive is concerned. The students' poor knowledge of grammar comes from their secondary school exposure to the language where grammar was not properly handled. Omale (2006) suggested that teachers in the content areas and teachers of English to emphases grammar and help the students to

develop their mastery of grammar. Unlike in the present study Omale (2006) did not go beyond grammar to lexis. The researcher gave some sources of error, but did not specify how to came about them as no questionnaire was administered to the students. The population was HND students, while those of the present research is at the secondary level.

The grammatical errors in the written English of undergraduate science students of Gombe State University were examined by Munjuk (2009). The study focused on the use of tenses by the students in written English. The result showed that science students in Gombe State University made several errors particularly in the use of tense aspect of grammar. The population of the two studies differ in the sense that Munjuk (2009) used degree students of a university, while the present study focused on SS2 secondary school students. It may be assumed then that the errors made by the students' might differ. Another difference is that, unlike the previous study, this study is comparative. However, there is a similarity in the present study and Munjuk (2009) in terms of models of EA used.

The present study differs from those mentioned earlier in some ways. Firstly, it is a comparative study of SS II science students' written English in English classes and in their subject areas.

2.12 Gain's from the Review of Related Literature

From the review of some previous studies, the present study has gained the following:

1. In spite of its shortcomings, EA is, indeed a necessary aid to L2 learning. It is a viable way of finding out science students' weaknesses in written English.
2. The sources of errors are varied. For example interference, development, learner, teacher and method induce errors etc are possible sources.

3. Although any of the descriptive grammatical models can be used in EA, predominantly pedagogic grammar is used (Mohammad, 2000) and Omojuwa 1979 was adopted for analyzing the learner's errors.
4. Areas of grammatical errors reviewed that are relevant to the present study include: concord errors, preposition errors, verbal, auxiliary and tense errors.
5. Areas of lexical errors that were considered in this study are repetition, collocation, and synonyms choice of lexical items and splits of compound words.

2.13 Theoretical Framework Adopted for this Study

The theoretical framework gains insight from other models developed by the works of Omajuwa (1979) and Mohammed (2000). This study has adopted Omajuwa (1979) and Mohammed (2000) models of error analysis in analyzing the learners grammatical and lexical errors. The model provided by Omajuwa (1979) is similar to that of Mohammed (2000), first the errors were identified by marking the student's written work and underling the erroneous items. The second stage is classifying the errors according to types using the selected descriptive model. The last step is explaining the errors identified. This study however, focused only on lexical and grammatical errors.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

The chapter describes the research methodology and is presented in the following sub-heading: research design, population, sample and sampling procedure, research instrument, pilot of the study, validity and reliability of the instrument and procedure for data collection.

3.2 Research Design

A descriptive survey design was used in this study. This is a type of research design that does not involved experiments. It is used for the purpose of obtaining data to test hypotheses or answer research question. It is also aimed at identifying variable and their relationship to one another.

3.3 Population

The population for this study comprised of all SS II Science Students from five special science Secondary Schools in Kaduna state. According to the ministry of science and technology in Kaduna state, there are five special science seconds schools, which are all managed by the Science and Technical Schools Management Board (STSMB). The schools are; GSSS Soba, GSSS Kwoi, GSSS B/Gwari, GSSS Kufena and GSSS Ikara, with a population of nine hundred and sixty SS II Science Students for the 2009-2010 academics session. The summary of the population is present in table 3.1

Table 3.1 Number of Students and their schools

S/No	Schools	Numbers
1.	GSSS Kwoi	218
2.	GSSS Soba	293
3.	GSSS Ikara	133
4.	GSSS Kufena	270
5.	GSSS B/Gwari	46
Total		**960**

Source: Science and Technical Schools Management (STSMB) Kaduna State (2010).

3.4 Sample and Sampling Procedure

Purposive sampling can be used to select a sample size from a population. It involves selecting subjects on the basis of specific characteristics. (Wimmer and Dominic; (1987)). This sampling technique was employed in selecting three schools were no fixed rule was used; the circumstances of the study situation determined the number. 91 Students were sampled by using simple random sampling technique involving balloting according to the need of the study. The sample was representative because the entire students had the same entry qualification. SS II students were selected because it is assume that they learnt the different types of essay and can effectively use lexical and grammatical items in writing. The summary of the sample size selected is presented in table 3.2 below.

Table 3.2 Shows the Number of Sampled Students and their Schools:

S/N	SCHOOLS	NO OF STUDENTS	NO OF SAMPLED STUDENTS
1.	GSSS Birin Gwari	46	7
2.	GSSS Ikara	133	40
3.	GSSS Soba	292	44
TOTAL	**3**	**471**	**91**

3.5 Research Instruments

The instrument for this study was written test given in English and Chemistry subject respectively. Two essay topics were given to obtain information on types and frequency of lexical and grammatical errors committed by SS II science students in English and Chemistry subjects.

This implies that two essay questions were administered for the purpose of this research. The test materials were taken from the student recommends text books. It is presumed to be the standard materials for the subject.

3.5.1 Data Collection Procedures

To obtain data for this research, the researcher administered written test to the students. The students were given two essay topics, one in English subject and one in Chemistry subjects to write on the topics as stated below:

1. As the most senior prefect in your school you are required to write a full report of your life which include: your past life experiences, daily activities and yours future plans English subject)

2. Write and explain how you can separate a mixture of two solids; salt and sand (Chemistry Subject).

The researcher sought the help of some teaching staffs to invigilate the students and the students were given two and half hours to answer the questions. After which the researcher retrieved, marked and extracted lexical and grammatical errors in the text scripts. The errors were scored using frequency counts. The students' error in English subject were compared with their errors in Chemistry subjects to identify the differences and similarities.

The students were allowed to interact and brainstorm on the topics to correct all slips and mistake before submitting their scripts. The essay topics were chosen because they are relevant and appropriate to the level of the students. The topics encourages students to use various structures in English (free expressions).

3.6 Pilot Study

A pilot study was conducted on ten SS2 Science Students from Government Science Secondary School, Ikara in order to:

- Assess the suitability of the test instruments to be used in the actual study.
- Find error types which are typical of the students.
- Find out if the topics given would give the error types expected.
- Get the likely problems to come up in the actual study and ways for improvement.

The students were given the following topics:

1. As the most senior prefect in the school, you are required by the principal to write a full report of your life's past experiences and daily activities.
2. Explain the procedure you will use to separate the mixture salt, sand and water.

- The topics produced error types expected;

- Errors typical of the students emerged and
- Error classifications were validated.

3.7 Validity

The instrument for this study was given to three language specialist in language unit of faculty of education, research methods and statistics to determine the adequacy and suitability of the instrument especially on content and construct.

3.8 Reliability of the Instrument

In determining the reliability estimate of this study the instrument of the study was obtained by using test, re-test reliability to determine the internal consistency of the instrument. Ten students of Government Science Secondary School Kufena participated in the pilot study. The students wrote essay test in English and Chemistry subjects. The result of the data was correlated to determine the correlation coefficient reliability of the instruments. The reliability was subjected to statistical analysis, using Cronchbach Alpha of reliability technique. The reliability score obtained from the pilot study is 0.777 = 0.8, this means that the instrument (test) is considered reliable and was therefore adopted for this study.

3.9 Data Analytical Procedure

Students errors are identified and classifying by the researcher into two categories (lexical and grammatical) using Quirk and Greenbaum's (1976) and pedagogic grammar. The data collected from the study was treated to descriptive statistics. The descriptive statistics such as percentages, frequencies and chi-square were employed to analysed, describe and to answer all the research questions.

3.10 Statistical Procedures

In order to test the hypothesis of this study three statistical test were used. These are frequencies, percentages and chi-square 0.05 level of significant. Chi-square which is valuable in analyzing relationship on categorical valuables was used to determined the significant differences in the types of errors students made in English and Chemistry Subjects. All errors were represented using frequencies and their corresponding percentages.

3.11 Categories of Errors

Using the descriptive models of Quirk and Grenbaum (1976) and Halliday & Hassan (1976). Two categories of errors were looked for in the study.

A. Lexical Errors: These includes error that occur in the choice of lexical items used.

1. Errors caused by inappropriate or wrong choice of lexical items for example
   a. Due to <u>rapid need</u> of science and mathematics teachers in Kaduna state …… (increasing need for)
   b. When I graduated I am planning to read medicine (study)
2. Errors caused by wrong splitting of a compound word. For example:
   a. It become <u>im possible</u> to pass a physics examination in my school (impossible)
   b. How ever, the air will condense …… (However)
3. Error of collocation: for example
   a. We normally end our lesson exactly <u>in</u> 4:pm (at)
4. Synonyms. These are words that are similar in meaning and sometime can be interchanged this could result to inappropriate choice of lexical item. For example:
   a. My spoken English is gradually increasing (improving)
5. Lexical repetition. For example

a. I have planned to read and study medicine in the university. (study)

B. Grammatical Errors: these includes:

1. Errors in the use of verb tense

   a. Regular lexical verbs have five forms, these are regular because other forms of the verb can be predicted if the base form is known. These errors occur when students use the wrong form of example

      i. We have stop reading …… (have stopped)

      ii. The work the technician is undertaken is highly scientific (undertaking).

   b. Irregular lexical verb errors. These verbs have a varying number of distinct forms (Quirk and Greenbaum, 1976) students made errors when trying to use the different forms of these verbs for example.

   c. Mr. Ade bring out some files from his offices (brought)

2. Errors in the use of auxiliaries. When students used the wrong form of the auxiliary or when it is omitted (Quirk and Greenbaum, 1976) for example

   a. Ade ^ my best friend (is)

   b. We ^ playing in our compound (were)

3. Concord errors. There are many types of concord errors. Some of the possible concord errors are:

   a. Noun-pronoun concord: for example

      i. The student will be able to pass their examination with flaying colours, they will also get admission into the university. (the students)

   b. Subject – verb concord for example

      i. They speaks to the teachers (speaks)

4. Errors in the use of preposition (Quirk & Greenbaum 1978) these includes omission inclusion or wrong forms of preposition: prepositions are connectors which hold the text together and are important element in scientific prose. For example:

   a. Wrong form of preposition for example

      i. We participated <u>at</u> the last inter-house events. (in)

   b. Omission of preposition for example

      i. I have observed that ^ the process of separating the mixture, the water also evaporates …….

5. Tense errors. Quirk and Greenbaum (1976:43) identify three tense: present, past and future tense. For example:

      i. When we finish our physic practical I left the laboratory (finished)

      ii. I leave the class room …… (left)

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND DISCUSSION OF FINDINGS

4.1 Introduction

This chapter analyzed and interpreted the data gathered for this study. The classification, percentages and frequency distribution of each type of errors was given in the two subjects areas, and error were interpreted on the basis of their percentages and frequencies. The discussion of findings from the test of the hypotheses was also presented.

4.2 Data Presentation

Table 4.1: Classification of Error Types Committed by the Students in English and Science Subject Areas

Error types	ENGLISH		SCIENCES	
	Freq.	%	Freq.	%
Collocation	59	73.75	56	70
Synonyms	55	68.75	56	70
Duplication	58	70	55	68.75
Splitting of Compound word	62	77.5	57	71.25
Inappropriate use of lexical	56	72.5	54	68.75
Tenses	72	90	65	81.25
Concord	49	61.25	49	61.25
Preposition	53	66.25	61	76.25
Auxiliaries	52	65	50	62.5
Determiners	49	61.25	59	73.75

The following samples of errors are used to buttreess the statistical fiding in this study; these are the sample of errors from the actual scripts of the students in English subject and Chemistrysubject.

4.2.1 Collocation

Errors in the use of collocations made by the students in their actual scripts are represented below.

1. Lawyers will always protect their client.
2. People say that doctors save life of their people, but also believe that lawyers saves life too (English) (Patient)

These errors were committed because the students were ignorant of the appropriate lexical that co-occur with one or more words. The reason for these errors could be due to neglect of teaching writing. Avoidance of teaching collocation in writing.

4.2.2 Lexical Repetition

Errors that were found in the students' actual scripts are represented below.

1. My ambition is to become a medical doctor, when I became a doctor……
2. I have poured small and ***little water*** into the beaker (science) (little, small)

From the analysis of lexical errors, it was revealed that lexical repetition was used as frequently as the other lexical errors.

While repetition may be inevitable especially in long discourse, it could hinder effective communication when overuse most of the students in this study were found to repeat the same again in different words without making meaning more clearer (as can be seen in the sample above) "little" and 'small' were used to refer to the same thing.

The result of the test revealed that the students did differ significantly in their error types committed in English language essay and in other chemistry subject area. This is deduced from the observed chi-square of 0.160 and the probability level of significance of 0.997 ($P > 0.05$). With this observation, there is no sufficient evidence to reject the null

hypothesis that there is no significant difference in the lexical error types made by SS2 chemistry students while writing English as a subject and English in their chemistry subject among senior secondary schools in Kaduna state. In other words, the errors types committed in the two subject areas are basically of the same magnitude.

4.2.3 Wrong-Splitting of Compound Words

Errors that were found in the actual scripts of the students in English and chemistry subject areas are represented below:

1. ***Never theless***, I have to give ***a way*** my ambition to become a doctor (English) (nevertheless, away)
2. **…** while common salt was ***un affected*** by the heat … (chemistry) (unaffected)

These types of errors were more frequent in English classes than in chemistry subjects (58.71|56.29). However, the errors were frequent in the areas. The reason for the error could be that due to the students' inability to understand the formation of some compound words.

4.2.4 Inappropriate Choice of Lexical Items

Errors found in the actual scripts of the students in the two subject areas are represented below:

1. My ***plant*** is to ***read*** medicine in the university. (English) (plan, study)
2. Evaporation is the process by which solid substance ***moved into*** liquid substance. (chemistry) (changed to).

Errors of inappropriate choice lexical items had the highest frequency of occurrence in this category (77.5 and 71.2%). These errors were most frequent due to the students'

inability to use appropriate lexical items to convey their meanings. For example in 'plant' and 'read' (as in samples 1 and 2) were wrongly used instead of 'plan' and 'study'. It could be due to the students' ignorance of the dictionary meaning.

4.2.5 Tenses

These are sample of the tense errors that were found in the actual scripts of the students in the two subject areas.

1. I will not forget the day my father ***bring*** me to this school (English) (brought)
2. This type of experiment will ***took*** place in ***a*** laboratories (chemistry) (take)

Most of the errors in this category include the use of present tense for past tense or past tense for present. In the fist sample, the student used a present tense to refer to past event, "bring" instead of "brought". This type off error is commonly found in the students' scripts were ignorant of the functions of the English verb in English tense formation.

4.2.6 Concord

Errors found in the students' actual scripts in the two subject areas are represented below:

1. ***The lawyer*** will always stand for the truth, ***they*** can also fight for justice. (English) (the lawyers, He)
2. ***The head*** are been supplied to the substance. (chemistry) (is)

Two types of concord errors were found in this study. Subject – verb concord and noun pronoun concord errors. In sample (12) the subject of the sentence should take a singular verb "is" instead of the plural "are". In sample (11) the subject "the lawyer" should also take a singular pronoun "He" instead of "they" which is a plural. The analysis of the

errors revealed that the students were unable to match the correct subject with the correct verb and noun with correct pronoun.

4.2.7 Prepositions

Errors found in the actual scripts of the students in the two areas are represented below:

1. My future plan is ^ graduate ***in*** Ahmadu Bello University and ***be*** a doctor. (English) (to, from, become)
2. I can proceed ***to*** adding water into the funnel. (chemistry) (by)

There were wrong use and omission of prepositions as in sample (15 and 16 above).this type of error was frequent with the students in the subject areas (66.25 and 76.25). This could be because the students lack the knowledge needed for using prepositions in written English. It may be that they do not bother to learn them properly (Olayemi, 1980).

4.2.8 Auxiliaries

Errors found in the students actual scripts in the two subject areas are represented below:

1. My father ***could*** be the one to sponsor my education up to the University. (English) should
2. The sand ^ be recovered from the filtrate by evaporation (chemistry) (can).

This type of error was frequent with the students in writing. The students showed their inability to choose the right types of auxiliary in relation to the subject they sometimes omitted or used the wrong forms of auxiliaries.

4.2.9 Determiners

Errors found in the actual scripts of the students in the two subject areas are represented below:

1. My future ambition is to become ^ nurse. (English) (a)
2. ***The*** mixture contains two or more different substances. (chemistry) (a)

This error type was more frequent with the chemistry students in chemistry subjects than in their English classes (61.25% and 73.75). The errors were those of wrong use or omission of the determiners.

4.3 Solution to Research Questions

The first objective of the study is to identify and describe the written error of SS2 science students' in essay writing. This objective was assessed with the first research question:

Research Question One: What are the error types of errors committed by SS2 science students in the writing of essay in English and chemistry subjects? Table 4.2 presents the frequency of the error types committed by the students in the two subject areas. The errors identified from the two essays were classified into lexical and grammatical types. But a general listing of the errors and the frequencies of occurrence among the students is presented and illustrated graphically in Figure 1.

Table 4.2: Percentages of Error Types Committed by the Students in the two subject areas.

Error grouping	Error types	Frequency	Percent
Lexical Error	Collocation	51	63.75
	Synonyms	56	69.375
	Repetition of Lexical	55	68.755
	Wrong splitting of compound words	49	61.25
	Inappropriate use of lexical	57	70.625
Grammatical Errors	Tenses	69	85.625
	Concord	60	74.375
	Preposition	57	71.25
	Auxiliaries	58	71.875
	Determiners	54	67.5

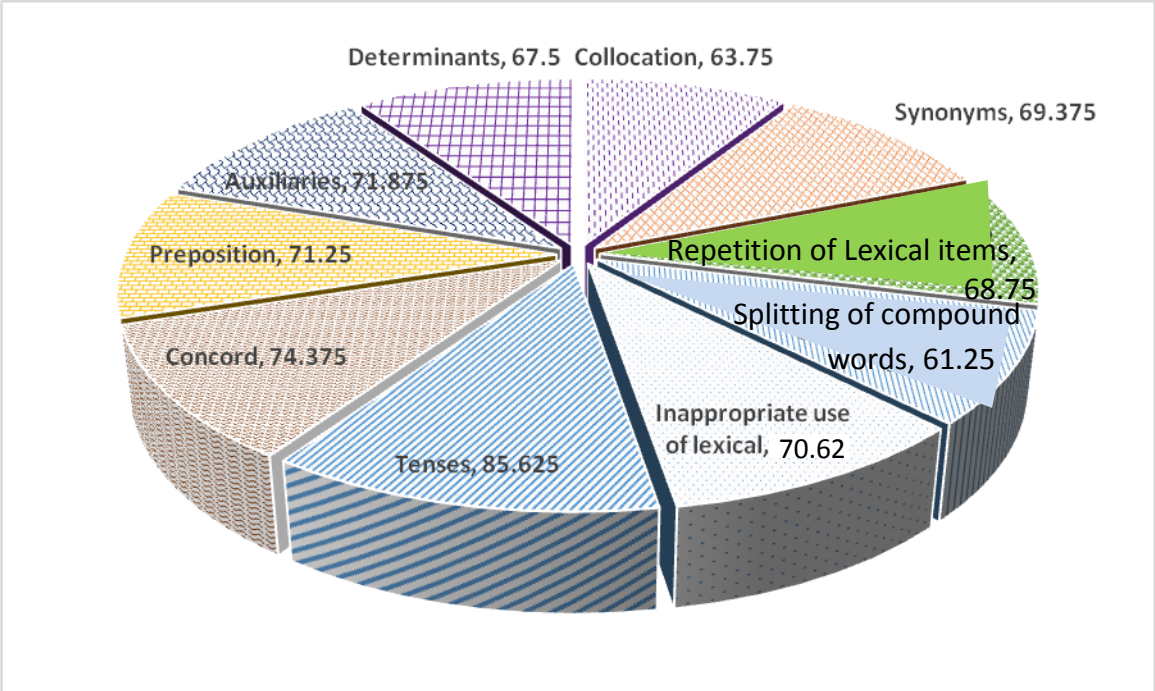


Fig. 1: Percentages of Error Types Committed by the Students in Essay Writing

As shown in the table and Figure 1, the rates of the errors observed from the essay of the students were generally very high. The most common error types committed by the students were grammatical with tenses accounting for the highest frequency of occurrence 69 or 85.6% of the students. Next in this hierarchy of errors was concord with 60 or 74.4% of the total number of students involved in the test. Auxiliaries were next with 58 or 71.9% of the students. Thus grammatical errors were the first three major error types committed by the students in the Essay. The fourth in the hierarchy were inappropriate choice of lexical items errors type and Preposition from grammar. In this order, Synonyms came next with 56 or 69.4%, Determiners 54 or 67.5%, Collocation 51 or 63.8% and Splitting of compound word 49 or 61.3% of the total number of students involved in the test. From this observation, it could be said that the students committed all the lexical error types (Collocation, Synonyms, Repetition, splitting of compound word and inappropriate use of lexical structure) but with grammatical errors (Tenses, Concord, Auxiliaries, and Determiners) having the highest occurrences.

The second objective of the study sought to compare the error types committed by the students in the English subject and chemistry subject areas. The research question used to assist the comparison is stated as follows:

Research Question Two: What are the types of Grammatical and Lexical errors made by SS2 science students while writing English as a subject and English in their chemistry subject area? The errors identified were classified into lexical and grammatical types. Five error types were each identified for lexical and grammar in the two essays (English and chemistry subjects). In all, ten types of errors were identified and these are classified by the students' scores in the two areas of subjects investigated in the study. Table

4.2 shows the frequency and the corresponding percentages of the errors committed by the students in the two subject areas. The percentage scores for each of the error types are graphically illustrated in Figure 2 below.

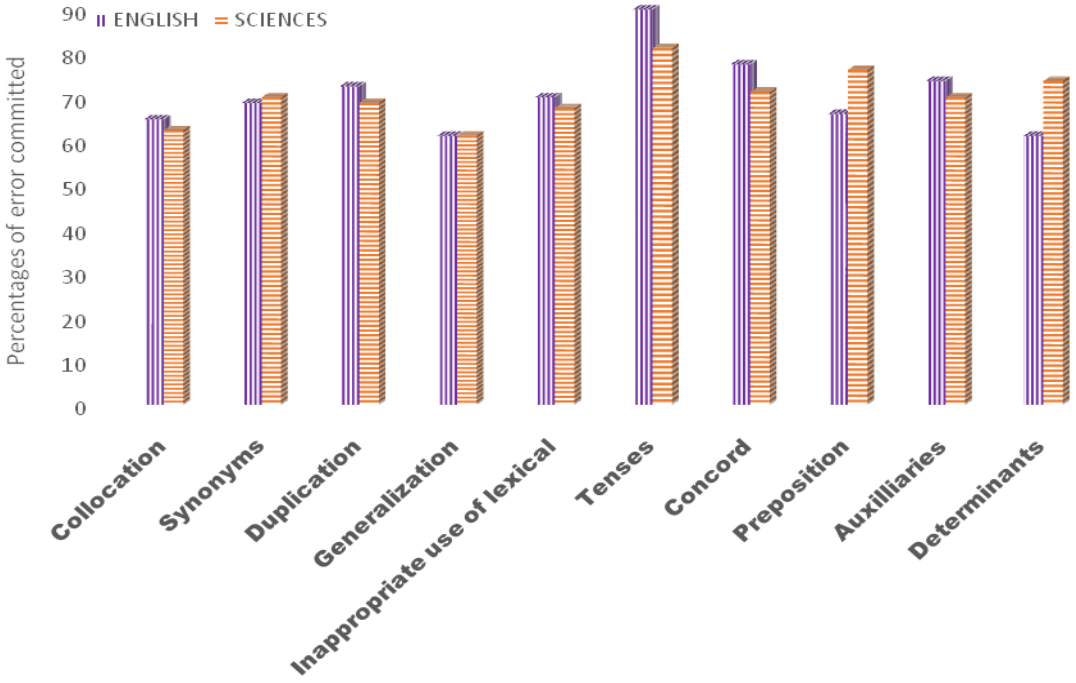


Fig. 2: Percentages of error types committed by the students in English and science essays

There were more grammatical errors in the English language essay than was observed in the chemistry subject area. For example, 72 or 90.0% of the students committed tenses error in the English essay but the number reduced to 65 or 81.25% in the chemistry subject. Concord error type was second in the English essay while error of preposition was second in frequency of occurrence in the chemistry subject test. In general the pattern of errors committed by the students in the two subject areas did not follow what could be called a trend. This is seen in the graphical illustrations where though the errors in the English language essay were generally high but in some cases like Preposition, Determiners and Synonyms the observed errors were higher than was observed in the English language essay.

Research Question Three: Was there any difference in the frequency of lexical and grammatical errors in the two subject areas among senior secondary schools in Kaduna State? In providing the solution to the research question the total number for the error types in the English subject and chemistry subject were computed and compared in Table 4.4. For each of the items the 91 students were replicated because each student must take part in the English language essay test and the respective Chemistry subject in the test. The expressed percentages in the table are based on the total number of students involved in the study. The percentages are graphically illustrated in Figure 4.

Table 4.4: Types of Error Rate Committed by the Students in science and other Subjects

Types committed	**English language**		**Science**	
	Frequency	Percentage	Frequency	Percentage
Lexical errors	290	51.3	278	49.5
Grammatical errors	275	48.7	284	50.5
Total	565	100.0	562	100.0

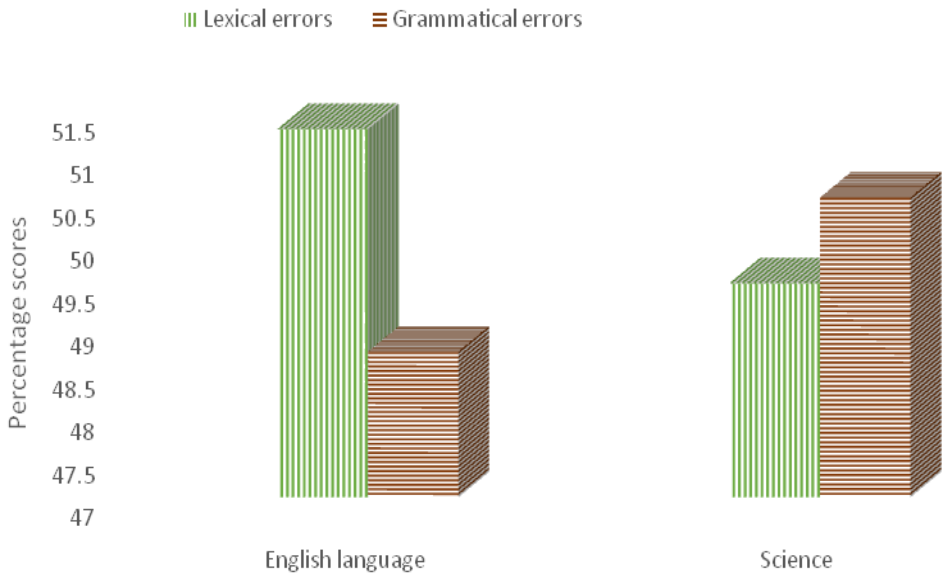


Fig. 4: Percentages of total error types committed by the students in English and Science essays

The errors committed by the students in English essay were higher in lexical errors types than in grammatical errors. But in chemistry subject, the grammatical errors were higher than in the lexical error types. In the overall more errors were committed in English essay than was observed in the chemistry subject. This may mean that the students were deliberately avoiding lexical errors in science subject by hiding under the registers of the field they have memorized or by paraphrasing instead of using register.

4.4 Test of Hypotheses

The hypotheses formulated, was to determine the significant difference in written English language errors of science students in their English essays and in their chemistry. The hypotheses are tested as follows:

Hypotheses I: There is no significant difference in the lexical error types made by SS2 science students while writing English as a subject and English in their chemistry in Kaduna state.

The error types (Collocation, Synonyms, Repetition, Splitting compound word and Inappropriate use of lexical structure) committed in the two subject areas (English language and science subject essays) were compared here with the Chi-square procedure to determine possible significant difference in the two subject areas. The result of the test is summarized in Table 4.5. In the table, the expected counts are enclosed in bracket along the observed frequencies of error committed in the two subject areas.

Table 4.5 Chi-square test on errors types committed in English and Science Subject Areas

Error types	English	Sciences	Total
Collocation	59(58.71)	56(56.29)	115
Synonyms	55(56.67)	56(54.33)	111
Repetition	56(56.16)	54(53.84)	113
Splitting of compound word	62(58.76)	57(58.24)	119
Inappropriate use of lexical	58(56.69)	55(55.31)	110
Total	290	278	568
Chi-Square = 0.160, DF = 4, P-Value = 0.997(P > 0.05)			

(Critical value at 4 DF = 9.49 and P > 0.05)

Hypotheses II: There is no significant difference in the types of grammatical errors made by SS2 English students while writing English as a subject and Science subject areas among senior secondary schools in Kaduna State.

In the test of this hypothesis, the grammatical errors identified and assessed in Table 4.2 (Tenses, Concord, Auxiliaries, and Determiners), were selected along their respective

subjects and compared using the Chi-square procedure. The summary of the test is shown in Table 4.6. In the table, the expected counts are enclosed in bracket along the observed frequencies for the two subject areas.

Table 4.6 Chi-square Test on Grammatical Errors Committed by Students in English Language and Chemistry subject

Error types	English	Sciences	Total
Tenses	72(67.40)	65(69.60)	137
Concord	49(48.21)	49(49.79)	98
Preposition	53(56.08)	61(57.92)	114
Auxiliaries	52(50.18)	50(51.82)	102
Determiners	49(53.13)	59(54.87)	108
Total	275	284	559
Chi-Square = 1.740, DF = 4, P-Value = 0.783 (P > 0.05)			

(Critical value at 4 DF = 9.49 and P > 0.05)

The test revealed that the students did not differ significantly in their grammatical errors of in the two subject areas. The observed chi-square for the test is 1.740 is lower than the critical value of 9.49 at the 4 degree of freedom and the probability level of 0.05. The observed level of significance (0.783) is greater than the fixed level of 0.05 (P > 0.05). With these observations, there is no sufficient evidence to reject the null hypothesis that there is no significant difference in the types of grammatical errors made by SS2 English students while writing English as a subject and Chemistry subject areas among senior secondary schools in Kaduna State. The table shoes that the frequencies of errors followed the same pattern for the error types committed by the students in the two subject areas. Though there was variability in the frequencies but this was not statistically found to be significant between the subject areas.

Hypotheses III: There is no significant difference in the frequency of lexical and grammatical errors committed by SS2 English students in the writing of essay in English language among senior secondary schools in Kaduna State.

The aggregate summation of the lexical and grammatical errors committed by the students in the essays in the two subjects areas were compared here to determine the error type that is most common among the error types committed by the students in the writing their essays. The total numbers were subjected to a contingency table with the application of the chi-square procedure and the result is presented in Table 4.7. In the table, the expected counts are printed in bracket along the observed counts.

Table 4.7: Chi-square Test on Lexical and Grammatical Errors Committed by Students in English and Science Subject Areas

Errors types	**English**	**Science**	**Total**
Lexical errors	290(284.76)	278(283.24)	568
Grammatical errors	275(280.24)	284(278.76)	559
Total	565	562	1127
Chi-Square = 0.390, DF = 1, P = 0.532 (P > 0.05)			

(Critical value at 1 DF = 3.84 and P > 0.05)

From the result in the table, the students committed more lexical and grammatical errors in the English language essay than the essay in chemistry subject. But this variability was not found to be statistically significant as indicated with the observed Chi-square value of 0.390 at the 1 Degree of Freedom and the observed level of significance (0.532) obtained in the test (P > 0.05). With this observations there is no enough evidence to reject the null hypothesis that there is no significant difference in the frequency of lexical and grammatical

errors committed by SS2 English students in the writing of essay in English language and chemistry subject among senior secondary schools in Kaduna State.

4.5 Discussion of Findings

This section interpreted the findings obtained from the study.

4.5.1 Findings on Lexical Errors

Within the category of lexical errors, errors of wrong choice of lexical items had the highest frequency of occurrence. The frequency of lexical errors might be due to the students' lack of mastery of lexical items. It could also be as a result of mispronunciation of most of the words.

The findings showed that collocation errors had the second highest frequency of occurrence. (See table 4.56). This could be as a result of poor knowledge of English or on account of poor teaching. Based on the analysis of the essay result, errors caused by wrong splitting of compound words were frequent in the two subject areas. Errors caused by repetition of lexical items were also frequent. This type of error was characterized by overuse of a particular lexical item. This error could be due to students' limited vocabulary and their effort to present facts in very simple English the least errors from this category were errors in the use of synonyms which was also frequent in the two subject areas. This study agrees with Olayemi (1980) and Abroks (2010) that students at whatever level they are, find the choice of lexical items a difficulty. This may be due to fossilization or ignorance of the knowledge required to enable them choose appropriate lexical items to express/convey their messages. The implication of the findings is that the students need to understand how to choose the right lexical item to express their intentions, acquire the

knowledge necessary to enable then achieve cohesive effect needed in writing and proper use of collocation of words.

4.5.2 Findings on Grammatical Errors

The analysis of the students essays result revealed that grammatical errors occurred most frequently of all the categories of errors. Within this category, tense errors occurred most frequently. This may be due to the students' ignorance of the functions of the English verbs, their sentences were characterized by verb-less sentences and switching from one tense to the other. The findings showed that the students made more tense errors in their English classes than in their chemistry subject. (See table 4.6a).

Prepositional and determiners errors were more frequent in chemistry subject than in their English classes (56.08% and 57.92%), (53.13% and 54.87%). Concord and auxiliaries errors were equally frequent in the two subject areas. This may be due to the students' inability to determine how to match the correct subject with the correct verb and noun with correct pronoun. It could also be due to the fact that most of their languages do not make same tense agreement as does the English language (Akoh 1989). The students made errors of wrong use or omission of prepositions and determiners. This could be that the use of preposition was not properly taught or influence of their first languages on the English language. The students have failed to make more grammatically correct sentences in both English classes and in their chemistry subjects as well. This could be attributed to fossilization of the wrong patterns or that the students, were ignorant of the rules governing the use of English language. The implication of this finding is that there is need for deliberate teaching of grammatical aspect of English language and their science teachers should accept only correct grammatical structures by their students.

4.6 Overall Error Profile

This study used the comparative approach to investigate errors committed by senior secondary school students in English language essay and chemistry subject in Kaduna State. Five lexical error types namely Collocation, Synonyms, Duplication, Generalization and Inappropriate use of lexical structure) along with grammatical errors types namely Tenses, Concord, Auxiliaries, and Determiners were investigated in the two essays written by the students in English language and chemistry subject areas. Three null hypothesis were tested to determine possible differences in the error types committed by the students in the two subject areas in the schools.

In hypothesis I, the differences in lexical errors committed by the students in the written essay in English language and Chemistry subject areas were compared using the chi-square procedure. The result revealed no significant difference in the frequencies of error types committed by the students in chemistry subject areas and those committed in the English language essay. Though there was variability in the frequencies but it was not statistically significant. The result revealed that the students committed more lexical errors in English language essay were likely to commit the same error types in chemistry subject but in most cases, those committed in chemistry subject were likely to be lower. The null hypothesis was therefore retained. The finding agrees with Taiwo (2001) who reasoned that most students have lexical problems in English language because a lot of efforts in applied linguistics are being concentrated on the grammatical, phonological and orthographical level, while the lexical level does not arouse the same degree of interest. As such it was reported that they have the problem of defining the semantic boundaries that separate lexical items and that they often fail to observe the rule of restriction. In a similar report, Read (2004) opined that learners are typically

conscious of the extent to which limitation of lexical knowledge hamper their ability to communicate effectively in the target language.The finding is consistent with Ajalie, (2007) where it was reported that the performance of chemistry students in English has been deteriorating and has equally affected performances all other subjects in the curriculum.

Hypothesis II tested for significant difference in the grammatical errors committed in English essays and chemistry subject areas by the students in the writing of their essays were compared. The grammatical error types were Tenses, Concord, Auxiliaries, Prepositions and Determiners. The chi-square procedure was used for the test. The result revealed that the science students did not differ significantly in their grammatical errors committed in the two subject areas in which the essays were written. The null hypothesis was therefore retained. From observations of the frequency scores, more tenses errors were committed by the students in the essay than any other error type. Though the frequency was higher in essay written in the English language than in the Chemistry subject but difference was not statistically significant. This finding agrees with Akande, Adedeji and Okonkwo (2005) from a study of errors in the English language of technical college students in Osun state. The study which was carried out in Obafemi Awolowo University, Ile-Ife, found out that technical college students did not have high competence in the used of words related to their different areas of specialization. It was observed from the study that the students normally made errors resulting from wrong analogy and wrong spellings. The finding is a reflection of similar finding by Munjuk (2009) in a study of grammatical errors in the written English of undergraduate science students of Gombe State University. In the report, it was stated that chemistry students in Gombe State University made several errors particularly in the use of tense aspect of grammar.

This finding is consistent with Kwassau, (2002) where it was opined that deficiency in communication skills are quite obvious in the written works of SS2 in science subject, since English is the language of academic expression and poor performance of the generality of students is traceable to their poor proficiency in English language. The finding agrees with Lawal (2004) who reported that errors made by learners could be due to complexities and rules used in teaching written English language. In similar reports, Barnet, (2008), claimed that, poor teaching and learning habit of learners is affecting the learner's writing skills. The finding agrees with Abroks, (2010) where it was reported that intra-lingual transfer, developmental, overgeneralization, learning stage, inappropriate teaching methods, teaching materials, teacher and learner's carelessness, low motivation and writing apprehension are some of the problems affecting students' errors in written English essays.

Hypothesis III tested for significant difference in the lexical errors and grammatical errors committed by the students in the English and chemistry subjects in the essays written. The Chi-square procedure was used for the test. From the result obtained in the test, it was revealed that the students committed almost the same level of grammatical and lexical errors in the English language essay and the chemistry subject. Though, the lexical errors were more in terms of frequency of occurrence and chemistry subject than lexical errors. The observed difference in the errors committed was statistically significant. Therefore the null hypothesis was therefore retained. This finding is consistent with Omale (2006) in a survey of science and engineering students of Kaduna State Polytechnic English needs. The report stated that the students' grammar was poor, as far as some English errors were concerned. The poor performance was associated with the students' poor knowledge of grammar from their secondary school exposure to the language where grammar was not properly handled.

4.7 Summary of Findings

The findings reveal that all the error types persisted with the students in the two subject areas in the two categories of errors grammatical errors were highest in frequency of occurrence while lexical errors has least frequency. The decrease in frequency of lexical errors in chemistry subject by the students may not necessarily imply mastery of lexical items in sciences. It may be due to some error avoidance strategies employ by the students. Errors caused by wrong splitting of compound words were frequent in the two subjects areas. This might be due to fossilization of the wrong patterns as such no amount of teaching can reduce the errors.

The implication of this finding is that the students need to be taught how to choose the correct lexical item that will express their intention. They should also be taught how to use the dictionary read extensively and learn collocation of English words. This study agrees with Abroks (2010) that error analysis of students' essay is a feedback for the teacher to understand the problem areas of the students in learning.

CHAPTER FIVE

SUMMARY, RECOMMENDATIONS AND CONCLUSION

5.1 Introduction

This chapter summarized the findings, conclusion and provided teaching implications of the findings, recommendations and areas for further studies.

5.2 Summary of the study

This study was undertaken in order to find out the written errors of SS II sciences Students in English Subject and their Chemistry subjects in Kaduna state. The study sought to find answer to the following research questions:

1. What are the types of lexical errors produced by SS II Science students in English and Chemistry subjects in writing?
2. What are the types of grammatical, errors made by the SS II science students in English and Chemistry subjects?
3. Was there any significant difference in the frequency of errors the students produced in the two subject areas?

To answer these questions, ninety one science students were selected from three Science Secondary Schools in Kaduna state (GSSS B/Gwari, GSSS Ikara and GSSS Soba). The students were given two topics, one in English subject to write on. Using the category of errors derived from Quirk & Greenbaum (1976) and Pedagogic , the student written essay in the two subjects were analysed into two categories (Grammatical and Lexical) the analysis involved the use of three statistical tests (percentages, frequencies and Chi-square). The findings of the study are summarized as follows:

1. All the two categories errors were persistent with the students in the two subject areas.
2. For all the error types, there was no significant difference in the frequencies of errors made by the students at SS II level in the written essays.
3. From lexical category of errors, splitting of compounds words had the highest frequency of occurrence (58.76) in English subjects and 58.24 in sciences subjects). Collocation error next in frequency of lexical errors (58.71 and 56.29) however, all the errors types persisted with the students in the two subjects areas (see table 4.5.0). This could be due to incomplete understanding of compound words as a result of poor learning and their carelessness when writing.
4. Grammatical errors also occurred quite frequently and showed that errors were more frequent in science subjects than in English subjects (see table 4.6.0). all sub categories of grammatical errors persisted with the students in the two subjects areas, concord error were the least in number and were less frequent. Among the sub-categories (48.21 in English subject and 49.79 in sciences subjects). The errors here could be due to student's poor knowledge of concord on account of poor teaching and learning .

5.3 Implications

The implications are made in relation to the students, the teachers of English and teachers of science subjects and the schools.

5.3.1 Implication for the Students

1. The students should realize that one learns a language not only by hearing others speak or by having the language explained, but by also practicing and transferring language use to situations outside the classroom.
2. It has been proven (Olaofe 1995 and 1998) that extensive reading aids students in their written work. Therefore, students should try to read extensively both fiction and non fiction texts.
3. Students should realize the relationship between listening, speaking and writing and should endeavour to use English as medium of communication both in and outside the classroom. This can be done by watching television, listening to radio and by speaking English to their friends.
4. They should learn to edit and proof read their written work by getting immediate feedback on their written work.

5.3.2 Implication for Teachers of English

1. Teachers should endeavour to teach writing as a process. They should encourage, the students to be outlining, proofreading and editing their written work.
2. Teachers should adopt communicative approach in teaching writing skill by integrating the four language skills with activities such as dramatization, listening to

pre-recorded tapes, questions and answers. The students could be tasked to write what they have learnt from any of these activities.

3. To minimize lexical errors, teachers should deliberately teach the students how to use the dictionary and also provide them with enough reading materials which can enable them to have a good storage of lexical items. The students should also be taught vocabulary.
4. To reduce grammatical errors, teachers should engage in intensive teaching and re-teaching of the rules of concord, verb tenses, determiners, prepositions and auxiliaries. This the teachers can do by flooding the students with adequate materials that will enable them to use the communicative aspect of the language. For example, teachers can engage the students in debate, storytelling, dialogue and puzzles etc.
5. Teachers should endeavour to use adequate teaching aids such as language laboratories, charts, diagrams, and pictures to motivate the students acquire the necessary skill in writing and become better writers.
6. English language teachers should note the importance of feedback they give to their students with regard to their written work. Students will improve in their writing skill if they are encouraged by the feedback they get from their teachers.
7. The teachers should assist the students by organizing teaching based on highly problematic and difficult writing areas.

5.3.3 Implication for Science Subject Teachers

1. Science subject teachers should be involved in the English language process. This can be done by giving the students tasks that involve innovative, creative and communicative use of the language.

2. It is possible that science subject's teachers give the students little or no encouragement in the learning of writing skill. If this happens, then the task of English language becomes more burdensome (Kwassau, 2002). Therefore teachers should endeavour to assume the role of English language teachers by ensuring that the students' errors are pointed out and corrected in their science subjects' areas.
3. The teachers should encourage and motivate the students to be proficient language users by saving as good role models.
4. English subject teachers and teachers of science subjects should work as a team to help the students acquire the necessary writing skill. English subject teachers can learn from science subject teachers, things such as registers and special use of certain structures relevant in the teaching of science subjects and science teachers can learn from English subject teacher items such as spelling, and grammatical structures. For instance English language teachers could invite science subject teachers to teach the scientific terminologies.
5. Science teachers can assist the students improve their writing proficiency by correcting their errors such as wrong spellings, concord, tenses, in the students assignment, and other classroom exercises. This means that they pay more attention to the language use of students and not only the points the learners make.

5.3.4 Implication for the Schools

1. The Schools should endeavour to train and retrain the teachers in other to increase their productivity and giving their best. More teachers should also be employed to teach English as the number of teachers cannot possible handle the large number of students.

2. The schools should also consider the possibility of increasing more contact hours for the teaching of English subjects. The present contact hours appear too small for effective learning to take place.
3. Because of the relationship between listening and writing skills the schools should provide language laboratory to aid in the teaching of writing skill. This can be achieve when students listen to pre-recorded tapes and then write essays based on what they listened to.

The schools can organize a remedial programme based on frequency of errors types found in the written essays to reduce the errors of the students. The programme could involve a pre-test that can administer to the students to see their performance before the remedial programme. A post-test can be given at the end of the remedial exercise to evaluate the objectives.

Based on the observation obtained from the study, it showed that students lack appropriate use of lexical and grammatical items in their writing essay. This means that secondary school administrative curriculum designers should encourages teachers both financially and professionally through workshop and seminar training to support their teaching of writing English through the use of appropriate lexical and grammatical items across the curriculum.

5.4 Conclusion

The findings of this study have shown that errors predominates the writings of SS2 science students in Kaduna State and that the errors can be minimized. The students' frequency of errors was different in English classes and in their science subject areas.

In view of the crucial role English language play in the Nigerian school system and the society at large, it becomes mandatory to teach and learn it properly. It is believed that the quality of students writing cannot go beyond what they were taught (Kwassau, 2002). Therefore the English language and the science subject teachers in Kaduna State must assist students to develop competence in writing.

5.5 Recommendations

The recommendations made based on the observations from the data gathered for this study are aimed at reduction of errors discovered.

i. This study aimed at finding solutions to errors made by SS2 Science students in English subject and their chemistry subject.

ii. Teachers should assign to students, writing tasks that have direct relevance to their chemistry subject areas. These include description, explanation of process or methods of production and the like. Essay topics should reflect issues such as defining concept which students learn in their chemistry subjects. If students are given writing tasks that have direct bearing with their content subjects, it will became mandatory that they do more reading in relevance texts. This is because extensive reading of such texts reinforces the writing skill.

iii. Teachers should adopt the students-centered approach to writing by allowing more of students participation in the classroom. The learners must be encouraged toward a more realistic concept of language learning and performance. This can be achieved by helping them to critically organize and present facts logically in correct expressions. The students should also be encourage to freely discuss their ideas in and outside the classroom.

iv. English language teachers must be familiar with texts in students' contents subject areas. Understanding of the characteristics of texts makes them competent to impart on the students the most desired writing skills.

v. Science students should be exposed to the language through various language skills. When students are sufficiently exposed to the language through various language the possibility of making errors is minimized.

vi. Errors analysis should be carried out from time to time and relevant error correction strategies, which are appropriate to various situations should be provided.

5.6 Suggestion for further Research.

1. There is need for similar study to be done on error analysis that will cover a larger sample size.
2. Other Studies on error analysis need to consider discourse errors as it is an area that has been neglected in the teaching of English language especially at the science secondary school level.

REFERENCES

Abbot, G. (1980): Towards a More Rigorous Error Analysis. IRAL

Abbot, G. Greenwood, J. Mckeating , D and Wingard, P. (1981). *Teaching of English as an International Language*. A Practical Guide. Glass glow: Collin.

Abbot, W.G. (1979) *"Intelligibility and Acceptability in Spoken and Written Communication*" English Teaching.

Abdullahi, A. (1982). *Chemistry Education in Nigeria*. First edition, Atoto press Ltd, kwara state.

Abroks, D.U. (2010) "*Analysis of Error Gravity and Persistency in Students Written Essays Across JSS Levels in Government Girls College Zankuwa*" Unpublished M.Ed thesis ABU Zaria.

Abubakar, B. (2009): *Teaching English Language in Primary Schools.* Jerry Press, Zaria.

Adamu, H. Musa, I and Mohammed, P. (2006): *Importance of Language in Chemistry Education*. Nigerian Journal of Professional Teacher's vol.3. An International Journal of Teacher's Registration Council of Nigeria.

Adedeji, R (1984) *"The English Teacher and the Technical Student*" Journal of the Nigerian English Studies Association. Vol.2

Adedeji, R. (1984) "*The English teacher and the technical students*" in journal of the Nigerian English studies association. Vol. 2.

Adesonaye, F. (1994) "*An outlook for English in Nigeria*" in Asein, S.O.

Adetoro, S.A. (1997): *Research Techniques for Projects* Revised Edition.

Adeyanju, T.K. (1976) "*Teaching English as Second Language in Nigeria, State of the Art".* A Journal of the Institute of Education. A.B.U. and Faculty of Education B.U.K. p. 25-30

Afolayan, A. (1984). "*The Role of Language in a Developmental Orientation Education*". A Paper Presented at the Conference on English Language Studies in Higher Education. Bayero University, Kano.

Ageda, J.M. (2008) *Effect of color procedure on secondary students achievements in English language grammar*. Unpublished Ph.D Thesis University of Nigeria. NSUKKA.

Ahmed, D.A (2005): *Language Need for Teaching Science in Nigeria*.

Ajalie, C.I. (2007). "*Making English Language a Course to Science, Technology and Mathematics Education Studies in Tertiary Institution"*. Nigeria Journal of Chemistryand Education Research (NIJOSER) Vol. 1 No. 1.

Akande, Adedeji and Okonkwo (2005) *"The English Teacher and the Technical Student*" Journal of the Nigerian English Studies Association. Vol.2

Akere, F. (1990) *English Across Disciplines*. Ikeja: Punmark Nig. Limited.

Aliyu, J.S. (1996). *Improving your Performance in English*. Zaria. Ahmadu Bello University Press Led. Pp13.

Aliyu, J.S. (2001): "M*ass Failure in WAEC Conducted Senior Secondary English Examination in Nigeria. Grammar as a Road Block to Candidate's Success"* Nigeria Educational Forum 17 (1) Pp 31-39 Zaria: Institute of Education.

Allen, 13.4 and Campbell (1972). *Teaching English as second language New York.* Hill international book company.

Allen, R. (1972). *English Grammars and English Grammar*. New York: Charles Scribners and Sons

Alley, M. (1996): *The Craft of Scientific Writing (3rd ed) New York*: Springer- Verkas.

Allwright, D. (1993). *Observation in the Language Classroom*. Longman, London.

Anasiudu, B.N. (1983). Error Analysis. *A positive Source of Information for Language Teachers*. Journal of Liberal Studies (1 and 2)

Aniama, S.O. (2002). *ChemistryTeaching and Learning in the Universal Basic Education (UBE) Programme*. Knowledge Review. A Multidisciplinary Journal.

Ankewe, U. (1998) "*Language Teaching and Learning*: Nigeria: Africana Publishers Limited

Aremor, B. (2003): *Advance English Composition*. Scrico Books Lagos, Nigeria.

Arusudu, B.N. (1983): "*Error Analysis a Positive Chemistryof Information for Language Teachers*" Journal of Liberal Studies, 1 (1 and 2).

Asian, E.F.L. (2003): *Journal of English Language Teaching and Research Article*. Htm.

Astill, P. and Dada, A. (1984). *The Writing Skill Needed by Secondary School Students*'. A Seminar Paper Presented at the Department Seminar in Education Department, University of Ibadan.

Avoaja, D.A. (1999) Relationships between students academic self concept and achievements in chemistrysubject journal of chemistrytechnology and mathematics education (JOSTMEDD), 2(1), 77-82.

Ayodele, S.O. (2004). *The Language Question and Nigeria Education*. Ibadan, Nigeria. Pp. 20-35.

Baba, L.N (2006): "*Essence of Language in Literacy for Sustainable Developmen*t". A Paper Presented at the 1st Annual Conference of the School of Languages, FCE, Zaria.

Balogun T.A. (1979) "Sentence Patterns in the Language of Chemistryand Technology". In Ubahakwe B (Ed). The Teaching of English Studies. Ibadan : University press.

Banjo, A. (1974). On the state of English language in Nigeria, journal of the Nigerian English studies association. 6/pp.5-13.

Barras, R. (2002): "*Scientists Must Write*, (2nded) New York: Rouledge.

Bartle, P. Common Errors in Writing. http:/www/sen.org./cmp/error/htm

Bernet, M.A. (2008) Teaching Concerns A Newsletter for Faculty and Teaching Assistants. University of Virginia, Teaching Resource Centre.

Bill, K. and Betsy, M.A (1995): *Writing Across the Curriculum in College Chemistry*. University of Missouri, St. Louis, Michigan University of Technology.

Blum, A. (1973): Towards a Rational Integrated ChemistryTeaching. Vol. II. Paris UNESCO Press. *Brooks, N. (1964). Language and Language Learning.* New York: Harcourt, Brace & World

Boadi, L.A (1969) *Grammatical Structure and it Teaching*, Lagos: African University Press.

Bombose, E (1995) "*English in the Nigerian environment"*. In New English: A West African Perspective.

Booth, L.A. (1973) Communicating in Science: Cambridge. Une. Press

Braina, G. Ed (1999): *Non-Native Educator in English Language Teaching Mahwah*, N.J. Lawrence Eribuam.

Bright, J.A and Mc Gregor G.P (1970). *Teaching English as a Second Language*. London, Longman Group Ltd.

Brookes, F.H. and Bross, h (1967). En*glish as a foreign Language for Chemistryand Technology students London*: Heinemann educational books.

Broughton A. Brunfit, C. Flavel, r. Hill, P & Pricas a. (1980). *Teaching English as a foreign language (2nd edition)* London: Rutledge and Kegan Paul.

Byrne, D. (1991). *Teaching, Writing Skills*. Longman, London.

Carson, J. (2001). Second Language Writing and Second Language Acquisition. In Silva, T. & Matsuda, P. (Eds.) On Second Language Writing. Mahwan NJ: Lawrence Eribaum Associates.

Celec-murcia, M. (1985). Making Informal Decisions about the Role of Grammar in Language Teaching. TESOL Newsletter. 19/1, pp. 1-5.

Champagre, A.B. and Kloflex, L.E. (1981) Structure Skills and Solutions of Verbal Problem Involving ChemistryConcept. Macmillan Publishers Ltd. London 5:493-51.

Chomsky, N. (1966). Linguistic Theory in mead. 43-49.

Chukwuma, H. and Olagburuagu, E. (2002): *English for Academic Purpose*. Africana PEP Pulishers, Onitsha.

Cook, V.J. (2001): *Second Language Learning and Language Teaching* (3rd Edition). London: Arnold Headline group.

Coper, B.M. (1981) *Writing Technical Reports*, London Penguin Books Ltd.

Corder, S.P. (1967): The Significance of Learners Errors. International Review of Applied Linguistics, pp. 151-169.

Corder, S.P. (1973) Introduction to Applied to Linguistics. Penguin Books London

Corder, S.P. (1981): Error Analysis and Inter- Language. Oxford University Press, London.
Crystal, D (1998). Cambridge Encyclopedia of Language. Cambridge, University Press.

Curtin, B.J. (1979) "*Attitudes to languag*e: the adult students" English language journal vol. xxxiii no. 4pg 116-118.

Darus and Saadiyah (2009): *Errors Analysis of the Writing English Essay*: European Journal of Social Science. 8/3.

David, et al (1969): Investigation English Style. Longman Group.

Digga, J. (1990) "*Use of Concord among Student of Tertiary Institution in Kaduna State*" Unpublished M.A thesis ABU, Zaria.

Dulay, H. and Burt, M. (1976) "*Error and Strategies in Child Second Language* Animashaun". Tesol, Quarterly (8. 129-138).

Ebode, E. (1981) Effective Writing Nigeria: Heinemann Educational Books publishers

Ellis, R. (1995): Understanding Second Language Acquisition (10thed) New York St. Matin's Press.

Enesi, A.O. (2000): "*Teaching English as a Second Languag*e". (TESL) in Nigeria Secondary Schools. The State of the Art" Nigerian Education Forum pp 102-108 Institute of Education, Zaria.

Etherton, A. R. B. (1977). *Error Analysis: Problems and Procedures*, ELIJ. 21/1 Pp. 67-78.

Fafunwa, A.B (1998). *Education and National Development*: Which way Nigeria. An Address at 34th Convocation, ABU, Zaria.

Faruk, U, Fagge. i.s. Abdullahi, s m (1991) " T*he teaching and assessment of writing in some selected secondary schools in Kano municipal*" A B. ED (language arts) project.

Federal Ministry of Chemistryand Technology (1986): *National Policy on Chemistryand Technology,* Ibadan. Nihort press.

Federal Republic of Nigeria (2004): National Policy on Education Lagos: NERDC Press.

Ferris, D. & Roberts, B. (2001). Error Feedback in Writing Classes: Journal of L2 Writing. Vol. 10, No. 112.

Flower, L. (1989). Problem Solving Strategies for Writing, London: Harcourt Brace Jonans publishers.

Friederichs, J. & Pierson, H. D. (1981). *What is ChemistryStudents Expected to Write*: ELTJ. Vol. 1, No. 4 Pp. 407 -409

Fries, C. E. (1952). *The Structure of English, Harcourt Brace*, Jovanovich, New York.

Friesmuth, M.R. (1997) *"L2 Error Correction". "Criteria and Techniques*". The Language Teachers Online. 22.06. http: Language Hyper: Chube, ac.jp/i/jatt/put/tllap/friersmith.html.

Giwa, O.Y. (2005). "*Chemistryfor Development and Peace".* Journal of Woman in Colleges of Education (JOWICE) p.92.

Halliday, M.A.K. and Hasssan, R. (1976): Cohesion in English. London, Longman.

Halliday, M.A.K. Mcintosh A. and Strevens P. (1964). *The Linguistic Chemistryand language Teaching*. London: Longman Group Ltd.

Herbert, J.N. (1997) "*Underlying purpose in language teaching*" journal of English London: Longman group Ltd.

Houghton, M. (2009) *American Heritage Dictionary of English Language*, Fourth Edition. H. Miffin New York.

Ibeh, U.C, (2003): Complete English Course for Senior Secondary School African First Published limited. Onisha, Nigeria.

Izumi, E. and Isahara, H. (2004): *Investigation into Language Learner Acquisition order Based as the Error Analysis of the Learners Corpus".* In Proceeding of Pacific Asia Conference on Language, Information and Computation (PACLIC) 18 satellite Workshop on E-learning, Tokyo, Japan.

Jabo, T. (1992) "*Relationship Between Performance in English and Overall Performance of Student of Post-Primary School in Kano State*". An Unpublished Thesis ABU, Zaria.

Jegede, C.A. (2001) "A Correlation Study of the Performance of Pre-NCE ChemistryStudent in Mathematics and Physical Chemistry in FCE , Okene. Unpublished Post-Graduation Diploma in Education Project. University of Ilorin.

John, M.A. (2010). *Optimization of English Language Grammar Pedagogy in Nigerian Secondary Schools using Close Procedure*. NASHER, vol.8 no. 1:39-43.

Joy, E. (2003). *Common Error in the Use of English Africana* First Publishers Ltd. Onitsha, Nigeria.

Kamel, A. (2004); *Writing Academic English in ESL*: A Case Study of Students of Bayero University, Kano, Nigeria. A Ph.D Thesis.

Karra, M. (2006) *Second Language Acquisition: Learner's Errors and Error Correction in Language Teaching.* http.iron p.o.2 com/doc/march..

Kern, R. (2000): Literacy and Language Teaching: Oxford University press.

Kitao, K and Kitao, S. (2000): Selecting and Developing Teaching /Learning Materials. http/www.Afeeh.ac.jp/itecles/kitaomaterial.htm/April20.

Kress, G. (1994). Learning to Write. London Rutledge and Regan.

Kujore, O. (1995). Whose English? in Bamgbose, A. and Thomas, A. (eds). New English: A West African Perspective. Intec Printers Ltd, Ibadan, pp. 367-380.

Kwassau, H. (2002): *Analysis of the Writing Needs of Student of Federal College of Chemical and Leather Technology* Unpublished Thesis ABU, Zaria

Lamidi, M.T (2000). *Aspect of Chamskyan Grammar*, Ibadan: Emman Publications.

Law, M.H. Crystal (2005): The Acquisition of English Subject-Verb Agreement. Master Thesis. University of Hong Kong.

Lawal, B.G. (2004). Genuine Mistakes by users of English. Dominion Publishers, Ibadan.

Macgregor, G.P.(1971): English in Africa: A Guide to the Teaching of English as a Second Language. London: Heinemann/UNESCO.

Maros, M. (2007): *Interference in learning English*: Grammatical Errors in English Essay Writing, Jowice 4-Bangi 212.

Mcdounough, S. H. (1987). *Psychology in Foreign Language Teaching*. George Allen and Urwin, London.

Mohammed, Z.B. (2000): "*Errors Analysis of Essays of Applied ChemistryDiploma, Student Nuhu Bamalli Polytechnic",* Zaria. Unpublished Thesis ABU, Zaria

Muhammed, N. (2001): "*Performance of Teachers and Nomadic Pupil in Reading Comprehension and Grammar Tests in Fulfulde and English in Adamawa and Taraba State".* Unpublished Ph.D thesis, ABU, Zaria.

Munjuk, R.P (2009) "*Tense Errors in the Written English of ChemistryStudents of Gombe State University*" unpublished M.A thesis ABU, Zaria.

Murphy, E.M. and Snell, S. (1991). Effective Writing: Plain English at work. Pitman Publishers, London.

Murray, S. Johnson L. (1989): Write to Improve: A Guide to Correcting and Evaluating Written Work. Holder and Staughon, South Africa.

National Teachers' Institute (2000): Course Book on English Language: Proposed Teacher Training programmed for Universal Basic Education (UBE) Kaduna

Ndukwe. J. (2005*) A Handbook on Applied Linguistic for College*. Bright Printing Press, Zaria.Nigerian Journal of Chemistry and Education Research.

NIT (2003): Manual for the Retraining of Primary School Teachers Teaching English Language), NIT, Kaduna.

Norrish, J. (1983): Language Learners and their Errors. Macmillan, London.

Obanya, P. (1982)" Secondary English Teaching. Nigeria, Macmillan.

Odejide, B.I. (1979). Some Aspects of Appropriateness of Nigerian Students'

Odumuh, A.E. and Odumuh, T.O. (1998). Effective English Teaching in Primary Schools: the Challenges and the Strategy. Jos, LECHPS Publishers.

Ofuoku, O. (1984). The quality of graduate English in Nigeria. A case study of Ahmadu bello university students. In jibril, m. freeman r.(eds). English language studies in Nigerian higher Evaluation. The British council, London, P.P. 75-85

Ogunyemi, L.E . (1972). The Effect of Different sources of Verbalized Instruction on Performance of ChemistryRelated Cognitive Tasks. Journals of Research in ChemistryTeaching. 9:2:157-165.

Ojo, G.O (1987): Origin of ChemistryStudent English Errors Implication for Curricular Unpublished Thesis

Ojo, U.M. (1995). Second Language: an Impediment to Effective ChemistryLearning,

Okamura, A. (1995). *Teachers' and Non Teacher' Perception of Elementary Learners' Spoken Japanese*. The Modern Language Journal. 9/1.

Okannuga, U.M. (1979) English for Chemistryand Technology in Ubakwe (ed). The Teaching of English Studies. Ibadan: University press.

Olaofe, I.A. (1984). Targets in the Development of Writing Programmed for Chemistryand Technology. Paper Presented at the 15th Annual Conference of Nigerian English Studies Association, Adeyemi College of Education, Ondo. 6th-10th March.

Olaofe, I.A. (1986). The Effect of Proficiency Levels on Error Production in English Verb structure: Journal of Nigerian English Studies Association. 3,pp.59-67.

Olaofe, I.A. (1987). Teaching through English in Nigerian Primary Schools. A Survey, Nigerian Education Forum. 10/1, pp.93-104.

Olaofe, I.A. (1988). Language and Development: English for a Result Oriented University Education, SAIWA; A Journal of Communication, Issue 5, pp.18-31.

Olaofe, I.A. (1992). A Communicative Model for Assessing Second Language Performance, IRAL, 30/3, pp. 207-222.

Olaofe, I.A. (1994). Testing English for Academic Purposes. Assessment and Evaluation in Higher Education. 19/1, pp. 378-48.

Olaofe, I.A. (1995 SB). Comprehensibility and the Nigeria Undergraduate English Forth Coming.

Olaofe, I.A. (2000). Current Trends in Communication Skills for the New Millennium. Paper Presented at a Four-day Workshop on Communication Skills, Kaduna State Polytechnic, Zaria, 26-29 June, 2000.

Olaofe, I.A. (2009). Lecture note on Contrastive Language Analysis (CLA).

Olaofe, I.A. (2010). Research writing for academic growth: *A hand book for writing seminar and conference paper thesis, dissertations and journal articles*. Zaria: A.B.. Press Limited.

Olayeme, A.E (1980). EA of Written Composition of Zaria Advanced Teachers' College of English with Suggestions for Remedial Programmed, Unpublished M.Ed Thesis, Ahmadu Bello University Zaria.

Omale, H.O. (2006): a survey of Kaduna polytechnics students response to the passive, Zaria journal educational studies vol. 8 pg 32-39.

Omojuwa, R, (1987): "English as a Medium of Instruction in Nigerian Schools/Colleges. Problem and Prospects. Occasional Paper" Literacy and Reading in Nigeria. Vol. 7, Pp 211-220.

Opats, D. (1984) An Investigation into the English Language Error Patterns of our Undergraduates. In Jibril, M. And Freeman, R (Eds) English Language Studies in Nigerian Higher Education. The British Council, London, Pp. 65-84.

Palmer, F. (1971): Grammar. Penguin, London.

Peter, P. (1986). Writing in Schools: Errors Structure as Ways of Meaning in Culture, B.(Ed) Function Approaches to Learning: Research Perspectives. Francis Printers, London.

Pike, Kenneth, L. (1958) "*On Tagmemes, Nee Grammemes"* International Journal of American Linguistics. Zziv, Pp 273-292

Porte, Y.K. (1993). Mistakes, Errors and Blacks Chocks. Forum Online, ChemistryTechnical Schools Board. Edition, Htte:1.

Pryse, B.E. (1985) How good is your English? Collins, Grafton street, London.

Quirk, R. And Greenbaum, S. Leech, G. Svartwik, J. (1975). A Comprehensive Grammar of English. Longman. New York.

Raimes, A. (1983): Techniques in Teaching Writing. Oxford University, Press.

Read, S. (2009): An Overview in Error Analysis and Corpus Linguistics. 4th International English Lingua Reading Conference (ELT-CON 2009).

Reid, J. (2001): "Writing" in Cater, R. And Nunan, D. (Eds) *Teaching English to Speakers of Other Languages*. Pp 831, Cambridge, University Press.

Richards, J.C (1973) error analysis and second language strategies. In other J.W. and Richards, J.C (eds) focus on the learner: pragmatic for the language teacher. Newbury, Rowley, pp.114-135.

Rivers, W.M. (1981). Teaching Foreign Language Skills. University Chicago Press, Chicago.

Roseline, W. (2009): *"Sources of Errors: An Interplay of Inter-Lingual Influence and Intra-Lingual Factors".* European Journal of Social Sciences Vol. II, November 2009, University of Technology, Mara (UTM).

Ross, N. (2006) "*Writing in the Information Age".* English Today, 87 Vol. 22 No. 3, Pp 45. Cambridge University, Press.

Schumann, J. (1998). The Neorobiology of Africa in Language. Language Learning 48, Supplement Pp. 528-549.

Senlinker, L. (1972): Inter-Language in Robinett, B.W. and Shachter J. (Eds) Second Language Learning: Contrastive Analysis, Error Analysis and Related Aspect. University of Michigan Press, Michigan, Pp. 173-176.

Sharifah, Z. (2009): The Communicative Ability of University of Technology: English Language Reading 2/2 www.Ccsenet.Org/Journal.Html.

Shaugnessy, M.P. (1997): Errors and Expectations. a Guide for the Teacher of Basic Writing. New York: Oxford University Press.

Shin, S.J (2006). Learning to Teach Writing through Tutoring and Journal Writing, Teachers and Teaching: Theory and Practice. 12/3,Pp.334.

Shu'aibu, L. (2008) "*Issues and Challenges of Effective Written English Among Secondary School Students In Kano State*. Zaria Journal of Linguistic and Literary Studies Vol. 2. No.1"

Silver, T. (2006). Second Language Composition Instruction: Developments, Issues and Directions in ESL. in Kroll, B. (Ed). Second Language Writing-Research Insights for the Classroom. Cambridge, University Press.

Snow, M.A. (2001). Content-Based and Immersion Models for Second and Foreign Language Teaching In Celece-Murcia, M. (Ed) Teaching English as a Second or Foreign Language (3rd Ed). Heince and Boston, 303-318.

Sonaiya, C.O (1988) *"Approach to Error Analysis*". Unpublished Ph.D Dissertation, Cord University.

Sternberg, N.C (1981): An Introductory Effective English Grammar, New York, Longman

Taiwo, R. (2001) "*Lexical Semantic Relations Errors in Senior Secondary Schools and Student Writing*" Nordic Journal of Africa Studies Vol. 10 No. 511

Taylor, Y. (1986): "Errors and Explanations" Applied Linguistics". 7:144-166.

The American Heritage (R) Dictionary of English Language Fourth Edition (2009).

The Webster Dictionary of English (1995). International Edition, U.S.A Lexicon Publishing Inc.

Thesaurus, (2011). *New World Roget's A-Z Willey Publishing Inc*, Cleveland Ohio. www.Synonyms.Net /Synonym/Biology.

Tomori, S.H.O. (1981): A Diachronic and Synchronic Study of the Motivation for Learning English in Nigeria in a Banjo, C.M.B. Brann H. Evans (Eds).

Trager, G.L. And Smith, H.L. Jr (1951). An Outline of English Structure. Batten Burg Press, Oklama.

Tsang Walking (1996): "*Comparing the Effect of Reading and Writing on Performance"*. Applied Linguistic. 17.2pp.210-223.

Umumuanbi, P.O. And Umoru, G.E. (2005): *The Relationship Between Interest in Mathematic and ChemistryAmong Polytechnic Studen*t: A Case Study of Auchi Polytechnic. Nigerian Journal of Professional Teacher's Vol. No.1. An International Journal of Teachers Registration Council of Nigeria.

Valdam, A. (1975). *"Learner Systems and Error Analysis*". In Javis, G.A (Ed. Perspective: A New Freedom. National Textbooks Company, Skokie, Pp. 219-258

WAEC (2004). Chief Examiner's Report. May/June. Lagos: WAEC.

Walkingson, J. (1995): Introducing Grammar. Penguin, English Books.

West African Examinations Council (2002) Chief Examiners report Nigerian (English) Lagos: WAEC printers.

West African examinations council (2007) Chief Examiners report Nigeria (English) May/June Lagos: WAEC printers.

West African Studies in Modern Language Teaching and Research, Lagos, Nigeria: The National Language and Language/Federal Ministry of Education. 58-70. Training Manual for ChemistryTeachers in Government ChemistryAnd Technical In Kaduna State. (2008) By Zaria Consultancy, Limited, Federal College of Education, Zaria.

Wilkins, E. (1975): Education in Practice. London Evans Brothers Limited.

Williams, O.D. (1990): "English Language Teaching: An Integrated Approach". Spectrum Books Ltd, Ibadan.

Wimmer, R.D and Dominic, K.J.R (1987). Mass Media Research: An Introduction Wordsworth, California.

World Bank (2004). *A World Bank Report on Learning Achievement Assessment on Sub-Saharan Africa and North Africa*. Lawrence. Eritbaum Associates, Mahwah NIPP. 191-200.

Writing. In Ubahakwe, E. (Ed). *Varieties and Functions of English in Nigeria. AUP and Nigerian English Studies Association*. 127-136.

Yule, G. (1996). "*The Study of Language".* Cambridge University Press.

Zamel, V. (1998): Strangers in Academic. The Experiences of Faculty and ESL Student across Curriculum, R. (Eds).