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TEXT READABILITY AND GRADE PROPRIETY: AN ANALYSIS OF SENIOR HIGH SCHOOL ENGLISH TEXTBOOKS IN GHANA

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TEXT READABILITY AND GRADE PROPRIETY: AN ANALYSIS OF SENIOR HIGH SCHOOL ENGLISH TEXTBOOKS IN GHANA

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**A Thesis in the Department of English Education,
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DECLARATION

Student's Declaration

I, **JUSTINE BAKUURO**, declare that this thesis, with the exception of quotations and references contained in published works which have all been identified and duly acknowledged, is entirely my own original work, and it has not been submitted, either in part or whole, for another degree elsewhere.

Signature: …….

Date: …….

Supervisors' Declaration

We hereby declare that the preparation and presentation of this work was supervised in accordance with the guidelines for the supervision of dissertation as laid down by the University of Education, Winneba.

DR. KWAKU OFORI (Principal Supervisor)

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PROF. CHRISTIANA HAMMOND (Co-Supervisor)

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Date: ……...

DEDICATION

I dedicate this work to my late father and daughter: Chrisantus and Catherine respectively.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS/GLOSSARY

LD=Lexical Density
GI=Grammatical Intricacy
GFI=Gunning Fog Index
FKGL=Flesch Kincaid Grade Level
FRE=Flesch Reading Ease
ASW=Average number of Syllables per Word
ASL=Average Sentence Length
BS=Basic School
JHS=Junior High School
SHS=Senior High School
L100=First year undergraduate
L200=Second year undergraduate
L300=Third year undergraduate
L400=Fourth year undergraduate
L500=First year Masters
L600=Second year Masters
L700=First year Doctor of Philosophy
L800=Second year Doctor of Philosophy
L900=Third year Doctor of Philosophy
L1000=Fourth year Doctor of Philosophy
L2=Second Language
LO=Lexical Originality
LR=Lexical Richness
LDv=Lexical Diversity
LV=Lexical Variety
LS=Lexical Sophistication
LCM=Logical Conversion Module
RPM=Refractive Percentile Multiplier
IGRI=Inter-Grade Refractive Index
TTR=Type-Token Ratio
EFL=English as Foreign Language
NOW=News on Web
BNC=British National Corpus
CoCA=Corpus of Contemporary American English
ESL=English as Second Language
SMOG= Simple Measure of Gobbledygook
PLSs=Plain Language Summaries
FOG= Frequency of Gobbledygook
ELT=English Language Teaching
GIR=Grammatical Intricacy Ratio
AGL=Average reading Grade Level
OA=Osteoarthritis
MT = Machine Translation
QA= Question Answering

BBC = British Broadcasting Corporation
UK= United Kingdom
USA= United States of America
GAST= Ghana Association of Science Teachers
RAs = Research Articles
rho and *phi* = Spearman's correlation coefficients
NDC = National Democratic Congress (political party in Ghana)
NPP = New Patriotic Party (political party in Ghana)
GCB = Ghana Commercial Bank
ADB = Agricultural Development Bank
GSE = Ghana Stock Exchange
PILs = Patient Information Leaflets
ICFs= Informed Consent Forms
CCI= Clear Communication Index
JAMA= Journal of American Medical Association
WASSCE= West African Senior School Certificate Examination
WAEC= West African Examinations Council
DRP-GE =Degrees of Reading Power-Grade Equivalent
FORCAST= Ford, Caylor, Sticht Scale
LEXICOOL= Online Text Analyzer
TEXTALYSER= Keyword Density and Word Count Tool
LXPER Index= A curriculum-specific text readability assessment model for EFL students in Korea. SPSS=Statistical Package for the Social Sciences
N/A=Non-applicable
CoKEC-text =Corpus of the Korean ELT Curriculum for texts
medRxiv = *(*pronounced "med-archive") is an Internet site distributing unpublished e-prints about health sciences.
bioRxiv= *(pronounced "bio-archive")* is a free online archive and distribution service for unpublished preprints in the life sciences.
MATLAB = an online language programming software
ANOVA= Analysis of Variance (a statistical test that was developed by Ronald Fisher)
SSNIT= Social Security and National Insurance Trust
HONCode= A collection of certified health websites
TAALED = an analysis tool designed to calculate a wide variety of lexical diversity indices
TAALES = a tool that measures over 400 classic and new indices of lexical sophistication, including indices related to a wide range of sub-constructs
Coh-Metrix= a computational tool that produces indices of the linguistic and discourse representations of a text
Vocabprofiler= a computational tool that calculates how many words a text contains
DISCERN= an instrument for judging the quality of written consumer health information on treatment choices
HIV/AIDS = Human Immune Virus/Acute Immune Deficiency Syndrome
G'ng = Gunning
R'dbty = Readability
H'day = Halliday

ABSTRACT

This study sought to examine the suitability of texts in Ghanaian Senior High School English textbooks to their intended students. The purpose is to determine the readability levels of English textbooks as well as the relationship between Lexical Density (LD) and readability, the inter-grade readability variation of texts, their suitability to intended academic levels, the extent of agreeability of readability metrics in their application to same texts as well as the reconcilability of metric and grader readability assessment of same texts. The textual data was culled from the *Global Series* English textbook series used in Ghanaian Senior High Schools for the teaching of the English language. Applying the mixed methods research, primary data was also collected from a total of 150 graders across the 3 grades of SHS in Ghana. Using a descriptive research design, within the constructivist research paradigm, the study revealed that there is gross arbitrary appropriation of texts in Ghanaian English textbooks to the intended learners as the readability levels of the sampled texts were found to be far above the intended grades of the students. Although the study is focused on senior high school, most of the texts (76%) were found to have readability levels suitable for undergraduate and postgraduate learners as they recorded very high (unreadable according to Flesch's translated index) readability values. Only two percent (2%) of the texts were found to be suitable for their intended grades at the senior high school. Grader readability assessment of texts was found to be at variance with metric readability assessment. Whilst most graders found most texts to be readable (over 96%), metric readability assessment found same texts to be unreadable (about 98%). The inter-grade readability variation was also found to be very high whilst the readability metrics applied to the texts fairly agreed, with the exception of the Gunning Fog Index (GFI). Some findings of this study are consistent with those of Bani-Amer (2021) and Abuquba et al (2022). The study concludes that readability tests should be conducted on texts in English textbooks before assigning them to students of various grades at the senior high school level in Ghana. It emphasizes the need for the comparative application of readability metrics to texts rather than using one metric. Also, both metric and grader readability assessments need to be conducted on same texts in order to conclude properly on their realistic readability status before assigning them to respective grades. This is as a result of the wide departure between the Gunning readability metric and the three other metrics used in this study, as well as the wide metric-grader readability assessment disparity.

CHAPTER ONE

INTRODUCTION

1.0 Introduction

In the words of Hendrikse and Van Zweel (2010), "Language describes complex phenomenon, but it is itself a complex phenomenon". Kwapien et al (2010) argue that linguistic complexity has still remained unsatisfactorily defined. What elements constitute linguistic complexity? Which aspects of human communication is at all not complex? These are the questions Kwapien et al (2010) raise regarding the subject "linguistic complexity". Their argument points out very clearly that the very nature of language is a complex phenomenon and hence, to isolate some aspects of language and label them as constituting linguistic complexity makes it very difficult for any linguist to adequately define the so-called linguistic complexity. Eggins (2004) agrees totally with this assertion by Kwapien et al (2010) when he opines that the idea of linguistic complexity is the driving force in general literacy and language education across all languages. Whilst the two underscore the fact that language as a whole is a complex entity, they agree with other linguistic scholars who argue that certain shades of language put it deeper into the realms of difficulty or complexity and understanding those shades of language means understanding the complex nature of language as a human science.

Halliday (1985b) cites lexical density as an example in this regard when he states that it is a significant factor of complexity of written language. Eggins (2004) identifies grammatical intricacy as one major factor in text complexity. Gunning (1952) believes that readability is yet another major factor in determining text complexity. As already stated, Halliday (1985b) has recognized lexical density as a significant factor

of complexity of written language. This relates to the notion of lexico-grammar in Halliday's Systemic Functional Linguistic Theory.

On this dimension of written language, Wiredu (2012) opines that editorial language is complex and that there was overwhelming reliance on complex sentences in the study he conducted using newspaper texts as data. He added that the complexity arises from among other things, dominance of nominal words or processes. He further states that editorials build on an argument and try to persuade readers to think the same way as the paper does. Again, Wiredu (2016) still commenting on written language, argues that pidgin language is perceived as complex and incomprehensible. His study finds this claim as a mere perception. Agreeing with Wiredu (2012) on the complex nature of written language, Frimpong (2017) observes that since the production of a written text involves careful planning and editing, written varieties are generally more linguistically complex. This complexity, correspondingly, requires a careful reading for comprehension, according to him.

The afore-mentioned authorities corroborate the propositions of Thorndike (1921), a founding scholar on readability, who in that seminal study, opines that course books are an important source of knowledge input in classroom teaching. Therefore, text difficulty is one of the key factors in choosing course books while text readability serves as an important indicator to measure the text difficulty. To that end, he underscored the fact that a readability study anchored on LD is a more formidable study than mere direct application of readability metrics.

From the foregoing discussion on text complexity, it is abundantly clear that indeed, written language is complex and this is largely attributable to the choice and use of the lexicon. More specifically, lexical density and text readability are identified to be major factors of text complexity. This study has closely examined the

complexity/difficulty levels of texts used in Ghanaian Senior High School English textbooks and their suitability to the intended grades. Lexical density and text readability metrics are applied to sampled texts to determine text-grade suitability.

1.1 Background to the Study

In teaching and learning, the most important factor, according to Sholichatun (2011), apart from the teacher is the textbook. According to Apple and Linda (1992), abstract textbooks play a paramount role in Western education. A textbook is a written document that facilitates teaching and learning between the teacher and the student. It outlines the content that a teacher should teach his students and, it plays very important roles (e.g, aiding self-help learning, serving as a reference material, building confidence in the learner, etc) in the teaching-learning process. In an English textbook, there are various sections. One of such is the reading section. Sholichatun (2011) states that knowledge and information from texts is received via the reading process, and this is not in contention.

This all-important language skill (reading) is as good as understanding what is read. As Hammond et al (2016) puts it, the effective use of the skills of language is not acquired naturally but learnt, and enhanced as a set of practices in formal instructional settings. Reading without understanding is thus a fruitless exercise in the teaching-learning process. Leaners at the SHS in Ghana encounter myriad of obstacles in their quest to construct meaning from texts in their English textbooks. My preliminary observations in different schools as I teach the English language in Ghana from 2001 to date, attests to this fact. From readings in the literature, it appears that there is general mismatch of text and academic levels in Ghanaian Senior High School English textbooks (Gyasi, 2013a; Nunoo et al, 2021; Owu-Ewie, 2014; & Owu-Ewie,2018).

Pratiwi (2014) opines that when students are given texts which do not fit their academic or reading levels, students' understanding of such texts are greatly hampered. Students may read a lot without understanding what is read and may not recollect most of what is read. Gunning (1952) states that when students encounter many unfamiliar vocabularies in their reading process, they do not understand the text, hence learning does not take place.

Additionally, use of borrowed words, unfamiliar words, figurative language and complex expressions among others are cited by scholars as the underlying obstacles to understanding a text. In this regard, many researchers have identified lexical density (LD) as one of the leading factors in determining text difficulty or complexity. Among other scholars,Khamahani (2015), Nesia & Ginting (2014), To et al (2013), Scholichatun (2011), Eggins (2004), Halliday (1985b), Ure (1971) and Flesch (1948) underscore this point by stating that texts that have high LD are generally more complex or difficult to study or understand than those with low LD. Lexical Density is seen as the most fundamental determining factor of text complexity owing to its generic focus on the lexicon. Lexemes are the basic building blocks of syntax and therefore any syntactic study, such as this one, that dwells heavily on explicating the function of the lexicon must be fundamental and succinct.

Lexical density simply means the number of content words in relation to the total number of words in a text. Some scholars (notably Halliday) also define LD as the total number of lexical or content words in proportion to the number of clauses in a text (Halliday 1985b). Halliday adds that a score of between 1.5 and 2.9 using this formula suggests a text as being in the spoken mode whilst those with a score of between 3.0 and 6.0 are characterized as being in the written mode and having average standard LD. Pratiwi (2014) agrees with Halliday on this definition and assertion. Ure (1971) and

Eggins (2004), however, agree with the first definition above: LD is total number of content/lexical words in a text in proportion to overall number of words in the text.

Content words include words from the four (4) main word classes namely nouns, adjectives, verbs and adverbs. It must be added that only lexical verbs and lexical adverbs are considered as content words. Non-lexical, grammatical or functional word classes like prepositions, conjunctions, articles, non-lexical verbs/adverbs are not content words (Halliday 1985b). It is believed that the higher the number of content words in a text the more informative the text becomes and therefore LD is a measure of how informative a text is, according to Sholichatun (2011). To et al (2013) observed that out of four texts used, three had high LD ratios and were found to be difficult for intermediate learners. O'Sullivan et al (2020) side with this assertion when they say that LD is a measure of the difficulty level of a text. Because of the high load of information in texts with high LD, comprehension and recollection is compromised greatly. Content words are mostly generally new and unfamiliar to the reader and that affects understanding, and when understanding takes place too, the learner is not likely to remember all the pieces of information conveyed, especially the details, due to the fact that a lot of information has been provided. With low LD texts, the opposite is true. Analyzing LD therefore helps authors and teachers determine which text is difficult or simple to suit their varied audience. It also helps us determine how informative a piece of information is.

From the definition of the term "text", it is derived that texts are print manuscripts that are meant to be read and understood. The extent to which a text can be interpreted by the reader underlies the very essence of the concept "readability". According to Turkben (2019), readability is the degree of ease by which a text can be understood. This means that meaning construction from a reading text is essential to

learning. Similarly, Li and Zhang (2021), define readability as how easily written materials can be read and understood. Thus, the ability of the reader to relate to written content with ease is what readability is all about. O'Sullivan et al (2020) underscore the fact that the readability level of a text which is based on linguistic factors and human enchantment is not more than a support tool for a writer in adjusting the readability of a text with the ability of the readers. Lee and Lee (2020) indicate that text readability level enables educationists and authors to communicate effectively. They do this by applying the readability theory to texts to determine how easy they are to comprehend both in terms of their forms and content.

In determining the readability of a text, Gunning Fog Index (GFI) is used and widely accepted by most authors and educationists. This formular is simple in application. According to Gunning (1952), the GFI is used to determine the amount of fog, obscurity, ambiguity or complexity in writing. He argues that words that have 3 or more syllables are "hard words" and that these words should be counted and added to the average length of the sentences in the text. The result is then multiplied by 0.4.

Admittedly, there are numerous formulae in measuring readability but Gunning's formular and Flesch Reading Ease scale are the most popular and widely known and used, arguably, due to its simplicity and ease of applicability. As indicated earlier, the main goal of the readability theory is to improve upon writing and therefore this quest by sectors of society to improve upon writing has resulted in well over a hundred different methods in determining readability. It is worthy of note that most of these formulae are based on the idea that when short sentences and short words are used in a text, that text will generally have high readability rate.

In the light of this, the study takes a close look at the extent of lexical density and readability of texts used in Ghanaian Senior High School (SHS) English textbooks.

Basically, the connect between LD and text readability at each of the three stages of learning at the Senior High School level in Ghana remains the focus of this study. That is, the right appropriation of texts to SHS academic levels using the benchmarks of lexical density and readability forms the functional objective of this study. In arriving at this, the study examines the LD levels of SHS English texts across the three academic levels (Form 1-3) and how LD levels relate to readability. With the key focus on determining the readability of texts assigned to various grades at the senior high school level in Ghana, this study relies heavily on earlier works in readability, with particular focus on works within the Ghanaian context (Gyasi,2011; Gyasi, 2013a; Gyasi, 2013b; Gyasi, 2017a; Gyasi , 2017b; Gyasi,2017c; Gyasi,2017d;Gyasi & Owusu-Ansah,2018; Gyasi,2019a;Gyasi,2019b; Gyasi & Tettey, 2019; Owu-Ewie, 2014; Owu-Ewie, 2018; Fosu, 2016; Nunoo et al,2021).

Regarding readability assessment for L2 learners**,** most previous work on readability assessment is directed at predicting reading difficulty for native readers. Several efforts in developing automated readability assessment that take L2 learners into consideration have emerged since 2007. Heilman et al. (2007) tested the effect of grammatical features for both L1 (first language) and L2 readers and found that grammatical features play a more important role in L2 readability prediction than in L1 readability prediction.

Vajjala and Meurers (2012) combined measures from Second Language Acquisition research with traditional readability features and showed that the use of lexical and syntactic features for measuring language development of L2 learners has a substantial positive impact on readability classification. They observed that lexical features perform better than syntactic features, and that the traditional features have a

good predictive power when used with other features. Shen et al. (2013) developed a language-independent approach to automatic text difficulty assessment for L2 learners.

They treated the task of reading level assessment as a discriminative problem and applied a regression approach using a set of features that they claim to be language-independent. However, most of these studies have used textual data annotated with the readability levels for native speakers of English rather than L2 learners specifically.

1.2 Statement of the Problem

In his seminal work, Thorndike (1921) observed that text difficulty is one of the key factors in choosing course books while text readability serves as an important indicator to measure the text difficulty. Texts in English Textbooks for various grades of SHS in Ghana are generally allocated without recourse to their level of difficulty relative to academic level or grade. This claim is premised on the fact that several readability studies within the Ghanaian education system point to general text misappropriation to grades and audience in general (Gyasi, 2013a; Nunoo et al, 2021; Owu-Ewie, 2014; & Owu-Ewie, 2018). This undermines adherence to appropriate academic standards in terms of content appropriation, resulting ultimately in poor academic performance (Gyasi, 2013a; Nunoo et al, 2021; Owu-Ewie, 2014; & Owu-Ewie, 2018). In order to ensure that texts are readable to their intended audiences, Gyasi (2017a) recommends that authors use plain and concise language whilst maintaining an average sentence length of 15-20 words. O'Sullivan et al (2020) recommend the application of readability and LD metrics to texts before assigning them to learners at different academic levels. This state of affairs is signaled by gaps in existing literature and methodology in readability studies across the globe. The research gaps identified in this study, which constitute the problem of this study, are two-fold: gaps in literature and gaps in methodology.

In terms of gaps in literature, the departure with the current study lies largely in the focus on genres of writing, lexical density, metric comparisons, inter-grade trend comparisons, the use of whole texts as well as geography/setting of the study. Whilst this study employed the use of whole texts, most studies used text excerpts and this does not provide for fair conclusions on findings according to To (2018) and Kim et al (2018). This is because the readability score of a wholly analyzed text may (most likely) vary from the score for an excerpt of same text (To, 2018 & Kim et al, 2018).

Regarding academic level, the literature clearly reveals a lack of comparison and trend analysis from a lower grade to a higher one (i.e., SHS1 to SHS2 and SHS2 to SHS3 in this study) by most studies (e.g: Fadhillah 2018; Abuquba et al 2022; Turkben 2019; To et al 2013, etc). Existing studies generally stick to particular grades, making no room for comparison. Most of them however do not focus on grade propriety at all, but that is the focus of this study.

Aside, almost all the studies reviewed (except Abuquba et al, 2022) do not cover the comparison of LD and readability metrics. They only apply the metrics to texts (mostly text excerpts) but are not interested in checking if these metrics agree in their application to same texts, and to what extent. Metric comparison is however one of the key objectives of this study. The importance of metric comparison lies in the fact that it provides an opportunity to test the reliability and viability of the metrics as they are applied to texts, adding to validity and reliability of the overall findings.

Also, some already existing studies used texts that are not selected from formal education textbooks. It must quickly be added that a good number of studies, local and foreign, used textbooks (Gyasi, 2019; Gyasi, 2013a; Nunoo et al, 2021; Owu-Ewie, 2014; & Owu-Ewie, 2018; Fadhillah 2018; Abuquba et al 2022; Turkben 2019; To et

al 2013, etc). This study uses texts from a widely used English textbook series (Global Series) within the Ghanaian formal educational system.

Furthermore, very few authors (Fadhillah 2018; Abuquba et al 2022; Turkben 2019; To et al 2013) covered the genre of texts used in their studies. None out of these few studies were conducted in Ghana as this study does. That aside, many of the works (Sholichatun,2011; Bansiong,2019; Istiqomah,2015; Prawinanto & Bram,2020; Li & Zhang,2021; Andri et al,2021; Yulinda et al, 2018, etc) used text excerpts and not the whole texts, creating a difficulty of validity and reliability of results and consequent generalization of findings as observed in Kim et al (2018) and To (2018). This study used whole texts and not text excerpts.

Regarding studies conducted in Ghana, 5 out of the 15 Ghanaian studies reviewed in the current study relate more closely to this study. Apart from the common denominator relationship of setting of the studies (Ghana), Gyasi (2013a), Owu-Ewie (2014 & 2018) and Nunoo et al (2021) used textbooks within the Ghanaian educational system, as does this study. All the Ghanaian studies reviewed in this study however do not include lexical density analysis but only focus on readability, and this remains one of the vacuums this study fills.

In terms of gaps in methodology, reviewed literature in this study suggests that the approximate methodological gap index stands at thirty-seven percent (37%) with a similarity rate of sixty-three percent (63%), representing the 42 unchecked and 70 checked boxes respectively, as illustrated in table 4 under chapter three (page 78). A thirty-seven percent (37%) estimated gap index, representing the 42 unchecked boxes in table 4, in existing contemporary literature on any topic definitely calls for the need to investigate more on the particular subject. Aside this approximate gap index, a

methodological gap filled by this study is the use of the *Global Series* textbook and all the texts used in it for the illustration of the narrative, descriptive and expository genres of writing.

In sum, regarding the use of empirical methodology, the current study employed the use of Ure (1971) LD formula; Halliday (1985b) LD formula; Gunning FOG Index; Flesch Reading Ease (FRE) scale; and Flesch Kincaid-Grade Level formula in data analysis. Comparing this study to the most closely related studies (some of which are identified above) in terms of methodology, it is clear that the tools of data analysis in each study vary largely with those used in this study. This creates a wide methodological gap, which the current study fills. Regarding empirical literature, the current study includes content on lexical density (LD). Very few of the local most related studies used in this study includes lexical density. The use of LD and its measuring formulae in the current study fills both methodological and literature gaps. Whilst none of the related Ghanaian studies took interest in genres of writing and formula comparisons, the current study investigated these, thereby filling the gap in terms of genre and formula comparison. From the foregoing, it is clear that this study has attempted filling up methodological, empirical and literature gaps in the field of readability.

1.3 Purpose of the Study

Over the years, there have been myriads of unfavourable reportage from the West African Examinations Council (WAEC) regarding the generally poor performance of SHS students at the West African Senior School Certificate Examinations (WASSCE). Among other factors, poor understanding of written

material (i.e., questions, passages, instructions, etc) constitute the reason for this state of affairs.

One may therefore wonder whether students at the senior high school in Ghana really understand what they read from their textbooks. The reading and understanding of texts from assigned textbooks to various grades by students of those grades forms the primary prerequisite for general academic excellence. Not understanding what one reads is only as good as not reading at all. This implies therefore that texts assigned to various grades at the SHS in Ghana ought to meet general readability standards so as to boost academic performance by carrying along all shades of learners.

A text that does not fit the readability level of a particular grade (higher or lower than the intended grade) is a disincentive to a learner's academic progress as it retards comprehension and breeds learner apathy among other disadvantages. Some learners may get frustrated along the educational ladder as a result of this and may ultimately drop out of school. On the flip side however, appropriate text propriety to intended grades affords all learners an equal opportunity to realise their maximum potentials academically. Good academic performance will no longer be the unfettered reserve of the naturally endowed learner or those who are capable of hiring supplemental teaching and learning services beyond what is offered in the regular formal classroom.

To that end, this study purports to determine the suitability or otherwise of texts assigned to various grades at the SHS level in Ghana. The study does this by applying readability and LD metrics to sampled texts to determine their readability status. The inter-grade variability of text difficulty is also determined to ascertain whether it falls within the acceptable standards. Readability metrics are expected to be generally consensual in their application to same texts in terms of their scores. This study makes

provision for checking this assumption by establishing the degree of agreeability of readability metrics as they are applied to same texts in this study.

Summarily, the study is a major work in the general field of text complexity aimed at investigating the suitability or otherwise of texts used in English textbooks at the Senior High School level in Ghana to intended learners. This serves to check the arbitrary appropriation of texts to grades in Ghanaian Senior High Schools. The study has done a comparative application of readability and lexical density metrics to texts to establish their suitability or otherwise to their respective assigned grades. The study is not interested in comparing the academic performance of learners with appropriate or inappropriate text difficulty.

1.4 Research Objectives

1. To explore the level of LD and its relationship with readability of texts used in Senior High School English textbooks across genres of writing in Ghana.
2. To examine the degree of text-grade variation of the selected texts from one grade to another in SHS English textbooks in Ghana.
3. To assess the suitability of texts assigned to grades in Senior High School English textbooks across genres of writing in Ghana.
4. To determine the agreeability rate of lexical density and readability metrics when applied to same texts.
5. To compare metric and grader readability assessment of assigned texts.

1.5 Research Questions

1. What is the level of lexical density and its relationship with readability of texts used in Senior High School English Textbooks across genres of writing in Ghana?

2. What is the degree of text-grade variation of the selected texts from one grade to another in SHS English Textbooks in Ghana?
3. How suitable are the English textbooks of Senior High School across genres of writing in Ghana?
4. How do lexical density and readability metrics agree in their application to same texts?
5. How do metric and grader readability assessments reconcile?

1.6 Justification of Research Questions

Research Question 1: *What is the level of lexical density and its relationship with readability of texts used in Senior High School English Textbooks across genres of writing in Ghana?*

In order to achieve the overall goal of measuring text-grade suitability, a good study must first establish the degree of LD and readability of the texts used for the study. The LD/readability levels of the texts are compared with the acceptable standards as opined by Ure (1971) and Flesch (1948). Whilst Ure's (1971) LD propositions identifies 40%+ lexical density as being on the high side, Flesch's (1948) text-grade readability scale classifies readability values according to grade suitability. To that end, merely establishing the degree or levels of LD and readability of the texts does not directly help the course of the study. It is a step towards determining the relationship between LD and readability. This research question therefore helps in finding out whether high LD directly and necessarily translates into low readability and vice versa as contained in one of the ground assumptions of this study.

Research Question 2: *What is the degree of text-grade variation of the selected texts from one grade to another in SHS English Textbooks in Ghana?*

In an attempt to measure the suitability of texts to intended grades, one critical factor at play is that the inter-grade difficulty levels ought to be within acceptable limits (Halliday, 1985b; Flesch, 1948). Halliday (1985b) and Flesch (1948) have estimated the maximum inter-grade variation index to be 33.3% and 35% respectively. Halliday's (1985b) proposition involves what he calls the *inter-grade variation refraction index of 1:11%,* whilst that of Flesch uses the direct readability value of a text as revealed by the formular. When the readability or LD value of a text falls outside these standards, it is deemed not fit for the ensuing grade for which it is intended. Ensuring that the inter-grade variation index of texts fall within acceptable limits is crucial in making sure that learners are fairly treated. Without doing so, a lower text may be assigned to a higher grade (resulting in retarded learning) whilst a higher text may be assigned to a lower grade (resulting in difficulty in coping). This research question is thus concerned with finding out whether the incremental difficulty levels of texts between grades are commensurate.

Research Question 3: *How suitable are the English textbooks of Senior High Schools across genres of writing in Ghana?*

This research question is interested in establishing the general degree of appropriateness of English textbooks to learners at SHS in Ghana. With all factors carefully considered in analysing the sampled texts, this question seeks to establish an overall estimate of the extent of appropriateness or otherwise of English textbooks to their intended learners. It is targeted at a broader generalisation of findings, necessary to inform policy. The Flesch text-grade readability index is used in measuring text-

grade suitability (Flesch, 1948) across the 45 different texts in the 180 separate analyses using the 4 LD and readability metrics. Research question 3 therefore looks at this broader picture to draw conclusions rather than focusing on specific issues as in research question 1 and 2.

Research Question 4: *How do lexical density and readability metrics agree in their application to same texts?*

This angle of the study looks at the consensus levels of LD and readability metrics as they are applied to same texts. Indeed, this research question tends to validate the reliability of the metrics used in computing LD and readability values. If these metrics are anything to go by, one expects them to have a fair degree of agreeability when they are used in analysing the same text. It would be curious to find that they disagree vastly as that would raise questions of doubt regarding their reliability and validity as methodological tools in doing readability studies. Research question 4 is thus a check on the methodology employed in this study. This is relevant and crucial to the extent that the strength of every good research lies in the accuracy of the methodology employed.

Research Question 5: *How do metric and grader readability assessments reconcile?*

Beyond metric readability assessment of sampled texts for this study, it is very necessary to ground the study in proper context and perspective by testing readability on the ground. This is done by allowing graders to make their personal individual assessments of the texts. The procedure in allowing graders to assess texts is well laid out under the methodology section of this study. That way, we are able to compare the metric and grader assessment values and make a more sound judgment of the texts regarding their suitability or otherwise for the respective grades. To this end, this

research objective serves to validate or de-validate metric readability assessments. Where there is contradiction in metric and grader assessment, the grader assessment supersedes.

1.7 Ground Assumptions

This study operates on the following assumptions:

1. That Lexical Density (LD) and Readability vary according to text levels and genres of writing in Ghanaian SHS English Textbooks.
2. That written texts have higher lexical density and readability levels than non-written texts.
3. That a text with high LD will have low readability and vice versa.
4. That authors are mindful of academic levels (grades) when assigning texts.
5. That lexical density and readability formulae should generally agree when applied to same texts.
6. That metric and grader assessment of readability of same texts should yield same or close outcomes.

1.8 Significance of the Study

This study expands and elucidates researchers' knowledge about the relationship between genres of writing, lexical density and readability in general. To the English textbook author, it is a guide in the appropriation of texts to grades. To the teacher of English Language, it provides the opportunity to check suitability of texts to intended grades. To the policy makers in education in Ghana, it is a guide for curriculum development and expansion. Indeed, it is not only texts in English textbooks that would have to be measured before assignment to grade levels, but all texts used in all subjects. The difficulty level of the language used in texts in other subjects could be assessed

using the criteria in this study to ensure right text appropriation to grades, which would invariably result in better learning outcomes in all subjects.

Also, the study adds to scholarly knowledge in various dimensions. It creates an interface between Ure and Halliday's LD formulae, making room for their comparison. This enables one to assess the extent of consistency or reliability of the two formulae. Halliday's (1985b) LD formula is said to be an improvement upon Ure's (1971) LD formula but Halliday's formula comes with its own attendant weaknesses. A fundamental weakness is the ambiguity in classification of some lexemes, particularly adverbs and phrasal verbs. Halliday himself noted that some adverbs are on the "borderline", making it difficult to classify them as either prepositions or adverbs. He cites examples of some English prepositions and adverbs such as "besides", "around", "always" and "perhaps". He also identifies phrasal verbs as single words, e.g., stand up, take on, move about, etc. In the face of these challenges and given that Halliday's method is an advancement upon Ure's method, the study affords us the opportunity to determine which one is more consistent and reliable in determining LD and readability.

Again, the study unravels which genres of writing present the highest levels of lexical density and readability. It is necessary for authors and teachers to know this so that they can regulate text levels to occasion positive learning outcomes. Genres of writing that naturally elicit high lexical density would be noted and the teacher would be more careful in using such texts for instance in introducing reading comprehension. High lexical density means a text is highly informative (loaded with information). Therefore, this study will help the reader or learner to know which genre to employ in writing based on the goal of communication.

Furthermore, some readings in the literature on this subject shows studies on the correlation between genres of writing and lexical density but most of these studies used text excerpts instead of entire texts as authored. This compromises validity of findings since an LD study of a full text may yield very different results from an LD study of a text extract. Who says the author is not conscious of LD and readability whilst assigning a text to a level? This study assumes a degree of 'novelty' in this direction as it uses full sampled texts as against many other reviewed works in this study which used text excerpts. By doing this, we get to know if authors are conscious of text difficulty levels whilst assigning them to various academic levels. Also, by using full texts, the statistical analysis is improved, thereby enabling much accurate conclusions and generalizability. This then becomes the standard for subsequent studies. The study is thus stronger since it uses full texts.

Summarily, the study generally adds to the knowledge base of lexical density, readability, grammatical intricacy and genre analysis within the broader framework of syntax as the study is a descriptive content analysis. Its permutation of metrics and academic levels across genres of writing makes the study largely novel, especially within the Ghanaian context. Conclusively, the study has a fair degree of uniqueness since it is within the Ghanaian context, adding to the knowledge base of text complexity in general.

1.9 Limitations of the Study

First, the use of one particular textbook series limits the extent to which findings can be generalized and used in informing policy. It could be that it is only this chosen textbook series (Global Series) that has problems with text suitability or the vice versa and not all English textbooks in Ghana. The study is thus limited in this regard, though

it has a strength as it makes room for one to properly study whether authors, assigning texts to varied grades in one textbook series, are conscious of text-grade dynamics.

Another restriction on this study is the ambiguity in classification of some word classes. Conjunctive adverbs like *unless, although, because*, etcetera, sometimes pose problems in terms of classifying them as content or functional words. If the researcher gets the classification wrong for some of the words, it goes a long way to affect the overall findings and conclusions arrived at by the study.

The last challenge this study faces is the extremely mathematical/computational nature of the analysis. A slip in calculation on the part of the researcher can undermine the entire findings. The process of counting syllables, lexemes, clauses and sentences is a tedious one and equally tedious is the process of applying the proposed formulae. This puts the study at the risk of mathematical misrepresentation. Having identified the possible threats to the validity and reliability of this study, let us look at how these threats are managed by the researcher.

First, the use of one textbook series makes for fair comparison of texts used and helps us understand whether authors really consider text levels in producing English textbooks. The revelations from this study therefore prepare the grounds for an in-depth comparison of English textbooks in Ghana in terms of grade suitability. It is said that the foundation of everything is the most important factor in determining the overall success of it. Since this study can largely be considered as foundational in terms of its varied scope of analysis and the use of the Ghanaian context, it would serve as the stepping stone upon which further studies in the area of lexical density and text readability in Ghanaian English textbooks can be done. Every research opens windows

for further studies and this study does that even more to the extent that it is largely a trail blazer for further research in this direction, particularly in Ghana.

Also, when word class ambiguity arises during classification, the context of use greatly helps in unlocking the ambiguity. The researcher therefore paid much attention to context of use so as to classify all words appropriately to provide for validly reliable findings.

Lastly, the risk of mathematical misrepresentation has been checked as the researcher was very meticulous with details in the analytical process. The researcher engaged the services of two experts in the mathematical sciences to compute LD and readability values. Mathematical calculations have been double-checked severally to ensure the accuracy of LD and readability values arrived at. Indeed, the entire work demands the researcher to pay particular attention to detail and with this at the back of the researcher's mind, mathematical misrepresentation has been curtailed.

1.10 Delimitation/Scope of the Study

In terms of data, this study uses only Senior High School English textbooks and further limits itself to texts from three main genres of writing, namely, descriptive, narrative and expository. Whole texts representing each of the three genres of writing under study here are sampled across the three academic levels of SHS in Ghana.

Regarding methodology, the study uses the descriptive qualitative approach to content analysis. As already indicated, it is a qualitative content analysis using the descriptive approach to data analysis. It employs the qualitative design, but using quantitative procedures in the presentation of data. Content analysis methods for lexical density and readability are used: Ure LD formula and Halliday LD formulae on one hand; as well as Gunning Readability formula and Flesch Readability formulae on the

other, respectively. Flesch's Grade-Readability Index remains the measuring standard in judging text-grade suitability.

Data analysis in this study is mathematical as well as graphical, and there was no external influence on computational outcomes. Indeed, this gives the study a scientific outlook as results can be tested and investigated. The study used texts in English textbooks assigned to only SHS learners (SHS 1 to 3) in Ghana. Geographically, this study was conducted within the Ghanaian educational system.

1.11 Organisation of the Study

The study consists of a total of five (5) chapters. Chapter 1 is the introduction to the study in which a general overview of the topic has been discussed. Topics under this section include introduction, background of the study, problem of the study, purpose of the study, research objectives, and research questions, significance of the study, limitations, delimitations and organisation of the study. Chapter 2 looks at the review of relevant literature in relation to the topic under study. It is devoted mainly to an empirical review of literature on readability, lexical density and the frameworks used for the study (theoretical and conceptual).Specifically, the review of literature in chapter 2 includes among others: the lexicon, text complexity, lexical density, grammatical intricacy, the nature of text and readability. This enables the researcher to unveil the existing gap which the study seeks to fill. Chapter 3 outlines the methodology for the study. This chapter examines the research design, research paradigm and approach, data collection procedures, data collection instruments, sampling/sample size, data analysis plan and the trustworthiness of data (ethical considerations). Chapter 4 is the data analysis. The data analysis centred on the five (5) research questions in the study. Therefore, the focus of the analysis was on the LD/Readability levels,

LD/Readability relationships, inter-grade variation, text-grade suitability, metric consensus and metric-grader assessment reconciliation. Finally, chapter 5 contains the summary of the findings as revealed in chapter 4, as well as recommendations based on the findings. Conclusions are drawn based on the findings. The implications of the findings as well as suggestions for further studies form part of this chapter.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter is an empirical review of relevant literature in the area of text readability, lexical density and theories on readability. This segment explores in detail, works which are related to this study in terms of readability by identifying the similarities and departures between this work and the reviewed works in this study. The review focuses quite extensively on lexical density as a major tool in determining text readability. As indicated earlier in this chapter, various factors influence the readability of a text. However, lexical density remains the single most significant factor in determining text readability, hence the focus on LD alongside the theoretical, analytical and conceptual frameworks underpinning the study. These frameworks serve as a guide in the analysis and drawing of key conclusions.

2.1 The Readability Theoretical Concept

As a (theoretical) concept, readability states that the ease at which a text can be read and understood determines the readability of it. Gunning (1952) defines it as the "easy degree" of a text to be understood. That is, readability refers to how easily one relates with written content. Gunning (1952) is widely credited with this concept through his innovation of what he called the Gunning Fog Index (GFI). Under this concept, 'difficult' words are counted and added to average number of words per sentence and then multiplied by 0.4. This gives the readability degree of the text under study. This procedure is applied in the analysis of sections of the data for this study.

2.2 Text Readability: Empirical Review

Fata et al (2022) attempts to evaluate the reading content in two distinct English textbooks that were released by various publishers in terms of readability. Numerous studies have been done to look at the reading materials in English textbooks, and the results have shown that the reading materials weren't good enough for the students' levels. The study analyzed, interpreted, and described the data using a descriptive content analysis method. As a tool, the Flesch Reading Ease formula was used. The English textbooks "Pathway to English" by Erlangga and "Bahasa Inggris" by The Ministry of Education and Culture were the source of the research's data. The research's conclusions show that five of the fifteen reading books correspond with the first textbook's students' level (a fairly difficult level) corresponds to three texts out of thirteen, whereas the second textbook's students' level (a fairly difficult level) corresponds to three texts out of thirteen. Additionally, the texts in the first textbook are classified as "standard" by the average readability score, whereas the texts in the second textbook are classified as "fairly difficult." Based on the study's findings, educators are advised to apply the readability formulas to assign pupils to suitable reading levels and to do additional research on readability in a broader context.

Kim et al (2018) used these readability tools: Automated Readability Index, Coleman-Liau Index, Flesch-Kincaid Grade Level, Gunning Fog Index and Simple Measure of Gobbledygook Index. An average reading grade level (AGL) was calculated by taking the mean of these five indices. Findings revealed that the full texts of the 100 most cited articles appear more readable than their respective abstracts. This according to the study, suggested that abstracts are generally more coded with technical language in scientific writing than their full texts. Experimental articles and methodology papers were also found to be more readable than reviews or meta-analysis

whilst articles published in journals with higher impact factors were found to be less readable. That study applied various readability metrics on the same texts and was also interested in comparing readability values of full texts and their excerpts (abstracts). The current study used whole texts and compared readability values using different readability formulae much the same way as Kim et al (2018).

Hidayatillah and Zainil (2020) researched into the readability of a course textbook on Semantics and Pragmatics in Indonesia. Students of this course in Indonesia complained of poor understanding of texts in the textbook, resulting in their poor performance in the course. The study therefore sought to probe the correlation between the students' low scores and readability of the textbook texts. The researchers measured the readability level of the textbooks, the factors which influenced readability levels and the best way to use the textbook. Using 3 pages from 3 Chapters of the textbook (Chapter 9,10 & 11) and using questionnaire, interview and online readability instruments, the study concluded that the readability level of the textbook was indeed too high (73.09), resulting in the difficulty in reading the text by students. Unfamiliar or complex vocabulary and lack of reading interest were identified as the leading factors influencing the poor readability by students. The primary objective of that study and the current study are the same—to determine text-grade suitability.

O'Sullivan et al (2020) sought to quantify the difficulty level of clinical research Patient Information Leaflets/Informed Consent Forms (PILs/ICFs) using validated and widely used readability criteria (Flesch 1948 reading ease scale; Gunning 1952 Fog Index) which provide a broad assessment of written communication. They also wanted to compare their findings with best practice guidelines. From the total of 176 PILs that were collected, 154 were evaluable. None of the PILs/ICFs had the mean reading age of greater than 12 years recommended by the American Medical Association. Seven

point one percent (7.1%) of PILs/ICFs were evaluated as having “plain English”; 40.3% was fairly difficult; 51.3% was evaluated as difficult and 1.3% was evaluated to be very difficult y. No PILs/ICFs achieved a CCI of less than 90, with only two documents complying with all six best practice literacy metrics. The PILs/ICFs in the study were found to be inappropriately complex when assessed against both traditional readability criteria and health literacy-based tools. Compliance with guidelines was also found to be poor on the part of literacy agencies. This study relates to the current study in its application of more than one readability formular to the same texts. This provides for formular comparability.

Slippe & Gyasi (2019) investigated the readability of English language textbooks for University of Cape Coast diploma students at the Center for Distance Learning. For the study, three textbooks for year one through year three diploma students were used. For readability studies, selected passages from each textbook were used. The textbook readability scores were calculated using the Flesch – Kincaid grade level (FKGL) and Flesch reading ease (FRE) indexes. The data were analyzed using bootstrapping, one-sample T-tests, and measures of central trends. According to the results, the three textbooks fell between the categories of "fairly difficult" and "difficult" to read (M = 40.69 and 52.73). How readable the textbooks are was discovered to differ statistically from the suggested readability ratings for openly accessible documents. Additionally, the results showed that for all three textbooks, the average word count per sentence should be between 22 and 25. This might have had a part in the textbooks' poor readability. The researcher suggests that the textbooks be revised in order for them to fulfill their intended function and support efficient English language instruction and learning.

In Hakim et al (2021), the study makes an effort to use the Coh-Metrix to assess the readability level of an English textbook. Since a textbook is the object of analysis, content analysis is used. Through the development of a relationship between the Coh-Metrix test result and the students' perceived readability, this study additionally builds on earlier research on readability metrics. Using cohmetrix.com, an automated Coh-Metrix readability assessment was carried out to collect the data. Additionally, 35 pupils in the tenth grade were given a questionnaire on their perceived readability in order to obtain a deeper study. Next, Miles and Huberman's interactive model was used to analyze the gathered data. Despite the small discrepancy between the Coh-Metrix-generated reading level and the perceived readability level, the majority of the texts in the book are still below the students' level, according to the study's findings. The textbook offers intelligible input; thus, it may have some promise for language learning.

In Hidayat (2016), however, the purpose of this study was to investigate how readable a textbook was for Indonesian senior high school students in Grade XI, Semester 1. *What is the readability level of the reading passages in the English textbook?* was the research question posed in this study. At the time, this book was the newest and first English textbook utilized under the Kurikulum 2013. The reading texts in the study were analyzed using the Flesch Reading Ease Formula. The readability level was ascertained by applying the formula. The results indicate that the book, with a score of 69.392, was in the Standard level. Stated differently, the reading materials were largely appropriate for kids in the eleventh grade.

For Kolahi & Shirvani (2012), the primary goal of the study was to use the Gunning Fog Index to assess the readability levels of Persian translations and English translation textbooks. In order to do this, the study's corpus included five translation textbooks, one in English and the other in Persian. These textbooks were selected since

they are the only ones available in Persian translation. Two hundred and eighty-four sample texts total—142 from English translation textbooks and another 142 translations of the corresponding English sample texts—were selected at random and evaluated for readability. According to the study's findings, the average Fog Index for English translation textbooks was 16.4, but the average FOG Index of their Perisan translation was 20.1. This indicates that the readability level of Persian translated textbooks is 3.7 grade levels higher than that of their English counterparts. The writing becomes less readable as the Fog Index rises. The study's conclusions demonstrated that Persian translations of textbooks are not as readable as their English counterparts.

Langeborg (2010) aimed to evaluate the readability of texts from four English textbook series for Swedish school years 7-9 and to find out if the text difficulty increases within the series with each assigned difficulty level and grade level. In order to ascertain whether these textbook series are comparable in terms of average readability, the study also sought to compare them. The readability grade levels of a sample of 231 texts from the series Good Stuff, Happy, Time, and Wings were determined using the readability formulas Flesch Reading Ease and Flesch-Kincaid in Microsoft Word 2007. According to the results of both algorithms, texts often get harder with each passing school year and level. The study did reveal, however, that there is a wide range in text complexity and that there are variations in average difficulty levels among the four series.

In Maryansyah (2016), the study examined the readability of texts used to teach reading to pupils in the ninth grade at an Islamic secondary school that is owned by the state. The study employed a quantitative approach and is descriptive in nature. Its goal was to find out how readable the texts that MTsN 2 Kota Bengkulu's IX grade pupils were taught to read. The 63 texts that MTsN 2 Kota Bengkulu's IX grade pupils were

taught to read were the subjects of this study. The Fry readability formula (graph) was the tool utilized to gather data. The percentage method was used to interpret the data. According to the research findings, for grade IX students at MTsN 2 Kota Bengkulu, 54% of the 63 texts are simple; 27% of the 63 texts are tough; 10% of the 63 texts are invalid; and 9% of the 63 texts are appropriate. Taking notice of the research findings, here are some recommendations: It is recommended that English teachers at MTsN 2 Kota Bengkulu apply readability analysis to texts before using them to teach reading; that authors of English textbooks meant for grade IX students be cognizant of the readability of the texts they incorporated into their textbooks; and that other researchers carry out additional research on the results of this study by employing other readability formulas, or other methods of readability analysis.

In Miftahurrahmi et al (2017), the primary emphasis of the study is how readable the HSSC-II textbook is. The study assessed the HSSC-II English textbook, which is taught at all colleges associated with the Federal Board of Intermediate and Secondary Education (FBISE), in light of the significance of textbook evaluation. The readability of a few chosen passages from the book has been assessed by analysis. The texts were examined using the Text Readability Consensus Calculator (TRCC), an online text evaluation tool that establishes the reader's age, grade level, and text readability in addition to the content's appropriateness. The students' comprehension test scores and the text's readability scores as determined by the TRCC were compared. In this comparison, the evaluator evaluates the simplified text as "fairly easy to read" for native readers among 12–14-year-old 7th and 8th grade students, whereas the original text is rated as "fairly difficult to read" by 13–15-year-old native readers among 8th and 9th grade students. Even though the results of the comprehension test for non-native readers indicate that the book is quite challenging, non-native students in the

12th grade, who are on average 17 years old, only scored 39% in the original text and 47.6% in the simplified version. The study ends with some recommendations for the text designer to take into account several aspects in order to make the content readable at the kids' grade level.

Sholiha (2018) examines the degree of readability of texts in the English textbook "Bahasa Inggris" for XII senior high school students. This study employed a descriptive qualitative methodology. The readability level of the texts was analyzed using the Flasch Reading Ease Formula to collect the data. Six works out of 16 are legible or appropriate for Senior High School students in grade XII, according to the research's findings. These fall into two categories: reading level range scores 30–50 and 50–60. The text's description style can be challenging at times.

The goal in Yulianto (2019) is to use automated computer methods to assess the readability of English reading texts. In this qualitative study, eight reading texts will be examined. The Pathway to English 2 Textbook for the Eighth Grade of Junior High School Students is an English textbook that served as the source and source of data for this study. By Erlangga, published. The findings show that just one text was suitable for junior high school pupils in grades seven or eight. Six texts were suitable for primary school students. Additionally, there was one text that senior high school students may use.

In Tabatabaei (2013), the readability indices of reading passages in English textbooks used in senior high schools in Iran were taken into consideration. Thirty English texts were entered into a computer to estimate the Flesch readability indexes of the passages in order to measure the readability indexes of the passages. In order to determine how interested or knowledgeable the students were in the passages in their

English textbooks, this study also looked at the prior knowledge-interest levels of the students. A Likert-type scale questionnaire was filled out by 120 participants in the study, 60 of whom were male and 60 of whom were female. The investigation also examined the relationship between students' interest and background knowledge levels and the readability indices of the texts. The study's findings showed that the readability indices of the sections in English textbooks for high school students did not meet the Flesch readability requirement. The findings also revealed that when it came to reading sections from their English textbooks, most students had a mediocre level of enthusiasm and previous knowledge. The study's conclusions showed a strong correlation between students' levels of interest and prior knowledge. According to the Flesch readability formula, there was a substantial association between these two variables in book one, but this study also revealed an inconsequential relationship between students' interest level and the readability indices of the passages in books two, three, and four. The final section of the study's findings showed a negligible correlation between students' experiential knowledge and the readability indices of the sampled texts.

Turkben (2019) analyzed the readability levels of texts in Turkish course textbooks to reveal the understanding of texts selected. Two formulae adapted to Turkish language were used in identifying the readability levels of texts by considering the number of words in a sentence and the syllables in a word and then going on to calculate the average word and sentence length to arrive at the readability scores of texts. The results revealed that the readability levels of narrative texts are easier compared to informing texts. The link between that study and this current one lies strongly in textual genre readability.

Li and Zhang (2021) investigated the readability levels of English course books (4 of them) for college students. They used Flesch Reading Ease Scale as the main tool

for the analysis. The aim of the study was to ascertain whether the compilation of the course books considered the rule of text difficulty developed from low to high. The study drew the conclusion that readability scores differ significantly among the texts in the four volumes of the course book. Texts in Volume 3 had a shorter average sentence length than those in Volume 2. Volumes 1, 2 and 4 generally showed a trend of increasing difficulty from low to high with volume 3 having lower value than Volume 2. The relationship between Li and Zhang (2021) and the current study is the focus on text-grade suitability.

Gallagher et al (2017) mapped science curriculum standards onto various texts namely, literacy readers, trade books and online articles. In that study, the analysis statistically points to inconsistencies among readability formulae for Grades 2 to 6 levels. A lack of correlation was detected among readability measures whilst comparing the different text sources. Online texts were identified to have very varied levels in terms of text difficulty. This implies that elementary school teachers should support students who learn through reading online, science-based resources. With the evolvement of learning through multi-modal literacies in the 21st Century, the readability of online, content-based text should be evaluated to ensure accessibility to all readers. That study discovered inconsistencies in readability formulae when they are applied to the same texts across academic grades. The current study equally compares readability formulae in their application to same texts across grades.

Bansiong (2019) analyzed 4 commercial science textbooks designed for third grade Filipino learners, on the basis of readability and comprehensibility, content and mechanical features. Sonmez's formular and the Cloze test methods were used to determine comprehensibility whilst readability was explored with the use of popular readability indices namely, Gunning and Flesch Readability indices. Textbook

alignment with national science standards, conceptual errors and level of gender bias formed the content features under exploration. The mechanical features under review included the lay-out, printing and handiness of the textbooks. Readability analysis suggested that the textbooks were about 3 to 4 grades more advanced and 2 to 3 years older than their intended users. Generally, the dominant reading ease of the 4 course books were between "fairly easy" to "easy". There was no "very easy" rating and they ranged through "difficult" to "very, very difficult". Generally, the 4 textbooks were suitable for 6th and 7th grades. The texts were rated as highly aligned to the country's national science standards. Three of the 4 textbooks were found to be gender fair while one had low-level male bias. Averagely, the error/conceptual problem density was at one error in every six to eight pages. Misidentifications were found to be the commonest conceptual problems in the textbooks. Mechanically, the textbooks were found to be very good as they were very good in printing, lay-out, paper quality, binding and handiness. Bansiong (2019) has its focus on text-grade suitability using different readability metrics. That is exactly the primary focus of the current study.

Lee and Lee (2020) used the LXPER Index to assess readability of texts for non-native English speakers. This was informed by the fact that most readability assessments are usually done on native readers/speakers of English. These assessments yield low accuracy scores when applied to non-native English language training curriculum. The researchers applied all the 22 features of the LXPER Index to cause validity and reliability of readability scores. A text corpus of the Korean ELT curriculum was used as the data (CoKEC-text). This was the first collection of texts from a non-native country's ELT curriculum. The results showed that the new model, LXPER trained with CoKEC-text significantly improves the accuracy of automatic readability assessment for texts in the Korean ELT curriculum. This method can be

adopted for other ELT curricula around the globe. Lee and Lee (2020) did not compare readability formulae but focused on only one readability model (CoKEC-text) as does the current study. It however also focuses on text-level suitability just like the current study.

2.3 Readability Studies in Ghana: Empirical Review

Narrowing down the focus on readability to the Ghanaian local context, a number of studies come to mind. Notable among them are the studies conducted by the renowned Ghanaian readability scholar at the University of Cape Coast, Ghana, Prof. William Kodom Gyasi.

Gyasi (2011) was an analysis of the readability of the essays of first year students of Ghanaian universities was conducted using University of Cape Coast as a case study. Two hundred and eighty students were selected across four (4) programmes of study namely Business, Arts, Science and Education. The selected students were made to write an easy on the topic: *Ways of Conserving Electric Energy in the Various Halls of residence of the University of Cape Coast*. Electronic forms of the essays were collected and fed to a computer. Using Microsoft word (2007) version, a Flesch-Kincaid Reading Ease analyses of the essays were run. With the aid of SPSS (version 16) frequencies and percentages of the Flesch-Kincaid readability scores were obtained. Other statistical tools like Levene's test of equality of variance, a One-Way Analysis of Variance (ANOVA) and t-test were used. There is a link between Gyasi (2011) and the current study methodologically as in the application of the Flesch-Kincaid Reading Ease to the student manuscripts to determine their readability levels.

Gyasi (2013a) investigated the readability of science textbooks for senior high schools in Ghana. The researcher used the survey research design for the study. Using

stratified sampling technique, a sample size of 300 SHS 1, 2 and 3 students were drawn from five senior high schools in the Cape Coast Metropolis of Ghana. The Gunning Fog and Cloze Test readability indexes were used to examine the difficulty level of the Physics, Chemistry, Biology and Integrated Science textbooks for senior high schools, written by the Ghana Association of Science Teachers (GAST). Findings revealed that, the books are difficult to read on the average and that the Integrated Science textbook is the most difficult among the textbooks, followed by the Physics textbook. That study employed the use of textbooks used in the Ghanaian educational system just like the current study, and it is one of the most closely related studies to the current study in terms of core focus and purpose-text appropriation to intended grades.

Gyasi (2013b) was an in-depth analysis of the readability of commonly used malaria medicine information leaflets in Cape Coast, Ghana. Seven leaflets of malaria medicines that are very popular in Cape Coast, Ghana were analyzed using the Flesch-Kincaid Reading Ease and Gunning Fog readability indexes. These leaflets were also examined based on the legibility of print, type of paper and bilingual information. Data collected from the two indexes revealed that all the leaflets are very difficult to read. Values ranged from 10.4 to 38 for the Flesch-Kincaid Reading Ease indicating that the leaflets are very difficult to comprehend and that one needs university education to comprehend them.14.2 to 18.8 were recorded for the Gunning Fog index also indicating that the leaflets are very difficult and that in some cases are even not readable for people with university education. The mean value for the readability consensus for the two readability indexes was 21.04. The implication is that in terms of the Gunning Fog index, the leaflets are very difficult to comprehend and that they were written far above the reading comprehension level for university graduates. Also, in the case of the Flesch reading ease regarding the readability consensus of the two indexes, the leaflets are very

difficult to comprehend in terms of level of reading difficulty but match the appropriate reading level of the university graduate. The findings of the study also revealed that 5 leaflets (71.4%) had a font type size <10 and none (0%) was produced in any of the major languages in Ghana apart from English and French. Conclusively, the study discovered that malaria medicine information leaflets available in drug stores and hospitals in Cape Coast, Ghana are not readable to the majority of the population. The significance of rendering the valuable information contained in those leaflets comprehensible to consumers is life and death matter. Hence, pharmaceutical companies in Ghana are encouraged by the researcher to produce readable medicine information leaflets so that their intended purpose can be achieved. This implies that the readability of texts in the leaflets did not suit the general intended audience and this relates directly to the third objective of the current study. Another relationship between the two studies is the comparison of readability values as revealed by the Gunning Fog Index and the Flesch Reading Ease scale after they were applied to the same sampled texts. This also relates directly to research question four of the current study which is interested in the extent to which readability indices agree in their application to same texts.

In his Doctoral thesis at the University of Cape Coast, Gyasi (2017a) sought to explore the level of readability of Research Articles (RAs) produced by lecturers in the Faculty of Arts in the University of Cape Coast. The descriptive research design was used and the stratified random sampling technique was employed to collect 100 RAs across the eight (8) departments of the Faculty of Arts. Readability scores were computed using Flesch reading ease (FRE) and Flesch Kincaid-grade level (FKGL) indexes. With the help of the Statistical Package for the Social Sciences (SPSS) (version 23.0) measures of central tendencies and dispersions, frequencies and percentage

distributions, Wilcoxon signed ranked test, Kruskal-Wallis H test, Mann-Whitney *U* test and Spearman *rho* and *phi* correlation coefficient were used to analyze the data. The results showed that a majority (63%) of the research articles were graded as 'difficult' to read; that is, above the 'standard' readability level of 60 when measured on the FRE scale. In addition, Mann-Whitney U test showed that males and female researchers write RAs with equal readability level. The study further revealed a positive relationship between readability and text comprehension. Research question one of this study aims to establish the readability and LD levels of texts for SHS leaners in Ghana. This relates directly to the core objective of this doctoral thesis by Professor William Kodom Gyasi.

Additionally, Gyasi (2017b) evaluated the readability of the topmost 11 journals published by the Taylor and Francis group. Purposive sampling technique was used to select the 11 journals used for the study. Flesch Reading Ease (FRE) and Flesch-Kincaid Grade Level (FKGL) indexes were used to compute the readability scores. Measures of central tendencies, one sample (with bootstrapping) T-test, and bar graph (with standard error bars) were used for data analysis. The results showed that they are practically unreadable when compared to the standard readability score. The relatedness of that study and the current one lies in the sampling technic (purposive/convenient) and the use of Flesch Reading Ease (FRE) and the Flesch Kincaid-Grade Level (FKGL).

In Gyasi (2017c), the main objective of the study was to evaluate the readability of news releases of the two major political parties in Ghana: The National Democratic Congress (NDC) and the New Patriotic Party (NPP). Seventy press releases (32 from NDC, and 38 from NPP) were selected using the convenience sampling technic. Flesch readability indexes were applied in computing readability values. Frequencies, measures of central tendencies, and one sample T-test using bootstrapping, were used

to describe readability of the press releases. In addition, independent sample T-test was used to compare differences in readability between the two news releases. The findings revealed that news releases by the two political parties were generally 'difficult' to read, compared to standard readability of public documents. A person must have attained an average age of over 13 years of formal education in order to be able to read and understand the news releases of the NDC, while it required about 12 years of formal education, on the average, to read and understand the news releases from the NPP. In addition, the results showed that there was no significant difference in readability between the news releases of the two parties. The current study has bearing with Gyasi (2017c) as the two employ the use of Flesch readability indexes in their analysis.

Gyasi (2017d) sought to determine the readability of Vice Chancellors' reports over a period of five years, using the University of Cape Coast as a case study. Narratives were sampled from these reports and a readability index analysis was run using the Flesch Reading Ease formula. One sample T-test was computed to ascertain whether significant differences existed across the reports. Eta-square was employed to determine the magnitude of effect size where significant differences existed. The mean readability scores of these reports were compared to standard Flesch Reading Ease scores of public documents to ascertain the level of reading comprehension difficulty of the reports. The study revealed that the reports are very difficult to read and that there are statistically significant differences across their readability. The researcher recommended that authors of the report use plain language to enhance ease in the understanding of the reports. The use of Flesch Reading Ease formula serves as a methodological bridge between the current study and Gyasi (2017d).

Gyasi and Owusu-Ansah (2018) attempted to evaluate the readability of annual reports of SSNIT and establish the trend in readability, covering a period of years (from

2011 to 2015). SMOG readability index was used to compute readability scores and descriptive statistics and ANOVA were used to analyze the data. The results indicated that the annual reports of SSNIT were generally very difficult to comprehend. Additionally, the study showed that the readability level of all annual reports was similar. The trend indicates a deterioration in readability of the annual reports over the five-year period. The researcher recommended that authors of the report use plain language to enhance ease in the understanding of the reports. Attempting to establish the trend in readability, covering a period of years is an objective very similar to examining the readability variation trend of texts between grades and across genres of writing (objective 2 of current study).

Gyasi (2019a) sought to investigate the readability of annual financial reports of four Ghanaian banks. The objective is to evaluate the readability of these reports and to establish differences in readability across the reports of the four banks. Convenience sampling was employed to sample annual reports of four banks (GCB, ADB, Fidelity, and Unibank) covering the years 2013 to 2016. SMOG readability index was computed from these reports. Means, standard deviations, and independent sample t-test, with bootstrapping, were used to analyze the data. The results revealed that all four banks used difficult words and sentences to write their reports. In addition, it was established that banks on the GSE and those not on the GSE did not differ in terms of the readability of their annual reports. It was suggested that the banks revisit their writing styles in order to make their reports readable. Establishing the variation in readability of sampled texts across the four banks is an objective which relates strongly to research question two of this study which seeks to evaluate the readability variation between grades and across genres.

Moving further, Gyasi (2019b) examined the readability of some medical information documents for HIV/AIDS patients in Ghana. The SMOG readability formula was used to determine the reading levels of the documents which were obtained through convenience sampling technique. One sample T-test was used to determine whether there were statistically significant differences in the readability of the sampled HIV/AIDS literature compared to a standard 8th grade recommended for public documents. The bootstrapping technique was employed in this evaluation to ensure robust estimates of significant or p-value, standard errors and the confident intervals. The study revealed that the leaflets were generally difficult to comprehend when compared to the standard readability score of public reading materials. The study concluded that it is prudent such documents are written in plane language in order that the target readers would benefit from the information carried by these documents. That study relates with this study as in the use of the SMOG index in calculating readability.

In a joint study, Gyasi and Tettey (2019) evaluated the readability profile of citizens of the English-speaking African countries concerning their constitution. A descriptive research design was adopted while the stratified random sampling was implemented to select the chapters of the constitutions for analysis. The SMOG and FOG indexes were used to compute the readability values. Measures of central tendencies, one-sample T-test, and one-way analysis of variance, with bootstrapping, were carried out with the results showing that the citizens found it difficult reading their respective constitutions when compared to the standard scores for public documents. There is methodological relationship between that study and the current one as in the use of the SMOG and FOG indexes to compute readability.

Switching over to another Ghanaian readability scholar, Owu-Ewie (2014) used the Gunning FOG Readability test, Flesch Reading Ease Formula, Flesch-Kincaid

Grade Level, SMOG Index, Coleman-Liau and Automated Readability Index readability formulae to determine the readability of 48 comprehension passages purposively selected from four different sets of JHS 1-3 English language textbooks. It was found that most of the passages were above the age of learners and were therefore difficult for them to read and comprehend. The findings here relate to the objective of research question one in this study-determining the LD and readability levels of texts.

Again, Owu-Ewie (2018) investigated the appropriateness or suitability of English language and Social Studies textbooks for Senior High School students at various levels within the Ghanaian Educational system. The findings revealed that texts assigned for Senior High School students in their English and Social Studies textbooks are too difficult for the students to understand. It means government and authors of these texts did not consider text-grade levels before assigning these texts. Among other readability checker tools, he employed the use of the two popular tools: Flesch Reading Ease Scale and Gunning FOG Readability test to arrive at these findings and conclusions. Text-grade suitability as well as readability formular comparison form the similarity between that study and the current one. That study also relates to the current study in terms of setting as they both used texts from the Ghanaian educational system.

Nunoo et al (2021) investigated the readability levels of some Integrated Science textbooks approved for use in Junior High Schools in Ghana, using Flesch Readability Ease Index and Flesch-Kincaid Grade formular to determine comprehension levels for the sampled students in the study. A total of 135 pupils drawn from rural, peri-urban and urban Junior High School year 1 to 3 in the Ashanti region of Ghana participated in the study. Findings showed that the selected textbooks had a problematic level of comprehension for many of their intended readership except for those who had additional resources for assistance. The study also revealed that these

approved books employed long sentences and multi-syllabic words to deliver lessons and instructions, making them difficult for Junior High Pupils to understand. The review of this study provides relevant background knowledge for the comparison of readability formulae in their application to same texts as it is the case in the current study. Geographically, that study also relates to the current study as they both used texts from the Ghanaian educational system.

Finally, Fosu (2016) investigated the readability and comprehensibility of English language newspapers in Ghana. It attempted a structural description of the language of the newspapers to explore implications thereof regarding the information function of the Ghanaian press. The study employed a research design that triangulated methods and findings from corpus linguistics and readability studies using front-page stories of four influential national newspapers of the country. The research established that the language used to communicate socio-political news to readers is complex and could be potentially difficult for many readers. The significant implication is that the newspapers may be largely ineffective in transmitting information directly to a wide spectrum of readers for socio-political benefits. This could mean, importantly, that the press may not be performing its information function well. Consequently, the paper makes a case for the press to use relatively readable and comprehensible language to broaden direct access to newspaper messages in the country. That study relates firmly to research question three of the current study-suitability (readability) of texts to intended audience.

2.4 Flesch Reading Ease Scale (Original)

Flesch (1948) propounded what has come to be known as the Flesch Reading Ease Scale. This scale is used to determine the suitability of texts to particular grades using the LD scores of these texts (see first left column of table 1). The range within

which an LD score falls is given a description (see second/middle column of table 1) and this description corresponds to learner grade level (see the third right column of table 1).

Table 1: Flesch's Reading Ease Scale (Original)

Flesch Reading Ease	Description of Style	Educational Attainment Level (USA)
0 – 30	Very Difficult	Postgraduate
30 – 50	Difficult	Undergraduate
50 – 60	Fairly Difficult	Grade10 – 12
60 – 70	Standard	Grade 8 – 9
70 – 80	Fairly Easy	Grade 7
80 – 90	Easy	Grade 6
90 – 100	Very Easy	Grade 5

Adapted from Kim et al (2018)

This scale is widely acclaimed as a reliable means of determining how readable or complex a text is (Kim et al 2018).

2.5 Flesch Reading Ease Scale (Adaptable Translation)

Flesch later translated the original version of the Scale into a more generalized formular to suit other educational systems apart from that of the United States. This generalized formular is captured in table 2. The Flesch text-grade formula was accordingly revised to reflect this adapted translation. In the adapted translation therefore, the higher the grade, the higher the readability value and vice versa.

Table 2: Flesch's Reading Ease Scale (Adaptable Translation)

Flesch Reading Ease	Description of Style	Educational Attainment Level (USA)
0 – 10	Very Easy	Grade 5
10 – 20	Easy	Grade 6
20 – 30	Fairly Easy	Grade 7
30 – 40	Standard	Grade 8 – 9
40 – 50	Fairly Difficult	Grade 10 – 12
50 – 70	Difficult	Undergraduate
70 – 100	Very Difficult	Postgraduate

Flesch (1948)

Flesch's (1948) Reading Ease Scale measures sentence length and the number of syllables per 100-word passage (Kim et al 2018). Flesch's (1948) measure of reading ease was used. The formular is stated below:

Reading Ease = 206.835 – 0.846wl – 1.015sl

Wl = Total number of syllables of the words in the passage

Sl = The average number of words per sentence.

Using this method, the figure 42.98 shows average difficulty level of a text (Kim et al 2018). The reading ease ranges are commensurate with academic levels in the American Educational system.

2.6 Inter-Grade Variation Refraction Index

Using Halliday's (1985b) inter-grade variation refraction index of 1:11% (1 is to 11%), which translates into the text-exit-grade variation formular of 33.3% maximum, the assessment of inter-grade variation has been duly estimated in this study. Similarly, Flesch (1948) stipulates that an inter-grade variation index of 35% maximum is acceptable.

Regarding readability variation, Flesch (1948) opines that a readability variation index of at most 35% between texts from one grade to the next is acceptable. That is, at any rate when text-grade analysis takes place using readability formulae, the percentage difference in difficulty level between one grade and the next should not exceed 35%. Find above, the original Flesch Reading Ease Scale which has been converted to suit all other educational systems including that of Ghana. It is known as the Logical Conversion Module (LCM).

2.7 The Logical Conversion Module (LCM)

Based on the translated version of Flesch's readability scale in table 2, To et al (2013) logically analyzed and generated an *Application Formula* for the adoption of Flesch's formular to other educational systems. From a numerical range of 0 to 100, readability is assessed in the logical conversion module. In the logical analysis, suppressed numerical digits between grades are expanded to fairly cover grades as they pertain to various educational systems other than the American system. It is important to state that, with the translated version of Flesch's reading ease scale, the higher the readability value of a text, the higher the corresponding grade and the more difficult the text. This is unlike the original Flesch reading ease scale in which lower readability values corresponded to higher grades. The Flesch readability formula was, thus, revised to suit this translated version. Applying this formular to Ghana's Educational System, the Grade-Readability Scale is duly adopted for this study in table 3.

Table 3: Flesch's Grade-Readability Scale Applied to Ghanaian Educational System

Educational Attainment Level (Ghana)	**Flesch Reading Ease Percentage**	**Educational Attainment Level (USA)**	**Description of Text Difficulty**
BS 01	N/A	N/A	N/A
BS 02	N/A	N/A	N/A
BS 03	N/A	N/A	N/A
BS 04	N/A	N/A	N/A
BS 05	0 -10	Grade 05	Very Easy
BS 06	11 – 20	Grade 06	Easy
JHS 01	21 – 30	Grade 07	Fairly Easy
JHS 02	31 – 35	Grade 8-9	Standard
JHS 03	36 – 40	Grade 10 - 12	Fairly Difficult
SHS 01	41- 43		
SHS 02	44 – 46		
SHS 03	47 – 50		
L 100 (Undergrad 01)	51 – 55	Undergraduate	Difficult
L 200 (Undergrad 02)	56- 60		
L 300 (Undergrad 03)	61 – 65		
L 400 (Undergrad 04)	66 – 70		
L 500 (Masters 01)	71 – 75	Post Graduate (Masters)	Very Difficult
L 600 (Masters 02)	76- 80		
L 700 (PhD 01)	81 – 85	Post Graduate (PhD)	Very, Very Difficult
L 800 (PhD 02)	86 – 90		
L 900 (PhD 03)	91 – 95		
L 1000 (PhD 04)	96 - 100 and above		

SOURCE: To et al (2013) Application Formula.

Analysis in this study basically follows the following trend as it is the case in some reviewed works in the literature.

First, Ure's (1971) LD formular has been applied to all texts. That is;

$$\frac{Total\ number\ of content/lexical\ words\ in\ text}{Total\ number\ of\ words\ in\ text}\ x\ 100$$

Second, Halliday's (1985b) LD formular has been applied to all texts. That is;

$$\frac{Total\ number\ of\ content/lexical\ words\ in\ text}{Total\ number\ of\ ranking\ clauses\ in\ text}$$

After the LD levels of these texts are analyzed using the two formulae above, the results of the analysis are usually compared or categorized according to or using Flesch's (1948) Reading Case Scale, Gunning's (1952) Readability Fog Index and Eggins' (2004) Grammatical Intricacy Formular (GIR). In this study, the results of the analysis using the above formulae shall be categorized using the Gunning Fog Index. Let us look at the operation of Eggins' (2004) GIR Formula.

2.8 Eggins Grammatical Intricacy Ratio (GIR)

$$\text{GIR} = \frac{Total\ number\ of\ clauses\ in\ text}{Total\ number\ of\ sentences\ in\ text}$$

This should be expressed in terms of ratio distribution. That a high ratio in GI marks the text as being one in spoken mode and vice versa.

2.9 Gunning Readability Formular

Steps involved include:

a) Finding average number of words per sentence (L), using a passage of more than 100 words (100+ word passage).

b) Identify the total number of difficult words (D) (words with 3 or more syllables).

c) Add the average sentence length (L) to the total number of difficult words (D) and multiply by 0.4.

i.e. Gunning Fog Index (GFI) = 0.4 x (L + D)

This gives an estimated grade level that a reader needs to attain in order to comprehend the text under study. Gunning's Fog Index formular operates hand in hand with Flesch's (1948) Reading Ease Scale in determining text readability and complexity or difficulty level.

2.10 Accounting for other Readability Factors aside Lexical Density

As indicated earlier, the ease with which a reader understands a text determines how readable or difficult that text is. According to Flesch (1948), aside lexical density, various factors account for the difficulty or readability of a text. Among others, some major factors are discussed below which include: average sentence length; number of new vocabularies; use of foreign words/culture words; ambiguous words or sentence; use of literary language; and translation. According to Flesch (1948), these factors have been identified to be the main stumbling blocks for readability, all things being equal. They relate to the interaction between the reader and the text, which is paramount in determining readability. Underpinning all these factors affecting readability is lexical density. This is because all the identified factors are predisposed to the use of unfamiliar content words, which constitute the lexical density of texts.

2.11 Detractors of Readability

Aside lexical density, the following are the key factors influencing the readability of texts according to Flesch (1948).

i. *Average Sentence Length*: Understandably, a major nightmare for every new learner is the task of unravelling various specimen of information packed in one linguistic unit. Simple linguistic structures or units generally present ease of comprehension on the part of the learner, especially the amateur learner. To this end, compound and complex sentences which generally often entail lengthy constructions, tend to pose readability and understanding challenges to learners.

ii. *Number of New Vocabulary*: In life, when we encounter an entirely novel situation which does not relate to our experiences, we are found wanting as to how to overcome it. Encountering new vocabulary in reading texts is an

example of such situations. Readability reinforces understanding and if a text is riddled with too many unfamiliar vocabularies, understanding will surely be greatly impeded. Reading becomes difficult resulting in no or little understanding of the text. Difficult words or new vocabulary in a text are obstacles which the reader needs to overcome in order to understand the text, hence the higher the number of new vocabularies in a text, the lesser the readability of that text. The term "new vocabulary" is used in relativity to individual readers.

iii. *Use of Foreign/Traditional/Cultural Words*: This relates quite with the use of new vocabulary discussed above. The distinction however is that foreign/traditional/cultural words have unique contextual meanings known to only those who share the same cultural/traditional background. The word may therefore not be new to the learner per se, but its context of use confuses the learner. The cultural context of use hides the meaning of the word from a foreign reader. Thus, a word may be familiar to the learner yet not understandable to him or her.

iv. *Ambiguity*: For various reasons, authors use ambiguous linguistic structures such as words, phrases or even sentences. Whilst the ambiguity may not be known to some authors themselves, especially amateur ones, others deliberately create it to add color to their artistic and aesthetic exploits. Whichever the nature of ambiguity, it stands in the way of the reader as far as readability and ultimately understanding is concerned.

v. *Literary Language*: The ordinary use of language provides for the highest possible readability and understanding by the learner. However, when language is used in the literary or figurative mode, it presents an obscurity in terms of

understanding on the part of the learner. One key factor hampering readability and understanding of reading texts is literary language. The use of figurative devices like irony, metaphor, oxymoron, hyperbole, etc undermines learners' understanding of texts. A learner who is not widely read would be totally lost as to the semantics of his/her text.

vi. *Translation*: When documents are translated from one language into another, the meaning is often tempered with no matter how excellent the translation may be described to be. The exactitude of synonyms used in the translation process can be near-perfect but never perfect. This is because, given the organic nature of language, some particular linguistic units in one language do not simply exist in another language. Converting such units into another language therefore requires the use of near-exact mechanisms like coinages, borrowings and compounding.

In sum, various factors account for the readability of a text, including lexical density, according to Flesch (1948). The six (6) main factors responsible for text readability according to Flesch (1948) outlined above, relate directly or indirectly to lexical density. A lexically dense text poses higher translation challenges, resulting in poor text readability. Literary language generally involves lexically dense texts (particularly poetry and drama) and the effect of that is poor readability. Ambiguity obstructs general understanding of texts. The essence of readability is understanding and if understanding of a text is impeded, it presupposes that the text has poor readability. The unique contextual meanings of foreign, traditional or cultural vocabulary restricts readability of a text much the same way as new vocabulary introduced in a text. And finally, the ratio of content words to lexical words in a longer

sentence would generally always be higher than that for a shorter sentence. Longer sentences therefore tend to impede readability due to their lexically dense nature.

2.12 Readability Metrics: Summarized Empirical Review

This study provides an empirical review of eight (8) well-known readability metrics, encompassing a diverse range of tools commonly employed for assessing text readability. The metrics under consideration are the Flesch-Kincaid Grade Level, Flesch Reading Ease, Simple Measure of Gobbledygook (SMOG), Gunning Fog Index, Lisbarhet index and Rate index, Automated Readability Index (ARI), Coleman-Liau Index, and Dale-Chall Index.

2.12.1 Flesch-Kincaid Grade Level

The Flesch-Kincaid Grade Level is a widely utilized formula designed to estimate the approximate reading grade level required for comprehending a given text. Originally developed by the US Navy in collaboration with the Flesch Reading Ease, it underwent revisions in the 1970s for enhanced usability. Widely employed in various applications, a Flesch-Kincaid level of 8 indicates the need for at least an eighth-grade reading proficiency.

2.12.2. Flesch Reading Ease

The Flesch Reading Ease assigns a score between 1 and 100, with higher scores denoting greater readability. Developed in the 1940s by Rudolf Flesch for the Associated Press, it has since found utility in diverse fields such as marketing, research communication, and policy writing. A score between 70 and 80 equates to an eighth-grade reading level, indicating text accessibility for the average adult reader.

2.12.3 Simple Measure of Gobbledygook (SMOG)

SMOG is a hand-scored assessment tool used to determine the grade level of patient education. The evaluator counts sentences at the beginning, middle, and end of a document to ascertain readability. This method provides a practical approach to evaluating text complexity.

2.12.4 Gunning Fog Index

Developed in 1952 by Robert Gunning, the Gunning Fog Index estimates the years of formal education required to comprehend a text on the first reading. A fog index of 12 suggests a reading level equivalent to a US high school senior (around 18 years old). This index is commonly employed to confirm text readability for specific audiences, with a preference for values below 12 for a broad audience and below 8 for near-universal understanding.

2.12.5 Lisbarhet Index (LIX) and Rate Index (RIX)

LIX and RIX represent two variations of the same readability formula that assess text readability based on letter counting rather than relying on the syllable counting method used by many other formulas. This departure from syllable counting proves particularly beneficial for languages other than English, where syllable counting might lack accuracy. The letter counting method of LIX and RIX enhances their suitability for such linguistic contexts.

2.12.6 Automated Readability Index (ARI)

The ARI is derived from ratios that consider word difficulty (measured by the number of letters per word) and sentence difficulty (measured by the number of words per sentence). Data for calculating the index are collected using an attachment to an electric typewriter, emphasizing a quantitative approach to assess readability.

2.12.7 Coleman–Liau Index

Developed by Meri Coleman and T. L. Liau, the Coleman–Liau Index is designed to evaluate the understandability of a text, similar to the Flesch–Kincaid Grade Level, Gunning Fog Index, SMOG Index, and Automated Readability Index. Notably, it approximates the U.S. grade level required for comprehension but stands out by relying on characters instead of syllables per word. While opinions on its accuracy vary, the index benefits from the ease and accuracy with which computers can count characters, making it computationally efficient.

The Coleman–Liau Index was intentionally designed for mechanical calculation from hard-copy text samples. In contrast to syllable-based readability indices, it sidesteps the need for character content analysis and can be paired with straightforward mechanical scanners. These scanners only need to recognize character, word, and sentence boundaries, eliminating the necessity for full optical character recognition or manual keypunching.

2.12.8 Dale–Chall Readability Formula

The Dale–Chall Readability Formula offers a numeric measure of comprehension difficulty encountered by readers when engaging with a text. Utilizing a list of 3,000 words deemed understandable by fourth-grade American students, the formula considers any word outside this list as challenging. This approach provides a practical gauge for assessing the readability of texts.

2.13 Overcoming Readability Challenges

Across various spheres of life (business, academia, technical communication, politics, etc) linguists have researched into feasible and effective ways of writing which improves upon or enhances readability. This is to promote effective communication in

those fields. According to Flesch (1948), among others, the following "golden rules" have been identified to deal with the problem of readability: the use of simple sentences, the use of active voice with present tense verbs, non-use of slangs or jargon, using familiar simple vocabulary that are short, use of language devoid of socio-cultural nuances, using correct grammatical features like spelling, punctuation, avoid the use of technical literary language, use of numbered/bulleted points, using simple sentences, avoiding too much lexical diversity and ultimately, applying readability formulae proposed by linguists to assess the suitability of texts for particular audiences.

An author's strict adherence to most or all of these parameters undoubtedly draws him closer to minimizing text difficulty. The litmus test of readability however remains the application of a readability formulae to a text. This study examines the levels of lexical density, grammatical intricacy and readability of text used in English textbooks in Ghanaian senior high schools. In determining readability, the age-old methodology has been to use "sentence length" and "vocabulary difficulty". This formulae dates as far back as the 1920s and educators have found it to be reliable in forecasting text readability and suitability for learners at different levels (Thorndike, 1921).

The formulae for readability kept increasing in number and by the 1980s, research indicated that there were well over 200 of them used in different contexts of communication ranging from technological to cultural contexts. The readability formulae faced huge criticism particularly in the 1960s when the "plain language" movement in the U.S led to the legislation which stipulated that documents of commercial and public nature should be composed in plain language to ensure readability and easy understanding by all. Supporters of the "plain language" movement were generally upbeat about the limitations or weaknesses of the formulars and this was

what informed their decision to push for the use of plain language in public and commercial communication. Some of the critics suggested "usability testing" as a remedy to check the flaws of readability formulae among other alternatives.

2.14 The Lexicon and Text Complexity

According to Ure (1971), lexical density (LD) is a quantitative measure of the relationship between lexical and grammatical items in spoken and written discourse. Halliday (1985b) asserts that LD refers to the number of lexical items as a ratio of the number of clauses. In more recent linguistic history, the idea of lexical density formula was proposed by Ure (1971), refined by Halliday (1985b) and then further developed by Eggins (2004). More recently, many scholars (Fadhillah, 2018;To et al, 2013;To,2015; To, 2018; Yulinda et al, 2018; Bani-Amer, 2021; Andri et al, 2021; Abuquba et al, 2022; Turkben, 2019; Li & Zhang, 2021; Hidayatillah & Zainil, 2020; Prawinanto & Bram, 2020, etc) have applied, refined and improved upon previous studies on LD and its relevance to text structure. It is important to state that scholars who basically applied earlier principles propounded by Ure (1971) did not significantly alter the concept of LD but merely provided some forms of iterations. This serves as the motivation for the use of these indices in this current study.

In his seminal work, Ure (1971) postulates that lexical density is a measure of the degree of content words in a text against functional items. Content items include nouns, adjectives, some verbs and some adverbs (Ure 1971, Halliday 1985b). The functional items of LD include prepositions, articles, conjunctions, some adverbs, pronouns and auxiliaries. A text is therefore, assessed to be of high LD if it has a higher number of content words and low LD if it has more of pronouns and auxiliaries rather than nouns, lexical verbs, adjectives and lexical adverbs. Halliday (1985b) and Ure

(1971) generally agree on the following ranges in determining the lexical density of a text:

Low Lexical Density = Below 40%

High Lexical Density = 40-50%

Above Average Density = 51-59%

Very High Lexical Density = 60 – 70%

Very, Very High Lexical Density = 70% and above

Halliday (1985b) observes that written texts are generally denser compared to oral texts and this is based on the assertion that written texts make use of loaded clauses with high numbers of lexical content words, whilst spoken texts tend to use functional or grammatical items.

The number of content words in relation to a clause, therefore defines the LD of that clause or text (Gallagher et al 2017). This view is further supported by Eggins (2004) who outlines the formular for finding LD and states that it involves expressing the number of content-carrying words in a text/sentence as a proportion of all the words in the text/sentence. Gallagher et al's (2017) assertion is in line with Halliday's (1985b) assertion on the view that written texts are generally more dense or complex than non-written texts. However, Eggins (2004) is of a different view from Gallagher et al (2017) regarding the calculation of the lexical density of a text. Using an example from Gallagher et al (2017),they explicate their proposition with an illustration on how LD is determined in the clause below:

"Ali arrived late, which worried us but pleased our rival team".

In the example above are 3 clauses (Ali arrived late, which worried us, but pleased our rival team); and 7 lexical items (Ali, arrived, late, worried, pleased, rival, team). By Gallagher et al's (2017) methodology, LD is calculated as 7/3 = 2.3. Applying this same example in Eggins' methodology, the total number of lexical items is 7 (They are: *Ali, arrived, late, worried, pleased, rival, team*) whilst total number of words of the text (sentence) is 11 (They are: *Ali, arrived, late, which, worried, us, but, pleased, our, rival, team)*. Therefore, LD = 7/11 = 0.64 or 64%. Ure (1971) uses this same formular in processing LD of texts, and thus, concludes that most non-written texts have an LD of less than 40% whilst most written texts have an LD of 40% and above. By this conclusion, Ure (1971) corroborates Halliday (1985b), Eggins (2004) and Gallagher et al's (2017) assertion that written texts are more complex or difficult compared to their non-written counterparts. Ure (1971) concludes that an LD of 40% is considered high. This position is strongly corroborated by Halliday (1985b).

The LD formular proposed by Gallagher et al (2017) is adopted from Halliday (1985b) whilst that of Eggins is adopted from Ure (1971). This implies that Eggins (2004) agrees with Halliday (1985b) on the method for calculating LD and it outlines the formular for determining Grammatical Intricacy (GI) as expressing the number of clauses in a text as a proportion of the number of sentences in that text (Eggins 2004, p97). He adds that the high ratio of Grammatical Intricacy (GI) marks a text as being in spoken mode rather than written mode. This stands in contrast to Ure's (1971) position explained above: written texts have high LD and spoken texts have lower LD. For example, we can consider the following sentences using Eggins (2004) GI formular:

1. Dakurah died because he had no money.
2. Dakurah's death was caused by his lack of money.

In sentence (1), we have 2 clauses: (a) Dakurah died (b) Because he had no money.

GI ratio = 2:1 (2 clauses to 1 sentence)

In (2), we have 1 clause: Dakurah's death was caused by his lack of money.

GI ratio = 1:1 (1 clause to 1 sentence).

Following the assertion of Eggins (2004, p97), sentence (1) has higher GI than sentence (2),thereby characterizing sentence (1) as a text in spoken mode, with sentence (2) being characterized as a text in written mode.

The terms *lexical density*, *lexical diversity* and *lexical richness* have often been problematic in their explications (Halliday 1985b). Though they may all be used in assessing the overall progress of a student in language and communication, they are different in their own right. Lexical density stands for the quantum of content words used in a text expressed as a percentage of the overall total number of words used in the particular text (Ure 1971).

Eggins (2004) avers that lexical diversity (LDv) refers to the measure of how many varied vocabularies are employed in one text at the same time. In lexical diversity analysis, the recurrence of a word is not counted. Lexical richness on the other hand explores the degree of diversity of the use of words. That is, the extent to which different vocabulary are used within a particular text (Eggins 2004).

It must be noted that a text may have a higher lexical diversity and low lexical density. That is, a text may have more varied words used in it (lexical diversity) and yet the total number of content/lexical words in it in proportion to the overall total number of words is smaller in terms of LD (Bani-Amer, 2021). Bani-Amer (2021) avers that the argument that the density of a text is measured by how many lexical vocabularies it contains in relation to its total number of words, is a problematic one. This is evident on the fact that it is often necessary to re-use several function words in order to produce

a new lexical word. Therefore, a longer text usually gives a lower type-token ratio value than a shorter text.

Presenting quite a similar dissenting view on lexical density, O'Sullivan et al (2020) also argue that LD does not necessarily measure lexis since it depends on the syntactic and cohesive properties of the composition. Fewer function words may reflect more subordinate clauses, participial phrases, all of which are not lexical but structural characteristics of a composition.

Hidayat (2016) emphasize that the study of English as a Foreign Language (EFL) has included dicey and controversial linguistic fields including lexical density. The ratio of different words, called "types" in relation to the total number of words known as "tokens" has over the years remained the commonest means of determining LD of texts. This formular is known as the "type-token ratio" (TTR).

Hidayat (2016) argues that any single value of TTR lacks reliability as it will depend on the length in words of the language sample used. Indeed, a number of scholars agree with Hidayat (2016). Bani-Amer (2021) and McCarthy and Jarvis (2010) argue that comparing texts on different topics is a very poor way of assessing LD since some topics may naturally elicit higher content word frequency than other topics. Hidayat (2016) avers that the comparison may be fair if the topics are the same and that, topic changes can greatly affect LD ratios.

Around the subject of lexical density are a number of related concepts including lexical richness (LR), lexical diversity (LDv), lexical originality (LO), lexical sophistication and lexical variety. In fact, the most encompassing of all these concepts is lexical richness (O'Sullivan et al, 2020). Lexical richness is the high degree of use of lexical vocabulary in relation to the use of grammatical vocabulary within an original

composition (O'Sullivan et al, 2020). This means that, the learner's performance in relation to the group within which the learner writes his composition determines the originality of the learner's writing. On this, O'Sullivan et al (2020) opine that lexical originality (LO) index measures the learner's performance relative to the group in which the composition was written. They however, opine that, this procedure of determining LO is not reliable as it is inconsistent. Rather than staying only on the content of the composition written, the formular focuses also on the group factor. That is;

$$\text{LO} = \frac{total\ number\ of\ tokens\ unique\ to\ one\ writer}{total\ number\ of\ tokens}\ x\ 100$$

Lexical Sophistication (LS) according to O'Sullivan et al (2020) is determined by expressing the total number of "advanced" words in the text as a percentage of the total number of lexical tokens. That is;

$$\text{LS} = \frac{total\ number\ of\ \text{"advanced" words}}{total\ number\ of\ lexical\ tokens}\ x\ 100$$

Lexical density (LD) in the view of O'Sullivan et al (2020) also examines the total number of lexical words expressed as a percentage of the entire text. Simply put, they define LD as "the percentage of lexical words in the text". Lexical words here refer to content word classes, namely, nouns, adjectives, adverbs and verbs. It must be noted however that some adverbs (non-content) and verbs (auxiliaries) are not lexical or content words and so those are not classified as lexical words in the calculation.

$$\text{LD} = \frac{total\ number\ of\ content\ words}{total\ number\ of\ words}\ x\ 100$$

In the opinion of O'Sullivan et al (2020), lexical variety (LV) examines the number of different words used in a text expressed as a percentage of the entire number of words in the text. They call this the *type/token ratio*:

$$\text{LV} = \frac{total\ number\ of\ different\ words}{total\ number\ of\ running\ words/tokens}\ x\ 100$$

Short texts are identified as not having stable LV. Length variation therefore affects the LV of texts. This study looks at LD and how it correlates with grammatical intricacy (GI) and readability of texts used in Ghanaian English Textbooks.

According to Li and Zhang (2021), lexical development is measured via mechanisms like lexical density and lexical variety. Together, these two greatly define the performance of a learner in a language. The lexicon is arguably the most important element of language for learners as far as developing a new language is concerned.

2.15 Lexical Density: Empirical Review

This segment provides a detailed review on studies in Lexical Density. Sholichatun (2011) conducted a study on a Junior High School English textbook titled "English on Sky". Ten (10) texts (passages) were selected as data and 3 out of the number were found to have lower lexical densities whilst 7 had high lexical densities. The textbook used was not limited to a particular level of Junior High School. The passages in "English on Sky" were found to be generally not too difficult to read or understand as they had low LD values. Though this study did not focus on genre dynamics, it provides empirical background literature necessary for this study as the two involve the use of selected texts (passages) from recognized English textbooks.

Also, Nesia and Ginting (2014) on LD, used 8 sampled texts from English course books. Of the total of 8 texts analyzed, 4 were found to have lower LD. Their study was interested in the relationship of genres of writing with lexical density. The 4 texts found to have lower LDs were *narrative* and *discussion* texts. Ginting and Nesia (2014) observed also that there are different lexical items in every text regardless of genre of writing. The lexical items used in different texts are varied and no particular

genre of writing is found to be associated with any particular category of lexical items. Their study used Ure and Halliday's LD formulae to determine the LD values of the sampled texts. The LD values were then measured for readability using Flesch's (1948) Reading Ease Scale. According to the study, *narrative*, *explanation* and *description* texts are formed by nouns and verbs predominantly whilst *review* texts are predominantly formed by three lexical items, namely *noun*, *adjective* and *verb*. *Explanation/expository* genre texts were found to be most difficult to understand. Nesia and Ginting (2014) relates quite with this study to the extent that it is interested in the textual genres employed in relation to LD.

Andri et al (2021) looked into lexical variation and lexical density in the folklore of Indonesian narrative texts in English textbooks for Grade X, published by the Ministry of Education and Culture of the Republic of Indonesia. A qualitative study as this study is, the research used Systemic Functional Linguistics theory of Halliday (1985b) alongside Ure (1971)'s LD formular. Eggins (2004)'s lexical variation formular was used alongside Gunning Fog Index and the Estimated Reading Grades Scale of Zamanian and Heydari (2012). These models were employed to help measure suggested reading grades of the texts accurately. The data comprised 3 narrative texts about Indonesian folklore from *Bahasa Ingris*: 3rd Edition and Interlanguage textbooks. The findings revealed a sharp variation in the texts in terms of their lexical density and lexical variation resulting in difficulty in comprehension. It was also uncovered that the texts vary in terms of Gunning Fog Index and many of the texts are suggested for lower grades. LD analysis procedures are very well explained by Andri et al (2021), hence its relevance to the current study.

Fadhillah's (2018) master's thesis used texts from an English textbook titled "Pathway to English" as data. Her work sought to establish a link between genre and lexical density. The study revealed that out of 15 texts used, nine (9) texts had high LDs, out of which 6 were descriptive, 2 from a recount genre and 1 was a narrative genre. The remaining 6 texts had average lexical densities. Two (2) of the remaining 6 texts were recount genres and 4 were narrative genres. It suggests therefore that narrative genre was found in that study to have a generally low lexical density by rating whilst descriptive texts were found to have high LD rating with the recount genre maintaining a middle ground of 50% high and 50% average LD ratings

Another study on LD by Ridwan and Yusuf (2016) focused on the level of LD in undergraduate theses abstracts with the view to determining how informative or loaded they are (in terms of meaning making), as in either spoken or written modes of language, based on the grammatical intricacy (GI) ratio paradigm opined by Eggins (2004).Eggins (2004) argues that the higher the GI ratio, the more likely it is for a text to be characterized as being spoken language and the lower the GI ratio, the more likely it is for that text to be classified as written language. From the analysis of 7 thesis abstracts, it was identified that the average LD level of the texts was 0.57 or 57% which means high LD level. There was also 1:8 average GI ratio, indicating high GI level, since the ratio is high (1:8). As said earlier, low GI ratio presupposes written language and 40%+ LD presupposes high LD which is characteristic of written texts. This study was not interested in text levels and genres of writing. Grammatical Intricacy (GI) is one of the pillar theories of this study, and Ridwan and Yusuf (2016) provides a deeper insight into the assumptions of this theory. This makes it easier to apply GI theory in the analysis of data in this study.

Hidayat (2016)'s study was on LD using the content analysis approach. It employed LD and readability formulae in the analysis of data, with the aim of assessing the LD levels of texts in a textbook commonly used as an instructional material for students of Non-English Education Study Program of English. Out of the total of 14 texts used, 7 were found to be in the low LD category, 6 in the average/normal category and 1 in the high LD category. These findings provide a fair platform for comparison of readability and LD formulae in their application to texts. This is relevant to the current study since one of its objectives is to compare LD and readability formulae.

Kondal (2015) is yet another study on LD where tenth grade medium students' (equivalent of SHS 1 in Ghana) written scripts were used as data to explore the effects of LD and LV on language performance and proficiency. The purpose of the study was to determine whether proficiency in LD and LV would necessarily result in language proficiency or aid in language learning processes. The study revealed that LD and LV greatly affect language proficiency and performance in lexicology. The study is silent about genre and academic level dynamics in relation to LD. It unveiled the fact that if a student is richer in lexis and more varied in use of lexis, the performance and proficiency level of that student is greatly boosted since LD impacts learning proficiency and LV affects overall language performance. This implies that more emphasis should be placed on vocabulary in the teaching of English. This study provides empirical literature for a better understanding of Eggins (2004) Grammatical Intricacy formular.

Carmen and Begona (2015) compared lexical richness of same grade learners using Eggins (2004) LR formular. The study revealed that the same level of lexical richness is what you get when the same learners produce two different pieces of writing on separate subject matter. This indicates that lexical or vocabulary richness manifests

itself across different topics and subject matters. Carmen and Begona's (2015) study help to better explicate the background propositions of Eggins (2004) GI formular which guides this study.

To et al (2013) aimed to examine the LD and readability of four texts from English textbooks. The textbooks were used for four different levels: elementary, pre-intermediate, intermediate and upper-intermediate levels. These texts formed the primary data for their study. The study revealed three of the four texts to be of high LD. Flesch's (1948) Reading Ease Scale was employed to measure readability. Only the text for upper-intermediate was found to have lower LD of 45.5% according to Flesch's (1948) Reading Ease Scale. Quite surprisingly, however, texts 2 and 3 which had high LD levels were found to be relatively difficult according to Flesch's (1948) Reading Ease Scale whilst text 1 was fairly easy to read with text 2 being the most challenging. This suggests that lexical density does not necessarily translate into text complexity in some cases as have been widely assumed and claimed. It must be quickly added however that this is an exception rather than the rule. Whilst this study uses 9 separate texts across genre and academic levels, To et al (2013) used 4 texts. Their study did not also focus on genre of writing but provides a very rich analytical procedure in doing LD and readability studies.

Additionally, Istiqomah (2015) studied the readability of English textbooks used by second year SHS students in Indonesia. Using Halliday's LD formular, four texts were analyzed and Flesch's Readability Ease Scale applied to the results to determine the level of suitability of these texts. Two texts had 30.92% and 35.55% and by Flesch's scale, they were of standard readability level. They were therefore found not to be appropriate for SHS students but rather for Junior High School (JHS) students. The two other texts had 46.58% and 47.93%, indicating high LD. Flesch's scale

categorized these as fairly difficult passages. They were therefore found to be suitable for second grade SHS students. This study was silent on genre of writing but underscored the need for lexical density of texts in English textbooks to be assessed by LD/Readability experts before use so as to ensure their suitability for the intended levels of learning. Istiqomah (2015) bears much in common with this study, thereby paving the way for drawing undisputed and valid conclusions.

Prawinanto and Bram (2020) analyzed the lexical density of adjectives and noun clauses in an English textbook for senior high school learners at the 10th Grade in Indonesia. The objective of the study was to probe whether or not the textbook was suitable for the students in terms of how lexically dense it was. A full text of 116 sentences was the data sample and the noun clauses and adjectives were the subject of investigation in the text. The study revealed that the average LD level of the selected text used for the study was 47%, making it suitable for the intended 10th Graders. Determining text-grade suitability is the primary objective of the current study, hence the relevance of the review of Prawinanto and Bram (2020).

Abu-Rabia (2020) examined three key measures used in determining lexical richness of learners of Hebrew by Arab students in Israel. These measures were level of abstractness, lexical diversity and lexical density. Ninth (9TH) and 11th Graders' written essays formed the corpus for the study. A total of 60 essays were sampled. The study revealed that abstractness increased with the increase in age of the learners, as expected. It was expected that lexical density in the texts of learners will increase with age but this was not the case. Overall, the lexical measures revealed two main categorizations: basic tests which can be applied at any level of linguistic competence; and advanced tests, which require a high level of competence. Lexical richness is one of the underlying pillars of grammatical intricacy which is a theory applied in the

current study. Abu-Rabia (2020) therefore affirms some of the theoretical propositions of Eggins' (2004) grammatical intricacy theory.

Syarif and Putri (2018) targeted to uncover how lexical density reveals students' ability in doing academic writing. Data was taken from the introductory parts of thesis proposals written by graduate students of English. The analysis showed that there was lower lexical density (31.19%), with grammatical complexity being the underlying factor contributing to lexical density. The study revealed further that the complexities came about as a result of students still having limited knowledge about the language use in academic writing. This implied that the students' ability in academic writing was still at average level. The impact of text-grade misappropriation on learners is one of the concerns of the current study and the review of Syarif and Putri (2018) above serves as relevant source of reference.

Syarif (2019) examined the relationship between Grammatical Intricacy (GI) and Lexical Density. The study specifically aimed at explaining how the two variables manifest themselves in students' academic writing. Data was picked from introduction texts of thesis proposals of university students in Indonesia. The LD level of the texts was found to be adequate whilst the grammatical intricacy level was rather high. The findings in that study oppose the theory that states: the lower the grammatical intricacy of a text, the higher its lexical density. Whilst the study showed that there was a significant link between LD and GI, it however revealed the fact that the level of LD decreased because of the number of clause complexes found in the texts. Syarif (2019) helps the researcher in applying LD formulae and GI theory in the analysis of data.

To (2018) examined how textbook language used for teaching English as a foreign language changed across academic levels in a book series. Three linguistic

features were at the center of the analysis: lexical density, nominalization and grammatical metaphor. Twenty-four (24) reading text extracts in total were picked from the textbook series to make the data for the study. Some of the texts were used wholly (4 of them) whilst excerpts were compared with whole text analysis in some instances. Lexical Density and readability scores varied greatly between whole text and excerpt analysis, with whole text analysis providing more valid findings and conclusions. Whole text analysis is thus preferred to text excerpt analysis, according to this study. The study revealed that texts in the series of that textbook grew more and more complex as their levels advanced. The mean scores of nominalizations and grammatical metaphor saw a rise in respect of the levels of the textbooks from elementary to intermediate, resulting in high LD in the selected texts. However, the mean scores of the 3 selected language features in the upper mediate textbook were not the highest among the 4 books. This study has great implications for the English as a foreign language (EFL) teacher: in selecting EFL textbooks, educators should consider textbook levels proposed by authors as well as examine their linguistic features to determine their suitability or otherwise for various levels. To (2018) gives relevant background for text-grade variation analysis which is one of the objectives of this study.

Yulinda et al (2018) set out to investigate the difficulties students of a Senior High School in Malaysia encounter in reading English textbooks. The study is based on the assumption that the students lacked the mastery of vocabulary leading to poor understanding of texts when they read them. Sixteen (16) reading texts were therefore sampled from an English textbook meant for learners of Form 4. Ure's (1971) LD formular and Flesch's (1948) Reading Ease Scale were used in the analysis and the findings revealed that, students' poor understanding of texts during reading, resulted

from high lexical density, coupled with poor mastery of vocabulary. Here, the impact of LD on readability was the focus, hence its relevance to the current study.

Bani-Amer (2021) examined LD and readability in secondary stage English language textbooks in Jordan. Data was sourced from some reading sections of the textbook for secondary stage ad analyzed using two online software analytical tools. The results revealed that the two texts had medium LD levels. Regarding readability, the two texts were found to be syntactically easy to read. The study further revealed that secondary stage textbooks for English for 12th Grade is suitable for 8th and 9th Grades whilst that for 11th Grade is suitable for 7th Grade. The study concluded that secondary stage English textbooks do not meet standard requirements of readability indices because they are easier or harder than the expected indices for the target levels. EFL teachers in Jordan are thus informed by the findings in this study to check complexity levels of English textbooks before administering them to the intended academic levels so as to promote effective teaching and learning of the Queen's language. This review provides relevant background literature to the primary objective of this study: determing text-grade suitability of SHS texts.

Li and Zhang (2021) report a corpus-based study of a cross-sectional nature, which targeted at exploring the developmental features associated with lexical richness in L3 writings by Chinese learners at the beginner level for English language, from the perspective of the dynamic usage-based approach to language learning. The research did a comparison of English writings by Chinese L3 secondary students (Grades 7-12), aged between 13-18 across three learning stages. The comparison was based on three parameters: lexical sophistication, lexical density and lexical diversity with almost the same sample sizes (6 texts, 7texts and 11 texts respectively). These number of texts in each category were what was available and that is why the researchers used the varied

numbers. The findings revealed that lexical richness was generally low in L3 beginner learners' writings. L3 beginner learners used fewer diverse words and lexical words but used more high frequency vocabulary in their writings. Lexical diversity experienced a non-linear development whilst lexical sophistication and lexical density yielded positive growth across the 3 learning stages. The study therefore reveals a dynamic development of lexical richness in L3 writings, as each of the 3 measures develops unevenly. The application of Eggins (2004) GI theory to textual analysis is demonstrated in this review, providing a guide for the analysis in this study.

Dawson et al (2021) sought to understand how exposure to book language supports children's learning. The study therefore tried to identify how book language differs from everyday conversation. The researchers created a picture book corpus from 160 texts commonly read to children of age 0-5. The study first quantified how children's book language differ from child-directed speech in terms of lexical richness, part of speech distributions and structural properties. Words occurring in children's books which are most uniquely representative of book language, were identified. It was discovered that children's book language is lexically denser, more lexically diverse and consists of a larger proportion of rarer word types compared to child-directed speech. Nouns and adjectives were found to be more common in book language whereas pronouns are more common in child-directed speech. In terms of structure, book words are found to be more complex regarding phonemic number and morphological structure. Book words are also usually acquired later and are more abstract and emotionally arousing compared to words used in child-directed speech. This review adds to empirical literature for the application of the GI theory.

Abuquba et al (2022) in their work sought to analyze the readability levels and lexical density of 100 English-as-a-Foreign-Language (EFL) students' written

academic essays. It employed Halliday's (1985b) LD formular and Ure's (1971) LD formular; and Flesch's (1948) Reading Ease Index. Online text analyzers were employed to analyze and compare the EFL students' essays with essays written by English native speakers. The findings had it that readability levels of EFL students' essays were much below the college level with shorter sentence lengths than in most published writings. Lexical density was found to be close to the threshold score of general written texts as proposed by Ure (1971), with more binding words, more sticky sentences, more mono-syllabic words and less variety in sentence openings. This review helps in drawing valid conclusions on the primary objective of the study—to determine text-grade suitability of SHS English textbook texts.

Ha (2022) analyzed the vocabulary profiling of News on Web (NOW). This corpus was made of about 12 billion words from online newspapers and magazines across 20 countries with the aim of determining the vocabulary knowledge needed to enable one reasonably understand online newspaper and magazine articles. Knowledge of the most frequent 4000-word families in the British National Corpus/Corpus of Contemporary American English (BNC/CoCA) wordlist, proper nouns, marginal words, transparent compounds and acronyms were the vocabulary ability stock to gain 95% coverage for the NOW corpus. The impact of LD on readability was the focus of this reviewed study. This focus is very well aligned to the general focus of the current study, hence its relevance.

Among other scholars, Khamahani (2015), Halliday (1985b), Kondal (2015) have compared written and spoken languages in terms of lexical density. Despite the varied mechanisms employed by linguistic scholars to determine lexical density, all have come to the conclusion that written texts are denser than spoken texts. Studies in lexical density on other languages aside from English include Dutch (Hendrichs 2010),

Swedish (Freeling et al 2021), German (Freeling et al 2021) and Bantu (Carmen & Begona 2015).

This study focuses on the application of LD formulae according to two widely accepted scholars in this field: Halliday and Ure. Their formulae are summarily explained as follows:

* Formular 1 (Ure's method)

$$\text{LD} = \frac{Number\ of\ lexical\ items}{Total\ number\ of\ words}\ x\ 100$$

(Halliday, 1985b; Eggins 2004; Ure 1971)

Using this formular, Ure opines that if the result is 40% and above, it accounts for high lexical density.

* Formular 2 (Halliday's method)

$$\text{LD} = \frac{Number\ of\ lexical\ items}{Number\ of\ ranking\ clauses} \times (10)..$$

(Halliday 1985b)

NB: $(10)^{*}$ =10% Refractive percentile multiplier

It is worthy of emphasis that in some computations using Halliday's formula, the 10% refractive percentile multiplier is omitted and the result expressed as a simple ratio. In expressing the LD of a text as a ratio, Halliday (1985b) noted that a typical average lexical density for written texts is between 3 and 6, depending on the text formality. The higher the index, the more difficult the text is. The figures for spoken language, conversely, fall to between 1.5 and 2.

As a concept in Computational Linguistics, Lexical Density (LD) examines the complexity of human communication and the structure of human communication as

well as estimate linguistic complexity using the functional/grammatical words and the content/lexical words of a text. An individual's LD changes based on various reasons: medical condition, age, style of communication, educational level, creativity prowess and his/her prevailing circumstances. Definitely, LD influences the readability of a text as well as general comprehensibility. Message retention and memorability of information in a text are directly linked to the lexical density of the text. This is because a text with high LD has in it a lot of information compared to the one with low LD. The high load of information therefore impedes retention and memorability of all details contained in the text.

2.16 Ure (1971) and Halliday (1985b) LD Propositions: The Departures

Halliday uses the term "items" and not "words" in discussing lexical units and grammatical units. Halliday asserts that this is due to the fact that they may be made of more than one word as you may have in the case of phrasal verbs, examples of which include roll out, make up, stand down, call off, give in, take over, among others. Halliday takes them as one item since they must necessarily stay attached to make meaning, whether in the grammatical or functional sense or the lexical or content sense of meaning making. Halliday (1985b) admits that it is easy identifying most grammatical and lexical items in texts but some items fall on the "borderline" and classifying them is challenging as they pose ambiguity problems within their context of use. To illustrate these "borderline items", he cites examples of some English prepositions and adverbs such as "besides", "around", "always" and "perhaps". Ure (1971) however separates phrasal verbs into individual words. He also uses the context to classify so called 'borderline' words. By doing so, Ure (1971) holds the view that LD analysis focuses on individual lexemes and not clusters (such as phrasal verbs).

The second point of departure in the two formulae is the method for calculating lexical density itself. Whilst Ure (1971) multiplies total number of lexical items by 100 and then divides by total number of words used in the text, Halliday (1985b) divides the total number of lexical items by the total number of ranking clauses in the text and then multiplies it by 100 (multiplying by 100 is optional). It must be stated however that Ure (1971) is the originator of the idea of lexical density. The idea was later refined by Halliday (1985b) to include the ranking clauses with the option of expressing the outcome in percentage terms. The idea was again developed by Eggins (2004). The formulae of Ure (1971) and Halliday (1985b) however have remained the most popular and widely accepted methods for assessing LD over years and this study shall implore the use of these formulae. Indeed, most scholars have agreed with the parameters proposed by Ure (1971) and Halliday (1985b) regarding LD as can be seen in the review of literature in this study. Indeed, most of the works reviewed in this study have employed the use of these formulae (O'Sullivan et al 2020; Eggins 2004; Bani-Amer 2021; and Abuquba et al 2022, among others). These scholars justify their use of these formulae on the grounds of precision and reliability.

On the matter of acceptable readability variation between and among texts from one grade to the next, Halliday stipulates that 33.3% is acceptable. That is, at any rate, when text-grade analysis takes place using readability formulae, the percentage difference in difficulty level between one grade and the next should not exceed 33.3%. Regarding this subject matter however, Ure (1971) is silent.

Finally, whilst Ure's (1971) LD formular involves the multiplication of the fractional index by 100, Halliday's (1985b) LD formular involves two options:

1. the multiplication of the fractional index by 10 (To,2015)

[i.e, Refractive Percentile Multiplier],

2. the use of ratios.

To (2015), citing To et al (2013), states that in order to be able to measure LD by Halliday's (1985b) formular on the adapted Flesch grade-readability scale, the latter of the two options above should be applied. By applying this option, the decimal point is displaced, making room for a percentage estimate of the LD value of a text.

That is :

- Ure (1971) LD Formula

$$LD = \frac{Number\ of\ lexical\ items}{Total\ number\ of\ words} \times 100$$

(Ure, 1971)

- Halliday(1985b) LD Formula

$$LD = \frac{Number\ of\ lexical\ items}{Number\ of\ ranking\ clauses} \times (10)^{x}$$

(Halliday, 1985b)

NB: $(10)^{x}$ = Refractive percentile multiplier

2.17 Summary of Gaps in the Literature

The gap in existing literature on this topic is illustrated in the table below. The table offers a graphic summary of most related and relatively most contemporary works, pointing out the relatedness and departures based on the key objective variables of the study. A detailed illustration of the graphic summary is given in table 4.

Table 4: Summary of Gap in the Literature (Approximate Gap Index)

SN.	Authority	Flesch (1948) Readability Index	Ure (1971) LD Formular	Halliday (1985) LD Formular	Gunning (1964) Readability Formular	Flesch (1948) Readability Formular	Genre of Writing	Inter-Grade Rating
1.	Abuquba et al (2022)	✓	✓	✓		✓	✓	
2.	Andri et al (2021)		✓	✓	✓			✓
3.	Li & Zhang (2021)	✓	✓			✓		✓
4.	Bani-Amer (2021)	✓	✓			✓		✓
5.	Nunoo et al (2021)	✓			✓	✓		✓
6.	Hidayatillah & Zainil (2020)	✓	✓			✓		✓
7.	Prawinanto & Bram (2020)	✓	✓			✓		✓
8.	Turkben (2019)	✓	✓		✓	✓	✓	✓
9.	Bansiong (2019)	✓			✓	✓		✓
10.	To (2018)	✓	✓		✓	✓		✓
11.	Owu-Ewie (2014 & 2018)	✓	✓		✓	✓		✓
12.	Fadhillah (2018)	✓	✓	✓		✓	✓	
13.	Yulinda et al (2018)	✓	✓			✓		✓
14.	Gyasi (2017a)	✓				✓		
15.	Gyasi (2013a)	✓			✓	✓		✓
16.	To et al (2013)	✓	✓	✓		✓	✓	✓

SOURCE: Author's Construct, 2021

The works in this field which relate the most (with reasonable degrees of currency) to this thesis topic have been listed vertically from 1 to 16 on table 4. The relationship talked about here lies in geography (in this case: Gyasi, 2017a; Gyasi,2013a; Owu-Ewie,2014; Owu-Ewie,2018; Nunoo et al,2021) and the application of LD and readability indices. The analytical variables (tools) used in this study are juxtaposed with the identified most related existing literature in the upper horizontal column of the table. The checked boxes (70, representing 63%) indicate the similarity of the related literature to my thesis whilst the unchecked or blank boxes (42,

representing 37%) indicate the approximate departure of existing related literature with this study.

In the literature, it is obvious that gaps exist to be filled by the current study. Halliday's (1985) LD formular is not applied in most works as shown above, despite the fact that it is widely accepted as an improvement upon Ure's (1971) formular. Also, very few authors (Fadhillah 2018; Abuquba et al 2022; Turkben 2019; To et al 2013) covered the genre of texts. Apart from these observations, many of the works (Sholichatun,2011; Bansiong,2019; Istiqomah,2015; Prawinanto & Bram,2020; Li & Zhang,2021; Andri et al,2021; Yulinda et al, 2018, etc) used text excerpts and not the whole texts, creating a difficulty of validity and reliability of results and consequent generalization of findings as observed in Kim et al (2018) and To (2018).

Turkben (2019) shares some similarities with this study, with a departure in Halliday's (1985) LD Formular. This is a gap in the theory. Abuquba et al (2022) is also related to this study (especially in terms of currency) but still with gaps in Gunning Readability Formular and Text-Grade Level considerations (gaps in methodology). To et al (2013) and To (2018) have same degree of closeness as Abuquba et al (2022) with the current study but are lagging in terms of currency, Gunning Fog Index and Text-Grade Level considerations (methodological gaps). To et al (2013) therefore has gaps in both literature and theory compared with this study. A major difference between these two closest studies and mine remain the fact that they were not conducted using texts from the Ghanaian Educational system.

Studies on readability within the Ghanaian context are quite many today but few relate to the use of textbooks as this study does (Gyasi, 2013a; Owu-Ewie, 2014; Owu-Ewie, 2018; Nunoo et al, 2021).That aside, all of them focused on using readability

indices but not lexical density. There are therefore very significant departures between this study and those before it within the Ghanaian context. Whilst Owu-Ewie (2014 & 2018) used English Language textbooks (with departures in Halliday LD formular and genre), Nunoo et al (2021) used Integrated Science textbooks for Junior High schools, (with departures in Ure and Halliday LD formular and genre).Gyasi (2013) used the Ghana Association of Science teachers textbooks for senior high schools, applying only readability indices without the use of lexical density indices such as those for Halliday (1985b) and Ure (1971).Gyasi (2017a),a PhD thesis, however provides in-depth methodological insight for readability analysis which was relied upon for the analysis in this study. The bottom-line similarity however lies in geography—they are all conducted within the Ghanaian setting.

Overall, 5 out of the 15 Ghanaian studies reviewed above relate more closely to this study. Apart from the common denominator relationship of geography (setting), Gyasi (2013a), Owu-Ewie (2014 & 2018) and Nunoo et al (2021) used textbooks within the Ghanaian educational system, as does this study. Gyasi (2017a) did not use a textbook but provides in-depth understanding of the methodology and literature in the field of readability, which serves as a guide for this study. Specifically, only Owu-Ewie (2014 & 2018) used English textbooks within the Ghanaian formal educational system. All the Ghanaian studies reviewed in this study however do not include lexical density analysis but only focus on readability, and this remains one of the vacuums this study seeks to fill.

In sum, the approximate gap index or departure of existing related literature with the current study stands at thirty-seven percent (37%) with a similarity rate of sixty-three percent (63%), representing the 42 unchecked and 70 checked boxes respectively, as illustrated in table 4. A thirty-seven percent (37%) estimated gap index,

representing the 42 unchecked boxes in table 4, in existing contemporary literature on any topic definitely calls for the need to investigate more on the particular subject. This therefore justifies the need to research into this topic.

2.18 Overall Summary of Reviewed Literature

Reviewing the cited literature in related studies in summary terms, it is clear that most of these studies are silent on genre comparison which is a focal point in this study. This study compares three (3) active 'frontline' genres of writing widely used by pre-tertiary learners (Chief Examiner's Report, WAEC 2020).

Again, regarding academic level, the literature clearly reveals a lack of comparison and trend analysis from a lower grade to a higher one (e.g., SHS1 to SHS2 and SHS3 in this study). Existing studies generally stick to particular grade levels, making no room for comparison. Most of them however do not focus on grade propriety at all, but that is the focus of this study.

Also, most already existing studies used texts that are not selected from formal education textbooks. This study uses texts from widely used English textbook series (Global Series) within the Ghanaian formal educational system. The baseline similarity between all these studies and the current study remains the fact that they are all involved in textual analysis with the aim of determining text complexity/difficulty levels and resultant suitability for certain categories of audience.

The departure with the current study lies largely in the use of genres of writing and inter-grade trend comparisons as well as the use of whole texts and geography/setting of the study. Whilst this study employed the use of whole sampled texts, most other studies used text excerpts and this does not provide for fair conclusions

on findings according to To (2018) and Kim et al (2018). Readability score of a wholly analyzed text may (most likely) vary from the score for an excerpt of same text.

On the local front, 5 out of the 15 Ghanaian studies reviewed in the current study relate more closely to this study. Apart from the common denominator relationship of geography (setting), Gyasi (2013a), Owu-Ewie (2014 & 2018) and Nunoo et al (2021) used textbooks within the Ghanaian educational system, as does this study. Gyasi (2017a) did not use a textbook but provides in-depth understanding of the methodology and literature in the field of readability, which serves as a guide for this study. All the Ghanaian studies reviewed in this study however do not include lexical density analysis but only focus on readability, and this remains one of the vacuums this study seeks to fill. This is because lexical density remains a very crucial determinant of the readability or otherwise of a given text. A readability study anchored by lexical density is more formidable (O'Sullivan et al, 2020).

2.19 Theoretical Framework

This segment explores the most related selected theories to this study and practically explains how each related theory manifests itself in the analysis of the data as well as the relationship of the theories to the core objectives of the study. Five main related theories have been discussed: the cognitive load theory; the schema theory; the reader-response theory; grammatical intricacy theory; and information theory.

2.19.1 Cognitive Load Theory

This theory is grounded in the human information processing model, depicting memory as comprising three primary components: sensory, working, and long-term. Sensory memory selectively filters incoming stimuli, transmitting chosen information to working memory for further processing. Working memory has a capacity to handle

5-9 pieces or chunks of information concurrently. The processed information in working memory is either discarded or categorized for storage in long-term memory.

Long-term memory organizes stored information into structures known as "schemas," which reflect how we commonly utilize the information. With repeated use, schemas become more developed, enhancing the ease of recall. Cognitive load, in an educational context, pertains to the volume of information that working memory can effectively process. Cognitive load theory serves as a guide in educational settings, preventing learners from being overwhelmed with information beyond their capacity for effective processing into schemas, facilitating long-term memory storage and future recall.

Schemas, even those that are highly intricate, are considered a single "chunk" of information within our working memory. Activating prior knowledge or schemas enables us to tailor instruction to the appropriate level, addressing the gap between what learners already know and what we aim for them to learn. Effective instructional design seeks to minimize the "problem space," the disparity between the current state and the desired goal. If the problem space is too extensive, learners may experience overload, impeding their ability to process and retain the information being taught. For instance, breaking down complex problems into smaller parts is more manageable for learners than tackling a large, intricate problem all at once.

The design process commences with the formulation of robust learning objectives that establish the desired endpoint for learners at the conclusion of a session or instructional unit. Subsequently, an assessment of learners' existing knowledge or skills is conducted to establish starting and ending points for the educational process.

This assessment can take various forms, such as surveys, tests, or a review of prior curriculum.

Materials should be designed to maintain a balance of visual information, preventing overwhelming visuals for learners. For instance, incorporating labels into diagrams rather than placing them off to the side enhances visual cohesion. This principle applies to auditory information as well, with efforts to minimize extraneous noise during verbal information presentations. If a session requires students to access multiple external resources, eliminate barriers by providing clear instructions and direct links. Auditory and visual information operate through separate working channels that do not compete with each other. Presenting information in both visual and auditory formats expands the memory's capacity to process information for long-term storage and retention. It is crucial to ensure that the information presented includes both visual and auditory components.

There are three types of cognitive load: intrinsic, extraneous, and germane. Intrinsic load refers to the inherent difficulty in processing information, regardless of its presentation format. This load remains constant, unaffected by extraneous and germane factors. Extraneous load pertains to how information is presented and the ease or difficulty a learner experiences in processing it, varying from person to person. Germane load involves the effort required to use memory and intelligence in processing information into schemas, contributing to encoding new information into long-term memory. When overwhelmed, individuals may struggle to process new information or make appropriate decisions, potentially leading to task failure even within their knowledge and experience.

Addressing cognitive overload can be approached in several ways. Firstly, engaging learners through questions helps assess their knowledge level, ensuring that instruction aligns with their understanding. Secondly, efforts should be made to eliminate extraneous distractions, such as cell phones or overly stimulating devices, that may contribute to cognitive overload. Thirdly, directing the learner's focus to one piece of information or task at a time can be beneficial. Additionally, providing clear time estimates for tasks helps manage cognitive load, offering a framework for reducing overload, especially in tasks involving reading materials.

2.19.2 Schema theory

A schema, also known as a scheme, is an abstract concept proposed by J. Piaget, referring to abstract concepts. Schemas are units of understanding, hierarchically categorized and interconnected into complex relationships. As knowledge grows, schemas become more extensive and intricate. For students, schemas encapsulate what they already know about a concept, which may need expansion or correction. The most crucial rule in teaching based on Schema Theory is to ensure that students' existing schemas are actively engaged at a conscious level during instruction.

Key Characteristics of Schemas:

1. *Dynamic Nature:* Schemas are dynamic, evolving with new information and experiences, showcasing the concept of plasticity in development.

2. *Guidance in Interpretation:* Schemas wield significant influence in guiding how we interpret new information, with their impact potentially profound.

3. *Storage of Information Types:* Schemas store both declarative ("what") and procedural ("how") information. Declarative knowledge involves facts, while

procedural knowledge pertains to knowing how to perform a task without necessarily being able to articulate the process consciously.

4. *Slot Structure:* Declarative schemas may consist of slots representing characteristics and values. For example, a house schema may include slots for materials and parts, with wood and rooms as corresponding slot values. These slots can have default values, and schemas may have parent-child relationships with others, inheriting or passing on characteristics.

5. *Isa Slot:* Schemas include a special slot called "isa," pointing to the superset. For instance, the house schema, when associated with the superset of building, would include features such as having a roof and walls and being found on the ground.

6. *Facilitation of Communication:* Schemas enable writers and speakers to make assumptions about the reader's or listener's existing knowledge.

2.19.3 Reader-Response Theory

Reader-Response Theory, prominent since the late 1960s, centers on the reader's reaction to a text, often surpassing the focus on the text itself. In contrast to text-based approaches like New Criticism, reader-response criticism contends that a text lacks meaning before a reader engages with it. The following are the ground characteristics of Reader-Response theory.

1. *Active Role of Reader:* Reader-response theory emphasizes the creative role of the reader in interpreting and constructing meaning.

2. *Transactional Nature:* Reading is viewed as a transaction between the reader and the text, influenced by the reader's past experiences, beliefs, and expectations.

3. *Mutual Influence:* Readers have the power to influence and change literary texts, co-authoring the meaning in their personal literary experiences.

4. *Construction of Meaning:* The theory posits that the construction of meaning in personal literary experiences is a central characteristic of the connection between the reader and the text.

Some criticisms about the reader-response theory include neglecting the author's intentions, an excessive focus on reader perceptions, and subjectivity limitations in text interpretations.

2.19.4 The Grammatical Intricacy (GI) theory

Eggins (2004) opines that the formula for finding GI is by expressing the number of ranking clauses as a proportion of the number of sentences in a text. Grammatical intricacy refers to how often a clause complex appears in a text in comparison with simple clauses. It is a theory propounded by Eggins (2004). According to him, the higher the clause-sentence ratio, the more grammatically intricate a text is and the lower the clause-sentence ratio, the less intricate the text is grammatically. Texts with high grammatical intricacy are characterised as being in the written mode whilst those with low grammatical intricacy are characterised as being in the spoken mode. Many linguistic scholars agree with the assertion that written texts are more difficult or complex compared to their non-written counterparts (Eggins 2004; Halliday 1985b; Ure 1971; and Gallagher et al 2017, among others). This theory applies centrally in Halliday's LD formula which is used in this study.

Based on this theory, it is accepted that every text has a different level of intricacy (complexity). This is all related to how much information is introduced in a clause complex which can contain more than one simple clause. Classification of clauses (sentences) is applicable to the determination of grammatical intricacy (complexity) of a text. If in a text there are more clause complexes than simple clauses, it can be said that the text is more complex in the sense that it presents more information in a condensed way. Consequently, the learners are at potential to encounter problems.

Grammatical intricacy is important to be uncovered because a text is said to be difficult because of the intricacy of information. A simple clause is easier to understand in the sense that the amount of information presented is less than that of a clause complex. In other words, a clause complex as indicated in functional grammar contains more information than a simple clause. To understand the total meaning of a text, the types of clauses in English must be familiar to the students. It often occurs that students cannot understand a clause complex as they cannot identify the subject and predicate. In fact, no matter how long a clause is, the subject and predicate should be easily identifiable because they are the elements of grammar which help to create meaning. The proposition contains the concepts of relation, events, attributes and things. It means that every clause must have a subject (what is being explained) which is described by showing its relation to other things or events. To illustrate this more clearly, a person, for instance, can learn English because the language is very important. He then studies it as a course and reads many books to get information. In this case, the level of GI is counted by analyzing High and Low level of grammatical intricacy (complexity) of a text. If the number of clause complexes is more dominant than simple sentences in a text, it means that the text has high level of GI; and on the contrary, if the number of clause complexes is lower than the number of simple sentences, it means that the text

has low GI. The level of intricacy can be found by finding the ratio between the simple clauses and clause complexes. In the real analysis, a simple clause may be regarded as consisting of subject and predicate. Every type of clause has a different level of difficulty. This is true of the clauses which contain different amounts of information. Various studies show that clause complexes are more difficult to process than simple clauses, reflecting their relatively greater intricacy/complexity (Halliday 1985b).

2.19.5 The Information theory

This is a mathematical representation of the conditions and parameters affecting the transmission and processing of information. Most closely associated with the work of the American electrical engineer Claude Shannon in the mid-20th century, information theory is chiefly of interest to communication engineers, though some of the concepts have been adopted and used in such fields as psychology and linguistics. Information theory overlaps heavily with communication theory, but it is more oriented toward the fundamental limitations on the processing and communication of information and less oriented toward the detailed operation of particular devices.

Information theory as a study began in 1924, when Harry Nyquist, a researcher at Bell Laboratories, published a paper entitled “Certain Factors Affecting Telegraph Speed”. It was followed by the paper “Transmission of Information”, which Nyquist’s colleague R.V.L. Hartley wrote in 1928 and established the first mathematical foundations for information theory. Based on these foundations, in 1948 Claude Shannon wrote his famous paper “A Mathematical Theory of Communication” in the Bell System Technical Journal and initiated the formal study of information theory. In 1998, Shannon made significant modifications of this paper which he published in the

University of Illinois Press (Shannon, 1998). Today, it is oriented toward the processing and transmission of information.

The key concept of information theory is *entropy*, on which the readability of a text depends. Entropy is the amount of information in a text, defined by the degree to which the textual content is surprising, i.e. by the degree of its so-called surprisal. Surprisal as a concept in the information theory is synonymous with lexical density in readability studies. If the surprisal of the content is high, the text is highly informative (high LD). On the other hand, if the surprisal of the content is low (low LD), the text carries very little information.

In sum, these five theories play out very clearly in this study. Beyond the lexicon is the analysis of groups (clauses, phrases, sentences). Eggins' (2004) grammatical intricacy theory sufficiently examines the role of these grammatical groups in text complexity as in the identification of ranking clauses, sentences and phrases in the analysis of textual data in this study. Thus, the study examines text data with the goal of determining text complexity. Indeed, there cannot be a better way of studying text complexity than examining the lexicon and grammatical groups of a text. To achieve the goal of determining text complexity, the information theory provides the platform with its mathematical representation of textual data to unravel how information transmission or processing in the selected texts is handled. The information theory therefore provides a strong anchorage to the grammatical intricacy and readability theories. The study is therefore a theory-based partially qualitative (mixed methods) descriptive content analysis within the broader field of corpus content analysis.

2.20 Application of Theory in this Study

This segment seeks to explain how the assumptions of the five (5) selected theories for this study are reflected in the analysis: readability theoretical concept, grammatical intricacy theory and the information theory. Clearly establishing this link between theory and analysis adds greatly to the validity and reliability of overall findings.

First, cognitive overload arises when the combination of intrinsic, extraneous, and germane loads overwhelms the learner. Regardless of intelligence, individuals have limitations in processing information simultaneously. This feature of the cognitive load theory is in tune with one of the ground assumptions of the study which states that high lexical density translates directly into low readability and consequent poor academic performance overall. A high level of content vocabulary in a single text overwhelms the learner regardless of their intelligence levels, and this ultimately breaks down academic progress.

Second, the Schema theory, within the realm of cognitive science, delves into how the brain organizes knowledge. A schema, constituting an organized knowledge unit for a subject or event, draws from past experiences and is accessed to guide current understanding or actions. Graders' ability to read and process meaning from texts depends also on their past experiences and how their brains contextualize new knowledge within existing knowledge (schemata). In the analysis of this study, the shocking revelation of metric and grader readability assessment being in sharp disparity may stem from this assumption of the schema theory. Graders' experiences or existing knowledge may have aided their effort to read and understand the sampled texts. Therefore, whilst the metric assessment bluntly uses syllables, content words, grammatical words, ranking clauses and sentences among other readability variables to

arrive at readability values, graders' schemata or background knowledge may override these abstract considerations.

Third, the reader-response theory emphasizes the reader's active role in constructing textual meaning and highlights the diversity of reader reactions. Just like the schema theory, this theory applies to research question five which centers on metric and grader readability assessment. Readability is influenced by several factors as indicated in the literature in this study. To that end, the strict adherence to readability metrics to determine text-grade suitability is problematic. How the individual grader responds to a text during reading vary depending on their varied peculiar characteristics and privileges. For instance, whilst graders may be in same grade, if grader **A** lives with a highly educated family in a predominantly elite environment, grader **A** is most likely to find a text more readable than grader **B**, who lives with an illiterate family in a predominantly non-elite environment. Their levels of active engagement with the text would definitely not be the same. To that extent, one may understand why the metric and grader readability assessment values in this study are in sharp disparity.

Fourth, Eggins (2004) grammatical intricacy theory stipulates that the complexity level of a text is expressed as a ratio of the total number of clauses within a text over the total number of sentences in that text. On the back of this basic assumption of the theory, Eggins' (2004) Grammatical Intricacy theory plays out in this study as in the determination of total number of clauses in a text over total number of sentences. Eggins (2004) Grammatical Intricacy Ratio (GIR) is calculated as follows:

$$\text{GIR} = \frac{Total\ number\ of\ clauses\ in\ text}{Total\ number\ of\ sentences\ in\ text}$$

This is usually expressed in terms of ratio distribution. That, a high ratio in GI marks the text as being one in spoken mode and vice versa. The grammatical intricacy

theory relates strongly with Halliday's Lexical Density formula which identifies total number of ranking clauses within texts in comparison with total number of whole sentences. To this extent, we see a very significant relation between this theory and the study at hand. Data analysis in the next two Chapters of this study employ the calculation of number of ranking clauses and whole sentences, particularly under Halliday's LD Formula.

Fifth, to the extent that LD and readability hinge largely on information transmission and information processing, the information theory fits into this study adequately. Today, this theory is oriented towards the processing and transmission of information. The textbook writer intends to communicate to his student audience by selecting and assigning texts to various grades. As the textbook writer transmits information (knowledge) through selected texts, the student is expected to be able to process the transmitted information adequately enough so as to bring about learning in him.

Summarily, the cognitive load, schema, reader-response, the grammatical intricacy and the information theories have been well proven, in the foregoing, to be adequately and variously relevant in guiding this study. Therefore, the study is strongly grounded in theory and carefully envisioned in analytical, conceptual and theoretical frameworks.

2.21 Conceptual Framework

A conceptual framework illustrates the expected relationship between the variables employed in a study. It defines the relevant objectives for the research process and maps out how they come together to draw coherent conclusions (Swaen & George, 2022).In this study, the key concept under exploration is *text readability*. Since the study

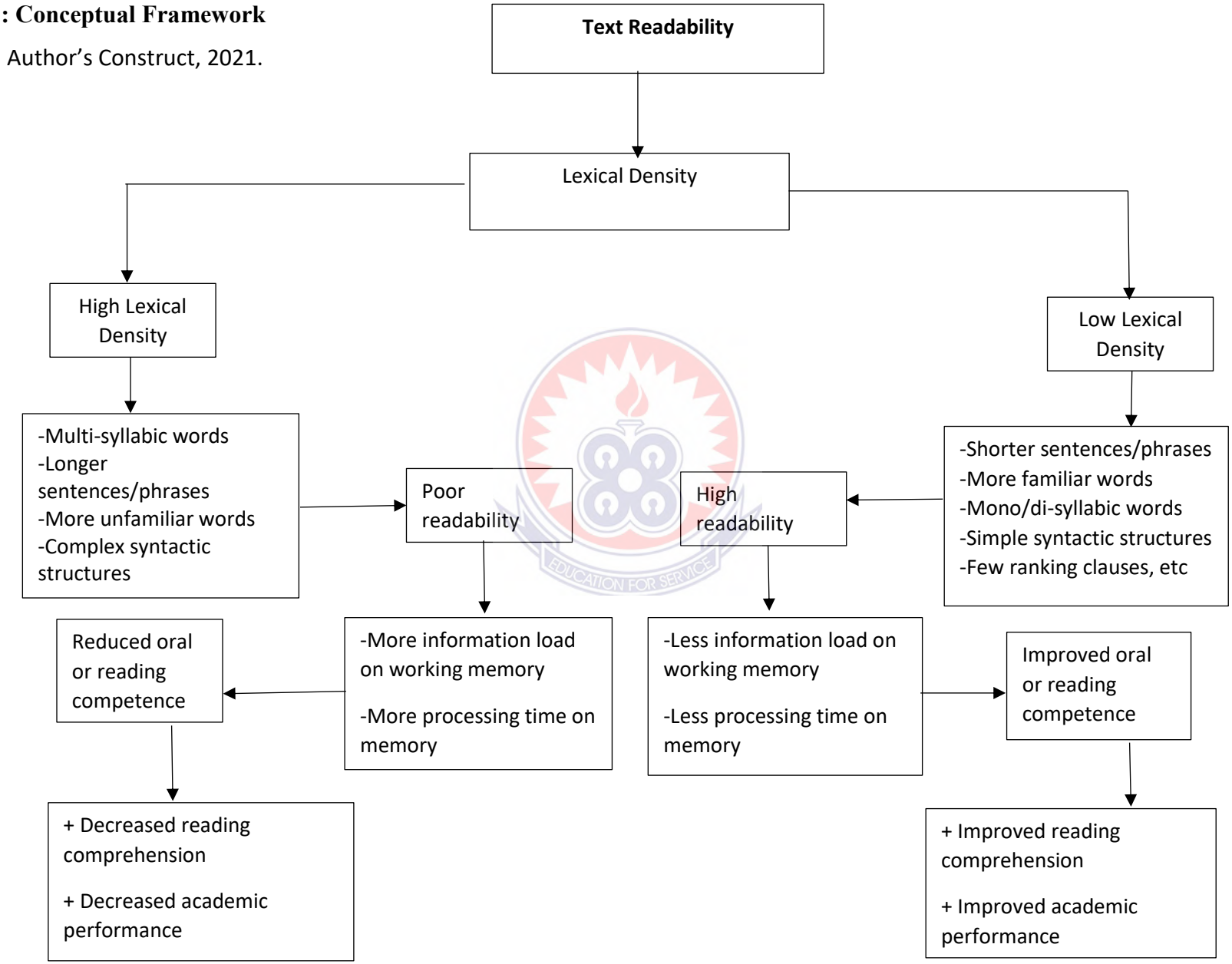
involves textual analysis, the concept of lexical density (LD) is also explored alongside readability to set the background for a clearer understanding of the problem under investigation and to arrive at more valid conclusions.

When a text has high LD, it is usually characterized by linguistic features such as multi-syllabic words, more unfamiliar words, longer sentences, more ranking clauses and complex syntactic structures among others. These linguistic features lend the text to poor readability. When the text has poor readability status, it results in higher information load on the working memory of the learner, requiring more processing time on the learner's memory as well. Consequently, there is reduced oral or reading competence on the part of the learner, resulting ultimately in decreased reading comprehension and academic performance.

On the other hand, when a text has low LD, it is usually characterized by linguistic features such as shorter sentences, more familiar words, mono/disyllabic words, fewer ranking clauses and simple syntactic structures among others. These linguistic features lend the text to high readability. With a high readability status, the text leaves relatively lower information load on the working memory of the learner and it requires lesser time for processing information on the memory. Consequently, there is improved oral or reading competence on the part of the learner, resulting ultimately in improved reading comprehension and improved academic performance. Afterall, the ultimate benefit of using readable texts to the SHS learner is for him/her to improve upon academic performance. The conceptual framework for this study is represented in figure 1.

Figure 1: Conceptual Framework

SOURCE: Author's Construct, 2021.



CHAPTER THREE

METHODOLOGY

3.0 Introduction

This segment of the thesis report fashions out the procedures, tools and mechanisms employed in gathering and processing data for the study. This chapter examines the research design, research paradigm and approach, data collection procedures, data collection instruments, sampling/sample size, data analysis plan and the trustworthiness of data (ethical considerations).

3.1 Research Paradigm

A research paradigm is a philosophical framework that a research is based on. It offers a pattern of beliefs and understandings from which the theories and practices of the research project operate. Three main research paradigms are widely used in the social sciences and humanities: positivism, constructivism and pragmatism. This study uses the constructivist research paradigm. According to Elkind (2004), Constructivism is the recognition that reality is a product of human intelligence interacting with experience in the real world. As soon as you include human mental activity in the process of knowing reality, you have accepted constructivism. Constructivism accepts reality as a construct of human mind, therefore reality is perceived to be subjective. Moreover, this philosophical approach is closely associated with pragmatism and relativism. In simple terms, according to constructivism, all knowledge is constructed from human experience. This viewpoint is based on inseparability between knowledge and knower.

Constructivists believe that there is no single reality or truth, but rather multiple realities. They devote themselves to understanding and interpreting the meaning

attached to an action. For this reason, constructivists tend to use qualitative research methods, such as interviews or case studies, which focus on providing different perspectives. Constructivism aims to provide the answer to "why."

This study on readability involves the SHS learner and the texts they have been assigned to read and construct knowledge at various grades. The 'knowledge' to be constructed should be packaged in such a manner that allows the 'knower' to do meaning construction seamlessly, devoid of obstructions in whatever form. When the text is unreadable or too easy to read, learning is ineffective or retarded as the case may be. The learner's interaction with written material (textbook) constitutes his/her reality of experience in the real world. This study is qualitative, aimed at unveiling many different kinds of realities or truths about human life as it is interested in answering the question: Why texts sometimes do not suit their intended readership or audience.

3.2 Research Approach

This study employs the mixed methods approach to research, embodying a descriptive qualitative content analysis with the use of numerical data. Content analysis is a research tool used to determine the presence of certain words, themes, or concepts within some given qualitative data (i.e. text). Using content analysis, researchers can quantify and analyze the presence, meanings, and relationships of such certain words, themes, or concepts. As an example, researchers can evaluate language used within a news article to search for bias or partiality. Researchers can then make inferences about the messages within the texts, the writer(s), the audience, and even the culture and time of surrounding the text. Qualitative content analysis has been defined variously.

Hsieh and Shannon (2005, p.1278), defines it as "…a research method for the subjective interpretation of the content of text data through the systematic classification

process of coding and identifying themes or patterns". Mayring (2000, p.2) sees research approach as "…an approach of empirical, methodological controlled analysis of texts within their context of communication, following content analytic rules and step by step models, without rash quantification". Finally, Patton (2002, p.453) opines that it is "…any qualitative data reduction and sense-making effort that takes a volume of qualitative material and attempts to identify core consistencies and meanings".

These three definitions illustrate that qualitative content analysis emphasizes an integrated view of speech/texts and their specific contexts. Qualitative content analysis goes beyond merely counting words or extracting objective content from texts to examine meanings, themes and patterns that may be manifest or latent in a particular text. It allows researchers to understand social reality in a subjective but scientific manner. In this study, beyond the counting of syllables, words, phrases, clauses and sentences, the social reality of how readable texts are to intended audiences is the phenomenon under scientific investigation. Also, texts in this study are analyzed using laid down principles to check the readability of the language used in these texts. This therefore passes the study for the mixed methods approach to research, with a high level of qualitative content analysis. The use of figures, numerals or statistics in the study provides a quantitative angle to the processing and analysis of data. However, the study ultimately targets to interpret or gain insights into the phenomenon called *readability*. It is on the basis of this that the approach to this study is identified as the mixed methods approach.

3.3 Research Design

Research design refers to an outline, plan or strategy specifying the procedure to be used in investigating the research problem (Christensen, 1991: 269). The research

design is the scheme and composition of investigation accordingly formulated to obtain answers to research questions. The design of this study is analytical in nature; therefore one may describe the study as having the descriptive or analytical design. The study is partly a qualitative content analysis using the descriptive mode of data analysis, and adopting quantitative procedures in the course of data analysis. The heavy use of numerical data, coupled with the qualitative content analysis using the descriptive mode, lends this study to the mixed methods research approach. The relevance in applying the descriptive research design in this study lies in the fact that it has allowed for an effective analysis of the numerical data, making it possible to ascertain the relationship between LD and readability, the suitability of texts to intended grades and the agreeability of readability and LD metrics in their application to same texts, among other objectives.

Bengtsson (2016) indicates that the primary goal of qualitative content analysis is to provide knowledge and understanding of the phenomenon under study. This study examines the nature and role of the lexicon in text complexity. The use of the term "qualitative" in the opinion of Aspers (2019) in research, stands for the metaphor, meaning, analogy, definition or model that characterizes a particular phenomenon under investigation. Aspers (2019) adds that time, space and other elements work in connection in qualitative research and these are analytically distributed in the qualitative analysis process. Bengtsson (2016) defines qualitative Content Analysis (CA) as the systematic examination of current records or documents as sources of data. He adds that Content Analysis is the method used in analyzing data in written forms, and since this study deals with written passages/texts from English textbooks at SHS level in Ghana, CA applies appropriately herein. This study is thus a qualitative content analysis under the mixed methods research approach.

In sum therefore, the study employs quantitative tools for the presentation of data but it uses the mixed methods approach to research. The study does not seek to extrapolate but to understand the phenomenon under study—text readability. This is done with the aid of descriptive statistical data, giving a fair balance between qualitative and quantitative research (mixed methods research).

3.4 Sampling Strategy and Sample size

The sampling strategy used in this study is the universal sampling strategy, otherwise known as sampling by consensus. The universal sampling technique is used where all the elements of the sample are taken as the sample. In this study, all the texts used to illustrate the three genres of writing (narrative, expository, descriptive) have been taken as the sample for the study. The sample in this study is in two forms: text sample and human sample.

In all, a total of forty-five (45) different texts forms the data of this study. That is, 15 texts each for the three (3) genres of writing (narrative, descriptive and expository). Under each genre of writing, 5 texts have been used for illustration for the three (3) academic levels (SHS1-3). This gives the total number of texts per genre per level as 15. All the 15 texts under each genre and level have been picked to form the data for this study, giving the total of 45 texts. The sample percentage for this study is therefore 100%, hence the use of the universal sampling method. Each of the forty-five (45) texts is analyzed using Lexical Density formulae of Ure and Halliday on one hand, and using readability indices of Gunning and Flesch on the other hand. The analysis has a total of 180 versions of the forty-five (45) texts; each text undergoing four (4) separate analysis, namely Ure and Halliday separate LD analysis and Gunning and Flesch separate readability analysis.

Regarding human sample research participants in respect of research question five (5),a total of fifty (50) graders from each academic grade (SHS1-3) constituting an overall total of one hundred and fifty (150) graders across the three (3) academic grades, formed the research participants for this segment of the study.

The fifty (50) graders for each grade were selected from five (5) different schools. Ten (10) graders were randomly selected from each of the five (5) separate schools. In the random selection procedure, the total number of graders at each grade was taken and divided by ten (10).Then the resultant figure was used to count graders and picking only those on whom the lot fell. This was done from class to class and the ten graders were eventually selected for each grade from the five schools.

3.5 Data Collection Method

Secondary data was used in this study (written texts). Data for this study was collected via the textual analysis method. Textual analysis is the process of gathering and examining qualitative data to understand what it is about. Textual analysis refers to a data-gathering process for analyzing text data (Hsieh & Shannon, 2005). This qualitative methodology examines the structure, content, and meaning of a text, and how it relates to the historical and cultural context in which it was produced. To do so, textual analysis combines knowledge from different disciplines, like linguistics and semiotics.

Content analysis can be considered a subcategory of textual analysis, which intends to systematically analyse text, by coding the elements of the text to get quantitative insights. By coding text (that is, establishing different categories for the analysis), content analysis makes it possible to examine large sets of data and make

replicable and valid inferences. Texts from three (3) popular genres of writing within Ghana's educational system (narrative, descriptive and expository) were used as data.

3.6 Data Collection Procedure

A number of tools (including computational formulae) were used in processing the text data from the *Global Series* English textbooks. This segment clearly identifies these tools and how they have been carefully applied to arrive at the findings or results. They are: Ure (1971) Lexical Density Formula, Halliday (1985b) Lexical Density Formula, Gunning (1952) Fog Index, Flesch (1948) Reading Ease Scale, Flesch Grade-Readability Index, Online Text Analyzer (*Lexicool*), Syllable Counter (*SyllableCounter.net*) and Merriam-Webster.com Dictionary. This segment looks at these tools or instruments and how they have been applied in the analysis of data in the study. Textalyser, Microsoft Word, Microsoft Excel and lexicool were the tools used to process the text data into numerical data. These tools were used to count words, syllables, sentences, clauses, phrases and letters.

The two formulae for finding LD used in this study are explained below:

*** Formular 1: Ure (1971) LD Formula**

$$\text{LD} = \frac{Number\ of\ lexical\ items}{Total\ number\ of\ words}\ x\ 100$$

(Halliday, 1985b; Ure, 1971)

Lexical density is calculated by multiplying the number of lexical items in a text by 100 and then dividing the result by the total number of words in the text. The final result is expressed in percentage terms and this is compared with Flesch's Grade-Readability Scale to find out which academic level a text suits. Using this formula, Ure argues that if the figure is 40% and above, it accounts for high lexical density.

*** Formular 2: Halliday (1985b) LD Formula**

$$LD = \frac{Number\ of\ lexical\ items}{Number\ of\ ranking\ clauses} \times 10^{**}$$

NB: 10^{**} stands for the refractive percentile multiplier

(Halliday 1985b)

Lexical density is calculated here by multiplying the number of lexical items in a text by 10 and then dividing the outcome by the number of ranking clauses in the text. The final result here is equally expressed in refractive percentile terms, unlike in Ure's formula and is compared with Flesch's Grade-Readability Scale to find out the academic level the text suits.

It must be added that in some computations using Halliday's formula, the refractive percentile (10%) multiplier is omitted and the result expressed as a simple ratio. In expressing the LD of a text as a ratio, Halliday (1985b) noted that "A typical average lexical density for written texts is between 3 and 6, depending on the text formality. The higher the index, the more difficult the text is. The figures for spoken language, conversely, fall to between 1.5 and 2."

The two formulae for finding Readability to be used in this study are explained below:

1. Gunning Readability Formula (Gunning Fog Index GFI)

$$0.4 \times [(\frac{Total\ words}{Total\ sentences}) + 100\ (\frac{Complex\ Words}{Total\ Words})]$$

The Gunning readability formula, known widely as the Gunning Fog Index (GFI), is calculated by dividing the total number of words by the total number of sentences. Note the result here. Then the number of complex words in the text is divided by the total number of words in the text. The outcome is multiplied by 100.The two results are then added. The result of this addition is multiplied by 0.4. This gives the

overall final readability index of the text. This final result is expressed in percentage terms and is compared with Flesch's Grade-Readability Scale to determine the academic level a particular text suits.

2. Flesch Reading Ease Scale

FRE = 206.835 – (1.015 x ASL) – (84.6 x ASW)

ASL=Average sentence length (total words divided by total sentences)

ASW=Average number of syllables per word (total syllables divided by total words)

In this formula, first the total number of words are divided by the total number of sentences in the text. Second, the total number of syllables in a text is divided by the total number of words in the text. Having done this, the formula flows as follows; two hundred and six point eight, three, five minus one point zero, one, five multiplied by the result of total number of words divided by total number of sentences, then minus eighty-four point six multiplied by the total number of syllables divided by the total number of words. This gives the final result which is expressed in percentage terms and compared with Flesch's Grade-Readability Scale to determine the text's suitability for its intended academic level.

3.7 Grader Assessment of Readability

Grader assessment of readability of sampled texts is done in this study manually. Graders were given the texts according to their respective grades. They were asked to carefully read through the texts and list out vocabulary and expressions that they did not understand or found difficult to understand their meanings. Ample time of one (1) hour was given to graders to identify these words and expressions. This process was supervised to ensure independent assessment of sampled texts by the graders. This adds to the validity and reliability of results of the study.

The total number of words and expressions identified by the graders for each text, together with other variables, namely: characters, syllables, words, phrases, ranking clauses, clause complexes and sentences are used alongside total running words in the text to arrive at the readability rating of the texts by each grader. The lexical density and readability values of the texts were thus computed using these variables. The average scores of graders' assessments were then compared with metric scores.

3.8 Data Analysis Plan

In this study, the researcher used quantitative tools to present the qualitative data. This was done to enable the researcher be able to analyze data and make sense of the corpus data. As indicated earlier, the textual analysis plan is used for this study. It is from an English textbook series called *Global Series* (Nelson, 2016) that the texts used in this study are drawn as data. *Global Series* is an English textbook used for SHS students in Ghana. It is recommended and approved by the Ghana Education Service and has been used by many schools in Ghana for many years in the teaching of the Queen's language. The texts were retyped from the textbook series using Microsoft Word processor. The retyped texts were meticulously edited to be exactly the same as the original ones from the textbook. They were then analyzed using the four (4) LD and readability metrics. Textalyser, Microsoft Word, Microsoft Excel and lexicool were the tools used to process the text data into numerical data. These tools were used to count words, syllables, sentences, clauses, phrases and letters. The researcher manually cross checked the analyzed text data to ensure accuracy, validity and reliability of overall results.

The density levels of lexemes in each text are analyzed using Ure (1971) and Halliday's (1985b) lexical density formulae. The trend of text complexity (i.e., lexical density and readability) across the academic levels and genres of writing is determined

in the analysis. The descriptive qualitative content analysis system heralds the data analysis procedure in this study. Analysis is qualitative in nature and tables and charts are used to summarize data for clarity. It is purely descriptive as LD and readability formulae have been strictly applied to the texts. Strict adherence to and application of these formulae to the texts form the core of data processing and analysis.

Analysis in this study is three-dimensional. First, lexical density has been analyzed using two methods: Ure (1971) LD formula and Halliday (1985b) LD formula. Secondly, readability has also been analyzed using two methods: Gunning Readability formula and Flesch Readability formula. Third and finally, Flesch's Grade-Readability Scale has been applied to the results of the analyses to arrive at the suitability or otherwise of the texts for their respective academic levels. The central goal of this study is determining the suitability of the texts used in Ghanaian English textbooks for the various academic levels (SHS1-3). This was done by examining the lexical density and readability levels of the sampled texts.

3.9 Ethical Considerations

Ethical considerations in research are a set of principles that guide the research design and practices. These principles include voluntary participation, informed consent, anonymity, confidentiality, potential for harm, and results communication. This segment therefore discusses the set of principles that guide the research design and general procedure in this study. Researchers are obliged to adhere to ethical standards in their work so as to protect the rights of research participants, enhance research validity and maintain general scientific integrity among other things.

For purposes of this study, the researcher took an official letter of introduction from the department which he emailed to the author of *Global Series*, asking for

permission to use the book. Permission was duly granted by the author before the researcher went on to use the texts for the analysis. This study does not involve research participants and uses only secondary data for the analysis.

3.10 Trustworthiness of Data

Trustworthiness is one way researchers persuade themselves and readers that their research findings are worthy of attention (Lincoln & Guba, 1985). Lincoln and Guba (1985) refined the concept of trustworthiness by introducing the criteria of credibility, transferability, dependability, and confirmability to parallel the conventional quantitative assessment criteria of validity and reliability.

This study is a pure textual analysis based on laid down theoretical and conceptual paradigms. Apart from possible human error in the computational analysis, which the researcher is wide alert about, the human factor in this study is totally absent. The methodological tools employed in the analysis are tried, tested and widely used in this field of study. Their suitability and dependability as research tools or methods in doing textual analysis (readability analysis) is highly commendable.

Regarding the sampled texts which form the data of this study, the texts are drawn from a widely used English textbook series in Ghana which is recommended by the Ghana Education Service for Senior High Schools. This authenticates the data used for the analysis. Conclusions and findings are therefore valid and the validity and reliability of results is guaranteed.

Inter-rator reliability of data was checked. It is one of the verification tools according to Creswell (2014), which is used to check validity and reliability of research findings. For purposes of this study, the researcher hired the services of two (2) research assistants from the university to assist in testing data trustworthiness. Specifically, these

research assistants together with the researcher independently checked the genre classification of texts, word class classification of text vocabulary, number of syllables in words used in the texts, number of words in each text, number of ranking phrases per clause, number of ranking clauses per sentence and number of sentences per text. The research assistants also assisted in the independent verification of the textual analysis method employed for the study. Results of each of the three verificators (2 research assistants and researcher himself) were compared and confirmed before the researcher went on to use the data.

3.11 Choice of Genres of Writing in this Study

The term 'genre' has been used loosely in this study to refer to the various forms or kinds of writing. This is however not a typical genre study. Generally, four (4) main genres of writing feature the Ghanaian English literacy system—argumentative, narrative, descriptive and expository. The WAEC Chief Examiner's Report (2020), identifies three (3) genres of writing (narrative, descriptive and expository) as the most commonly used forms of writing by SHS students in Ghana at the WASSCE as in their selection of essay questions. Within the Ghanaian educational system, argumentative genre is one of the popular genres of writing but it has been excluded in this study for good reasons.

First, it is not identified as one of the most commonly used genres of writing by SHS students in Ghana, according to the WAEC Chief Examiner's Report (2020). This may largely be due to the brain-tasking nature of argumentative writing. According to Sholichatun (2011), it is intellectually more demanding to write an argumentative essay compared to writing narrative, descriptive and expository essays. Argumentation is an advanced writing technique which includes descriptive, narrative and expository writing skills. That is, a good piece of argumentation must embody aspects of

descriptive, narrative and expository writing (Sholichatun, 2011). To that extent therefore, a study involving the three identified most commonly used genres of writing, per WAEC's observation, (narrative, descriptive and expository) would definitely inure to the benefit of a larger segment of the student population at SHS in Ghana. To that end, a separate analysis of the argumentative genre in this study would appear to be a duplication of a sort since bits and pieces of argumentation have been analyzed already in the three (3) identifiable genres under study.

Second, the claim that the argumentative genre is an advanced form of writing was confirmed at the early stages of data sampling for this study. Pilot analysis of sampled texts revealed that LD and readability values for the argumentative genre were far higher (150% in some cases) across genres and academic levels at the data saturation stage of the pilot analysis. It would therefore not be a healthy comparison to add the argumentative genre to the frontline normative genres of writing under study.

3.12 Flesch Grade-Readability Index (Adapted Translation)

In Flesch's original reading ease scale, readability is assessed across a range from 0 to 100.The lower the readability value of a text, the more difficult the text is assessed to be, and the higher the readability value, the easier the readability status of the text. Just like in the original scale discussed earlier, the readability of a text in the translated scale is measured from 0 to 100.Unlike the original scale however, in the adapted scale, the higher the readability value of a text, the more difficult the text is assessed to be, whilst the lower the readability value, the easier it is to read the text. The adapted Flesch readability scale is credited to To et al (2013) who successfully translated the original scale to suit all other educational systems.

Using this method, the figure 42.98 shows average difficulty level of a text (Flesch, 1948). Flesch's Readability Ease Scale is logically translated by fusing the educational attainment levels of Ghana and the United States of America (USA) to enable the researcher determine the suitability of a text to a particular academic level. The indices of lexical density and readability arrived at using Ure and Halliday's LD formulae and Gunning and Flesch's readability formulae respectively, are compared with this translated version of Flesch's Readability Ease Scale to arrive at text level suitability. The translated version is known as Flesch (1948) Grade-Readability Scale or Index.

3.13 Software Adopted

In this study, Microsoft Word and Excel were employed to deal with some counting and abstract statistics. First, Microsoft Word was used to calculate the total words in each text, and to show the readability statistics realized by the various formulae. Later, Microsoft Excel was employed to analyze the data and determine the correlation between measurements. Other key online tools used for the analysis are discussed below.

3.13.1 Online Text Analyzer (Lexicool)

This text analysis tool provides information on the complexity of a text, as well as statistics on word frequency and character count. It is a tool that allows you to analyze a text by counting the number of sentences, words and characters present. It also provides statistical information on the repetition of phrases and keywords. This online text analyzer/word counter is easy to use.

This software operates as follows: Copy and paste the text or type it into the input box, select the language for optimization (English, Spanish, French or Italian) and

then click on ‘Go’. If a language for optimization is selected, a filter that blocks certain short "irrelevant" words is applied to the word repetition analysis. If the language you are using is not in the drop-down list, it is better to select "none". It is possible to evaluate texts in all languages with this analysis tool. This tool is also intended for teachers, who can use it to assess the level of difficulty and skill required to understand a text. They can also easily extract a list of vocabulary to study.

3.13.2 Syllable Counter (SyllableCounter.net)

Syllable Counter is a simple and free online tool that can be used for counting the total number of syllables in a word or sentence. This is useful in checking syllables while writing. It is a tool to assist in learning or teaching English grammar and syllables.

This method operates as follows: It uses a simple algorithm to calculate the total number of syllables. You would enter the sentences line by line, to display syllable count for each line. It must be stated very clearly that, this online tool is used in this study only to check the accuracy of number of syllables in words and overall sentences in confirmation with the syllable count by the Merriam-Webster dictionary. Wherever the two conflicted in terms of syllable identification and number, the Merriam-Webster dictionary is followed. This tool enables the researcher to meet the formular demands of Flesch (1948) in his Readability formular as follows:

FRE = 206.835 – (1.015 x ASL) – (84.6 x ASW)

ASL=Average sentence length

ASW=Average number of syllables per word

3.13.3 Merriam-Webster.com Dictionary

For the counting of syllables in words, this is the tool used in this study. Merriam-Webster is America's foremost publisher of language-related reference works.

In addition to its award-winning *Merriam-Webster.com* dictionary site, the company offers a diverse array of print and digital language references. The first Merriam-Webster dictionary was issued on September 24, 1847. The *Merriam-Webster.com Dictionary* is a unique, regularly updated, online-only reference. It is for these reasons of regular update of content (currency) and renowned reputation that the researcher chose this dictionary over others such as Oxford Advanced Learners' Dictionary. It is America's most trusted online dictionary. This software operates as follows: A word is searched using Merriam-Webster dictionary and the breakdown of syllables in the word is displayed alongside its right pronunciation and meaning among other linguistic features.

The Online Text Analyzer tools are used in calculating total number of words, syllables, content words, grammatical words, clauses and sentences. Findings are presented according to each research question. That is, the theme of each research question is the prime focus of the analysis and appropriate findings from the analyses have been identified as answers to research questions. To this end, the results as revealed by the analysis of data have been carefully discussed to properly contextualize the findings in respect of each research question.

3.14 Analytical Framework

For the ease of analysis, the researcher has developed a method to follow. The proposed method summarizes the procedure for analysis as the author perceives it. This is represented in figure 2.

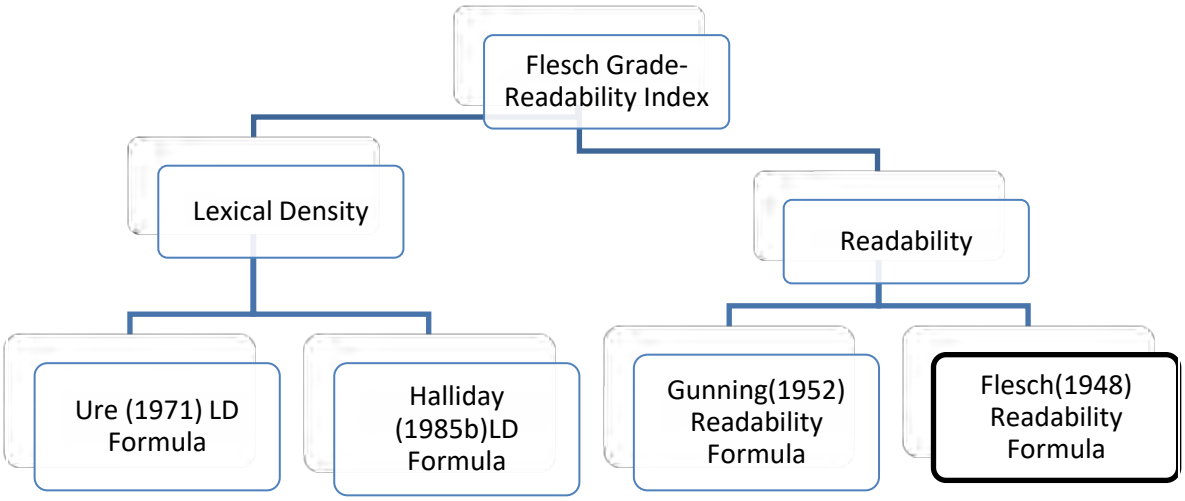


Figure 2: Analytical Framework

SOURCE: Author's Construct, 2021.

The two aspects of text complexity in focus in this study include lexical density and readability. On one hand, lexical density is analyzed using Ure and Halliday's formulae for finding lexical density. On the other hand, readability is analyzed using Gunning and Flesch's readability formulae. The results of the analysis of lexical density and readability are then compared with Flesch's Grade-Readability Index so as to determine the suitability or otherwise of the texts for their intended levels.

CHAPTER FOUR

DATA ANALYSIS

4.0 Introduction

This chapter contains the analysis of data. The data is analyzed according to the five (5) research questions. The focus of the analysis is therefore on the LD/Readability levels, LD/Readability relationships, inter-grade variation, text-grade suitability, metric consensus and metric-grader assessment reconciliation. Key findings in this chapter are juxtaposed or compared with the literature and theories discussed in chapter two and three. Taking each research question one at a time, the discussion points out how each finding contradicts/opposes, affirms/corroborates, or extends/expands literature in the findings and propositions of existing works and the theories cited in the review of related relevant literature in the study. Essentially, how the findings relate to theory and literature remains the focus of this segment.

4.1 Textual/Graphic Analysis

The data analysis (both Part I & II) of this thesis report reveals the significant and novel findings of the study. These significant and novel findings are carefully identified, interpreted and ultimately discussed. In effect, the major findings of the study and the inferences made from these findings in view of findings from related previous studies form the focus of the discussion. The full textual analysis has a total of 180 analysed versions of the 45 separate sampled texts used in the study. Before moving into the graphic analysis, the following are sample analysis of the texts using the 4 metrics.

EXAMPLE 1: Sample LD Analysis using Ure's LD formular: SHS 1 Descriptive text

KEY: Bold print = content/lexical words **Non-bold print** = grammatical/non-content words

During this **time Okonkwo's fame** had **grown like** a **bush fire** in the **harmattan**. He was **tall** and **huge**, and his **bushy eyebrows** and **wide nose gave** him a **very severe look**. He **breathed heavily**, and it was **said** that, **when** he **slept**, his **wives** and **children** in their out **houses** could **hear** him **breathe**. **When** he **walked**, his **heels hardly touched** the **ground** and he **seemed** to **walk** on **springs**, as if he was **going** to **pounce** on **somebody**. And he did **pounce** on **people quite often**. He had a **slight stammer** and **whenever** he was **angry** and could not **get** his **words** out **quickly enough,** he would **use** his **fists**.

The **last match** was between the **leaders** of the **teams.** They were **among** the **best wrestlers** in **all** the **nine villages**. The **crowd wondered** who would **throw** the other this **year**. Some **said Okafo** was the **better man**; others **said** he was not the **equal** of **Ikezue**.

Dusk was **already approaching when** their **contest began**. The **drums went mad** and the **crowds also.** They **surged forward** as the **two young men danced** into the **circle**. The **palm fronds** were **helpless** in **keeping** them **back**.

Ikezue held out his **right hand**. **Okafo seized** it and they **closed** in. It was a **fierce contest**. The **wrestlers** were **now almost still** in each **other's grip**. The **muscles** on their **thighs** and on their **backs stood** out **twitched**. It **looked like** an **equal match**.

The **two judges** were **already moving forward** to **separate** them **when Ikezue**, **now desperate, went down quickly** on **one knee** in an **attempt** to **fling** his **man backward** over his **head**. It was a **sad miscalculation**. **Quick** as the **lightening** of **Amadiora, Okafo raised** his **right leg** and **swung** it over his **rival's head**. The **crowd burst** into **thunderous roar, Okafo** was **swept** off his **feet** by his **supporters** and **carried home shoulder high**.

Variables:

Total content/lexical words=167

Total words=316

- **Ure's (1971) LD Formula**

$$\text{LD} = \frac{Number\ of\ content/lexical\ words}{Total\ number\ of\ words} \times 100$$

Application:

$$\text{LD} = \frac{167}{316} \times 100$$

LD=53%

EXAMPLE 2: Sample LD analysis using Halliday's LD formular: SHS 1 Descriptive text

KEY: Bold print = content/lexical words **Non-bold print** = grammatical/non-content words

//=boundaries of ranking clauses

During this **time, Okonkwo's fame** had **grown like** a **bush fire** in the **harmattan//**. He was **tall** and **huge**, // and his **bushy eyebrows** and **wide nose gave** him a **very severe look//**. He **breathed heavily**, //and it was **said** that, // **when** he **slept**, //his **wives** and **children** in their out **houses** could **hear** him **breathe//**. **When** he **walked**, // his **heels hardly touched** the **ground** //and he **seemed** to **walk** on **springs**, // as if he was **going** to **pounce** on **somebody//**. And he did **pounce** on **people quite often//**. He had a **slight stammer//** and **whenever** he was **angry** //and could not **get** his **words** out **quickly enough, //** he would **use** his **fists//**.

The **last match** was between the **leaders** of the **teams//.** They were **among** the **best wrestlers** in **all** the **nine villages//**. The **crowd wondered** //who would **throw** the other this **year//**. Some **said// Okafo** was the **better man**;// others **said//** he was not the **equal** of **Ikezue//**.

Dusk was **already approaching// when** their **contest began//**. The **drums went mad//** and the **crowds** also. // They **surged forward//** as the **two young men danced** into the **circle//**. The **palm fronds** were **helpless** in **keeping** them **back//**.

Ikezue held out his **right hand//**. **Okafo seized** it// and they **closed in**//. It was a **fierce contest//**. The **wrestlers** were **now almost still** in each **other's grip//**. The **muscles** on their **thighs** and on their **backs stood out twitched//**. It **looked like** an **equal match//**.

The **two judges** were **already moving forward** to **separate** them// **when Ikezue**, **now desperate, went down quickly** on **one knee** in an **attempt** to **fling** his **man backward** over his **head//**. It was a **sad miscalculation//**. **Quick** as the **lightening** of **Amadiora, Okafo raised** his **right leg//** and **swung** it over his **rival's head//**. The **crowd burst into thunderous roar, // Okafo** was **swept off** his **feet** by his **supporters//** and **carried home shoulder high//**.

Variables:

Total content/lexical items=162

Total Ranking Clauses=46

- **Halliday's (1985b) LD Formula**

$$LD = \frac{Number\ of\ content/lexical\ items}{Number\ of\ ranking\ clauses} \times (10)^{*}$$

Application:

$$LD = \frac{162}{46} \times 10^{*}$$

LD=35%

NB:10^{*} stands for the refractive percentile multiplier

EXAMPLE 3: Sample Readability analysis using Gunning's Readability formular: SHS 1 Descriptive text **KEY: Bold print** =3+ syllable words/complex words **Non-bold print**=simple/non-complex words //=boundaries of sentences

During this time **Okonkwo's** fame had grown like a bush fire in the **harmattan**.// He was tall and huge, and his bushy **eyebrows** and wide nose gave him a very severe look.// He breathed **heavily,** and it was said that, when he slept, his wives and children in their out houses could hear him breathe.// When he walked, his heels hardly touched the ground and he seemed to walk on springs, as if he was going to pounce on **somebody**.// And he did pounce on people quite often.// He had a slight stammer and **whenever** he was angry and could not get his words out **quickly** enough, he would use his fists.//

The last match was between the leaders of the teams. //They were among the best wrestlers in all the nine villages.// The crowd wondered who would throw the other this year. // Some said **Okafo** was the better man; others said he was not the **equal** of **Ikezue**.//

Dusk was **already** approaching when their contest began.// The drums went mad and the crowds also.// They surged forward as the two young men danced into the circle.// The palm fronds were helpless in keeping them back.//

Ikezue held out his right hand. **Okafo** seized it and they closed in.// It was a fierce contest.// The wrestlers were now almost still in each other's grip. //The muscles on their thighs and on their backs stood out twitched. It looked like an **equal** match.//

The two judges were **already** moving forward to **separate** them when **Ikezue**, now **desperate,** went down **quickly** on one knee in an attempt to fling his man backward over his head.// It was a sad **miscalculation.**// Quick as the lightening of **Amadiora, Okafo** raised his right leg and swung it over his rival's head.// The crowd burst into **thunderous** roar, **Okafo** was swept off his feet by his **supporters** and **carried** home shoulder high.//

Variables:

Total words =316;

3+ syllable words/complex words=26;

Total sentences=24

Gunning's (1952) Readability Formula (Gunning Fog Index- GFI)

$0.4 \times [(\frac{Total\ words}{Total\ sentences}) + 100\ )\frac{Complex\ Words}{Total\ Words})]$

NB: Complex words are words with 3 or more syllables.

Application:

$GFI = 0.4 \times [(\frac{316}{24}) + 100\ )\frac{26}{316})]$

GFI= 9%

EXAMPLE 4: Sample readability analysis using Flesch's Readability formular: SHS 1 Descriptive text **KEY:** /= syllable boundaries //=sentence boundaries

Du/ring this time O/kon/kwo's fame had grown like a bush fire in the har/mat/tan.// He was tall and huge, and his bu/shy eye/brows and wide nose gave him a very se/vere look.// He breathed heav/i/ly, and it was said that, when he slept, his wives and chil/dren in their out hous/es could hear him breathe.// When he walked, his heels hard/ly touched the ground and he seemed to walk on springs, as if he was go/ing to pounce on some/body.// And he did pounce on peo/ple quite of/ten.// He had a slight stam/mer and when/ev/er he was an/gry and could not get his words out quick/ly e/nough, he would use his fists.//

The last match was be/tween the lead/ers of the teams. //They were a/mong the best wrest/lers in all the nine vil/lag/es.// The crowd wond/ered who would throw the oth/er this year. // Some said O/ka/fo was the bet/ter man; oth/ers said he was not the e/qual of I/ke/zue.//

Dusk was al/read/y ap/proach/ing when their con/test be/gan.// The drums went mad and the crowds al/so.// They surged for/ward as the two young men danced into the cir/cle.// The palm fronds were help/less in keep/ing them back.//

I/ke/zue held out his right hand. O/ka/fo seized it and they closed in.// It was a fierce con/test.// The wrest/lers were now al/most still in each oth/er's grip. //The mus/cles on their thighs and on their backs stood out twitched. It looked like an e/qual match.//

The two judg/es were al/read/y mov/ing for/ward to sep/a/rate them when I/ke/zue, now des/per/ate, went down quick/ly on one knee in an at/tempt to fling his man back/ward o/ver his head.// It was a sad mis/cal/cu/la/tion.// Quick as the light/ning of Ama/dio/ra, O/ka/fo raised his right leg and swung it o/ver his ri/val's head.// The crowd burst in/to thun/der/ous roar, O/ka/fo was swept off his feet by his sup/por/ters and car/ried home shoul/der high.//

Variables:

Total words =316;

Total syllables=417;

Total sentences=24;

FKGL=4.9

Flesch's (1948) Reading Ease (FRE)/Readability Formula

FRE = 206.835 – (1.015 x ASL) – (84.6 x ASW)

ASL=Average sentence length

ASW=Average number of syllables per word

FRE= 83%

As earlier indicated, the above are sample analysis using each of the 4 metrics on one of the 45 sampled texts. In similar manner, all the 45 texts were analysed separately using the 4 metrics. That means, one metric is applied to each of the 45 texts, giving a total of 180 separate analysis (90 for LD, 90 for readability). For clarification and further illustrative purposes however, each of the 4 metrics has been applied to 1 text each across the 3 genres and 3 academic levels under study. This gives a total of 36 separate illustrative analysis. These 36 illustrative sample analysed texts have been attached to the work as appendices (see Appendix 1 to 36). The average LD and readability values synched from the use of the metrics have been used for the analysis of each research question. Analysis of results for research question one follows.

Research Question One: *What is the level of lexical density and its relationship with readability of texts used in Senior High School English Textbooks across genres of writing in Ghana?*

4.1.1 Levels of Ure and Halliday (H'day) Lexical Density (LD) Values Per Genre Per Level

As stated earlier, the LD values drawn from the textual analysis and their respective averages are indicated in table 5. The levels of LD using Ure and Halliday's separate formulae on each text are stated side by side in the table. This makes it easier to see their levels and be able to compare these levels as revealed in the data analysis. From the table, it is clear that the levels of Ure and Halliday LD values on the sample texts are generally very close on the average. This pre-supposes that the LD metrics used by the two scholars have about the same level of accuracy in their application to texts.

Table 5: Levels of Ure and Halliday (H'day) Lexical Density (LD) Values Per Genre Per Level

	Text 1		**Text 2**		**Text 3**		**Text 4**		**Text 5**		**Averages**	
	Ure	H'day	Ure	H'day	Ure	H'day	Ure	H'day	Ure	H'day	Ure	H'day
Narrative texts-SHS1	51	50	56	53	71	69	59	58	65	63	**60**	**59**
Narrative texts-SHS2	51	35	61	58	68	66	57	55	62	58	**60**	**54**
Narrative texts-SHS3	56	48	60	61	70	70	61	53	61	60	**62**	**58**
Descriptive texts-SHS 1	53	35	58	62	73	69	62	60	59	58	**61**	**57**
Descriptive texts-SHS 2	61	72	64	61	64	76	59	58	63	61	**62**	**66**
Descriptive texts-SHS 3	55	55	59	61	74	69	63	61	66	70	**63**	**63**
Expository texts-SHS 1	61	58	57	55	71	67	65	59	67	58	**64**	**59**
Expository texts-SHS 2	56	59	66	65	69	67	66	53	64	60	**64**	**61**
Expository texts-SHS 3	62	62	62	61	66	64	67	62	59	57	**63**	**61**

From table 5, it is abundantly clear that the texts used for this study had very high LD ratings as all the average LD values by both authorities are well above the 40% benchmark for high LD. Ure's LD average values are fairly higher than those of Halliday. Whilst Ure's LD metric recorded 60% as the lowest LD average value and 64% as the highest, Halliday recorded 54% as the lowest LD average value with 66% being the highest value. This is represented in figure 3 below.

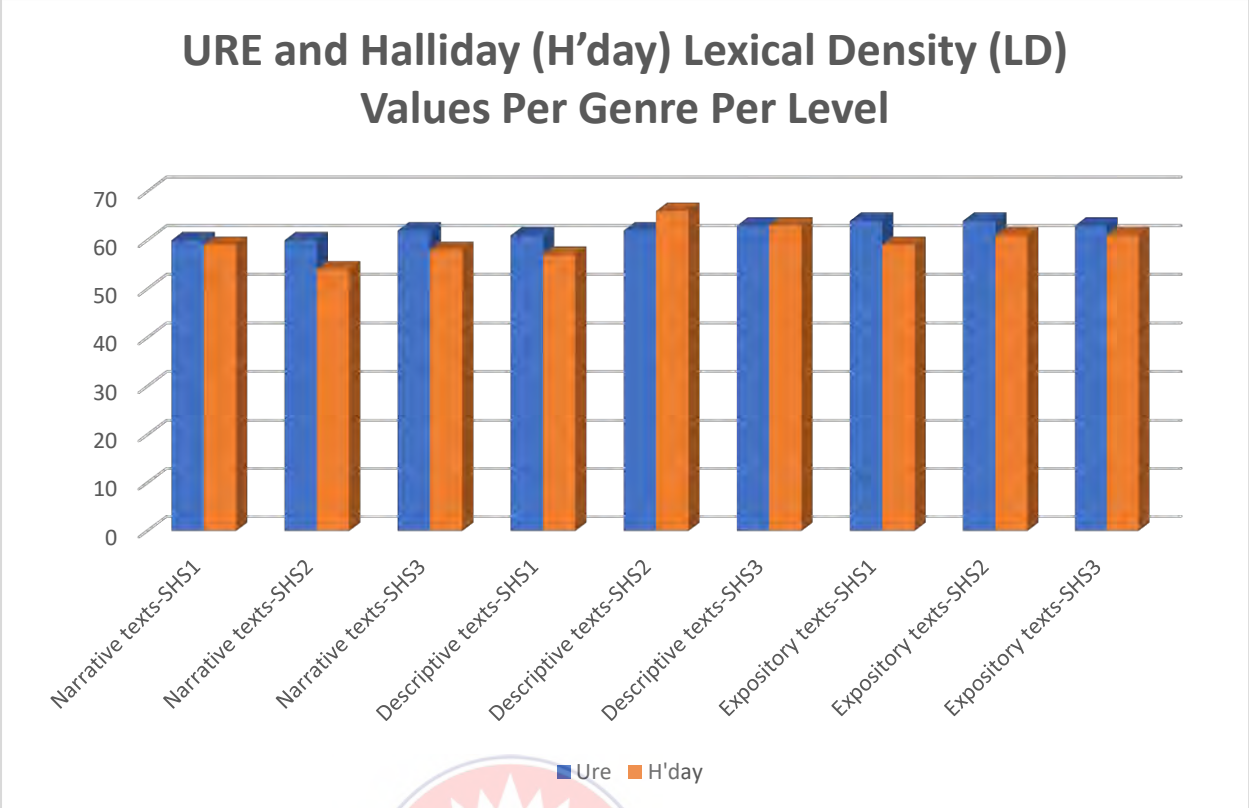


Figure 3: Ure and Halliday LD Values per Genre per Level

4.1.2 Levels of Gunning (G'ng) and Flesch Readability (Rdb'ty) Values Per Genre Per Level

Table 6 provides detailed statistical information on the texts used for readability analysis. The readability values arrived at using the two readability metrics by Gunning and Flesch are shown together with their respective averages for the analysis. Unlike Ure and Halliday's LD values which are generally very close on the average, Gunning and Flesch's readability values show a vast gap of difference in terms of their levels. This pre-supposes that the readability metrics used by the two scholars disagree largely in terms of accuracy in their application to same texts.

Table 6: Levels of Gunning (G'ng) and Flesch Readability (Rdb'ty) Values Per Genre Per Level

	Text 1		**Text 2**		**Text 3**		**Text 4**		**Text 5**		**Averages**	
	G'ng	Flesch	G'ng	Flesch	G'ng	Flesch	G'ng	Flesch	G'ng	Flesch	G'ng	Flesch
Narrative texts-SHS1	12	77	08	43	14	38	24	68	34	46	**18**	**54**
Narrative texts-SHS2	09	77	18	51	18	41	21	71	31	51	**19**	**58**
Narrative texts-SHS3	10	80	15	44	21	36	18	72	30	53	**19**	**57**
Descriptive texts-SHS 1	09	83	19	34	23	35	19	81	29	64	**20**	**59**
Descriptive texts-SHS 2	11	77	21	46	18	68	25	76	28	67	**21**	**67**
Descriptive texts-SHS 3	14	68	20	41`	15	63	28	72	17	71	**19**	**63**
Expository texts-SHS 1	15	80	14	56	18	71	30	69	11	69	**18**	**69**
Expository texts-SHS 2	14	71	16	47	18	77	18	68	09	64	**15**	**65**
Expository texts-SHS 3	10	77	13	40	20	65	27	67	14	60	**17**	**62**

From table 6, it is abundantly clear that the texts used for this study had relatively low readability ratings. Gunning's readability average values are far lower than those of Halliday. Whilst Gunning's readability metric recorded 15% as the lowest readability average value and 21% as the highest, Halliday recorded 54% as the lowest LD average value with 69% being the highest value. The generally high LD values have accordingly translated into generally low readability values. This is represented in figure 4.

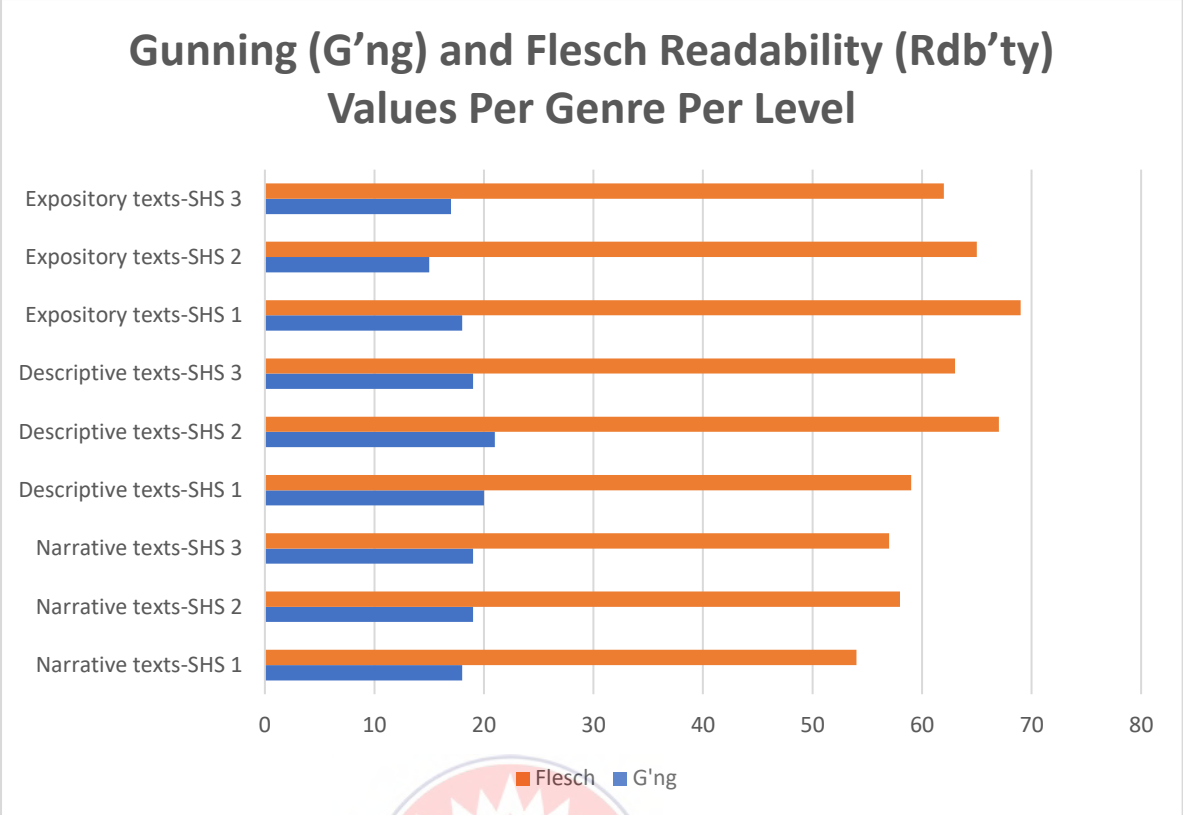


Figure 4: Gunning and Flesch Readability Values per Genre per Level

The relationship between LD and readability

Table 7: The relationship between LD and readability

	Ure Vs G'ng	Ure Vs Flesch	H'day Vs G'ng	H'day Vs Flesch
Narrative texts-SHS 1	60 18	60 54	59 18	59 54
Narrative texts-SHS 2	60 19	60 58	54 19	54 58
Narrative texts-SHS 3	62 19	62 57	58 19	58 57
Descriptive texts-SHS 1	61 20	61 59	57 20	57 59
Descriptive texts-SHS 2	62 21	62 67	66 21	66 67
Descriptive texts-SHS 3	63 19	63 63	63 19	63 63
Expository texts-SHS 1	64 18	64 69	59 18	59 69
Expository texts-SHS 2	64 15	64 65	61 15	61 65
Expository texts-SHS 3	63 17	63 62	61 17	61 62

Having explored the LD and readability levels of the sampled texts, we shall now look at how LD and readability relate. The focus here is basically to find out whether high LD translates directly into low readability and vice versa.

This segment of research question one seeks to map each metric onto another permutatively. The focus remains finding out the extent to which each one of the metrics relate to the other three metrics. One of the ground assumptions of this study is the fact that high LD translates directly into low readability and vice versa. This research question seeks to test the veracity of that assumption. From table 7, it is established that Ure versus Flesch and Halliday versus Flesch permutations show the closest degree of relationships. Wherever Gunning comes into the picture, it shows a weak relationship

because of the generally low readability values derived using the Gunning readability formular. This one-on-one relationship between metrics is presented graphically in figure 5.

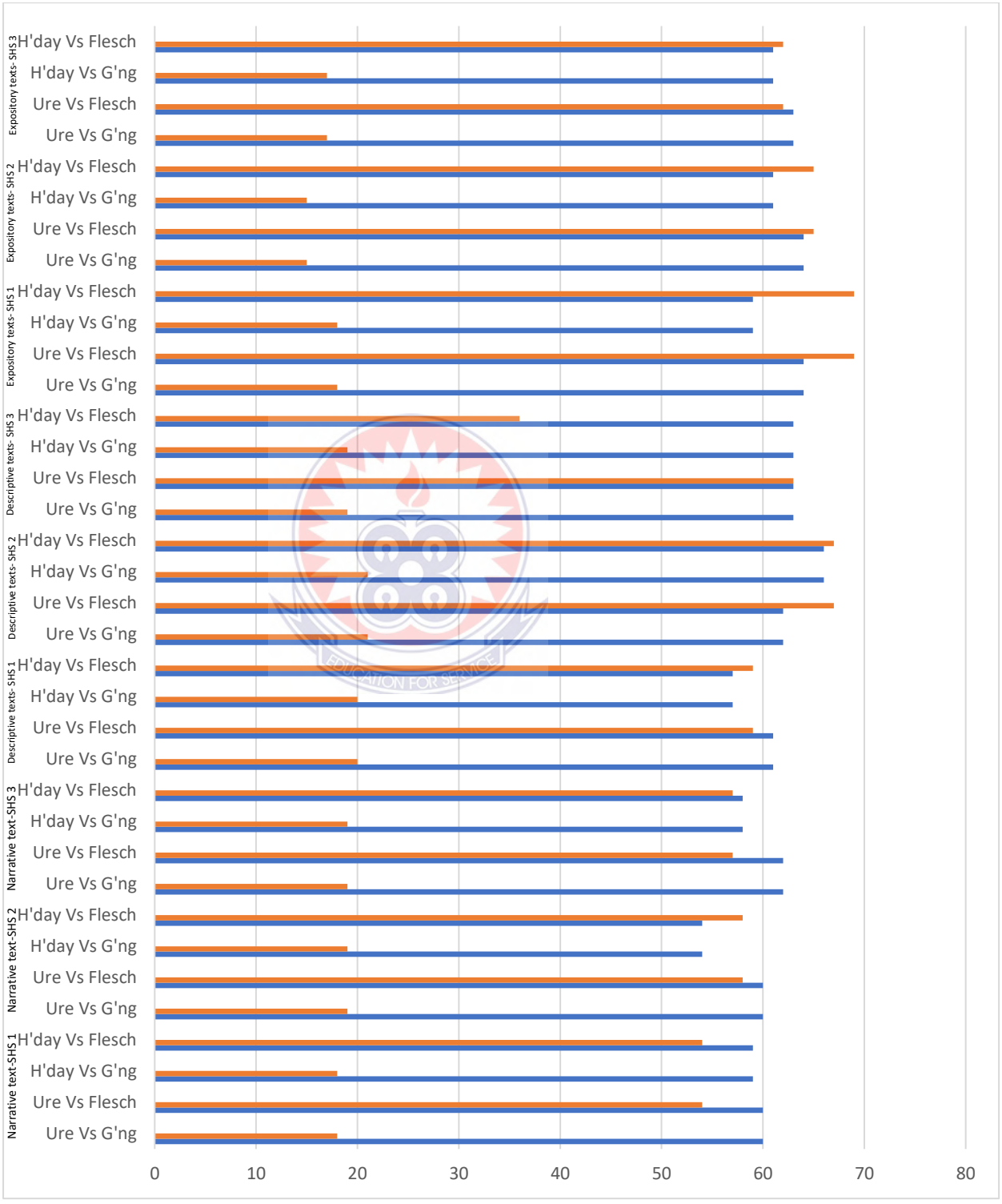


Figure 5: The relationship between LD and readability

4.2 Discussion of Findings: Research Question One (1)

From the foregoing findings under research question one, it is revealed that texts assigned to SHS students in the Ghanaian Education System have very high lexical density. This trend cuts across the three genres of writing under review in this study and the three academic levels implored in the study. Lead scholars on LD generally agree that an LD score of 40% and above is on the high side (Ure, 1971; Halliday, 1985b; Eggins, 2004). As indicated earlier, high LD translates directly into low readability. This implies that texts in SHS English textbooks in Ghana are very difficult to read.

In Gyasi (2017a), the results showed that a majority (63%) of the research articles used as data were graded as 'difficult' to read; that is, above the 'standard' readability level of 60 when measured on the FRE scale. This affirms the findings from research question one which reveals generally, a very high LD and by implication, low readability rating of the texts used for this study.

In similar affirmation, findings in Gyasi (2013a) revealed that, the textbooks used for that study were difficult to read on the average and that the Integrated Science textbook was the most difficult among all the textbooks, followed by the Physics textbook. Similarly, it was found in Owu-Ewie (2014) that most of the passages were above the age of learners and were therefore difficult for them to read and comprehend.

Findings in Nunoo et al (2021) revealed that the selected textbooks for that study had a problematic level of comprehension for many of their intended readership except for those who had additional resources for assistance. This directly confirms the findings from this research question which indicate that LD and readability levels are very high across genre and grades.

Data analysis under this research question further reveal that Ure's (1971) and Halliday's (1985b) overall LD averages across genres and academic levels are very well above the 40% mark for "high" LD rating. This affirms Fadhillah's (2018) findings in which 15 sampled texts were found to have an overall LD average score of 50% across descriptive, narrative and recount genres. Quite similarly, this finding affirms Nesia and Ginting (2014) whose study found 4 out of a total of 8 sampled texts to have low LD levels, across genre and level. Nesia and Ginting's (2014) findings suggest that the sampled texts for SHS students were averagely readable. This study extends the literature in Nesia and Ginting (2014) because it includes the Gunning (1952) readability index in the analysis of data.

Aulia (2019) quite corroborates the findings in Fadhillah (2018) and Nesia and Ginting (2014) as explained above. Aulia (2019) studied lexical density using Ure (1971) formular in 8 selected texts downloaded from the British Broadcasting Corporation (BBC) website as data. The texts were excerpts from the BBC Online Newspapers, sampled between April and May 2019.Applying a descriptive qualitative method of analysis, the study revealed that 5 out of the total of 8 selected texts had dominant content words compared to non-content words, making them lexically denser than the remaining 3 texts. Aulia (2019) and this study therefore corroborate significantly in terms of key findings. This study comes with a vast extension of literature in view of Aulia (2019) as Aulia (2019) only applied Ure (1971) LD formular without comparing it with Halliday's (1985b) LD formular and without applying Gunning (1952) and Flesch (1948) readability indices.

In sharp contrast to the findings from research question one, Syarif and Putri (2018) targeted to uncover how lexical density reveals students' ability in doing academic writing. Data was taken from the introductory parts of thesis proposals written

by graduate students of English. The analysis showed that there was lower lexical density (31.19%), with grammatical complexity being the underlying factor contributing to lexical density. The study revealed further that the complexities came about as a result of students still having limited knowledge about the language use in academic writing. This implied that the students' ability in academic writing was still at average level.

The findings from research question one further affirms the findings in To et al (2013) which aimed to examine the LD and readability of four texts from English textbooks. The study revealed three of the four texts to be of high LD. Only the text for Upper-intermediate was found to have a relatively lower LD of 45.5% according to Flesch's (1948) Reading Ease Scale. Ironically however, texts 2 and 3 which had higher LD levels were found to be relatively difficult according to Flesch's (1948) Reading Ease Scale whilst text 1 was fairly easy to read with text 2 being the most challenging. It similarly affirms Ridwan and Yusuf (2016) whose study was to assess the level of LD in undergraduate thesis abstracts to determine how informative or loaded they were. From their analysis of 7 thesis abstracts, they uncovered that average LD level of the texts was 0.57 or 57% which suggested a very high LD level and 1:8 average Grammatical Intricacy (GI) ratio, indicating a high GI level also, since the ratio is high (1:8).

Sholichatun's (2011) study which used 10 texts as data, found 3 out of the number to have lower lexical densities whilst 7 had high lexical densities. This revelation by Sholichatun (2011) very much affirms the findings under research question one of this study. In further affirmation of findings under research question one, Andara and Rosyida's (2021) study reveal that all the 5 sampled texts used in the

study had high LD levels with the lowest LD rating being 55% and the highest rating being 64%. In similar affirmation, Hidayatillah and Zainil (2020) researched into the readability of a course textbook on Semantics and Pragmatics as a course of study. The study concluded that the readability level of the textbook, as observed by the students, was indeed too high (73%), resulting in the difficulty in reading the text by students.

Again, the narrative genre is found to have the lowest LD across genres and levels in this study. This revelation affirms Nesia and Ginting's (2014) findings which suggest that the Expository (explanation) genre is the most difficult genre to read and understand across genre and level, whilst the Narrative genre remains the most readable. Fadhillah (2018) however finds narrative genre to be of average LD rating. This neither affirms nor contradicts the findings in this study but one may however see it as more of an affirmation of findings in this study than a contradiction in view of the fact that an average LD rating is more closely related to a low LD rating than a high LD rating. Findings in Turkben (2019) perfectly corroborate the findings in this study as it underscores the fact that narrative texts are generally more comprehensible to High school learners.

Still on genre and readability, the expository genre generally proves to be the most difficult. Turkben (2019) underscores this fact with its findings which indicate that informing texts (a common example being Expository texts) are the most difficult texts in terms of readability. Turkben (2019) therefore affirms this finding alongside other studies (To et al 2013; To 2018; Fadhillah 2018; Bani-Amer 2021).

Regarding readability, this study reveals a very sharp contradiction in readability levels between Gunning (1952) and Flesch (1948) with overall readability averages of 12% and 77% respectively. Whilst this contradiction only lies in the use of

the two different readability formulae, the grand overall readability average of the two formulae across genre and level remains on the low side (44.5%), therefore suggesting high LD (Ure 1971). This finding is in contradiction with the findings in Turkben (2019) which found readability levels of sampled texts to be generally high (easy to read) with the narrative texts being comparatively easier to read than informing texts. The findings in this study regarding the extent of readability of assigned texts affirms the findings in Nunoo et al (2021) which uncovered that assigned textbooks for Junior High School learners in Ghana were inappropriate in terms of their readability in relation to academic levels because they had very high lexical density and readability levels. The study found the sampled texts to be "…too difficult with long sentences and multi-syllabic words…".

Similarly, Owu-Ewie's (2018) paper corroborates this piece of finding in the study as it underscores the fact that texts assigned for SHS students are "too difficult" for respective intended levels. This according to the author suggests that government and textbook authors in general ought to consider text-grade levels before assigning texts to learners. Having explored the general key findings and their relationship with literature, we shall now take the authorities and the key findings revealed by their proposed formulae one after the other.

LD analysis in this study, using Ure (1971) LD formular reveals a very high LD rating of sampled texts from English textbooks used for SHS learners within the Ghanaian educational system. This is classified as very high according to Ure's (1971) 40% benchmark for identifying "high" LD of texts. This finding contradicts the findings in Turkben (2019) which rather finds the LD-readability levels of texts selected to be comprehensible.

Lexical density analysis using Halliday's (1985b) LD formular reveals an equally high LD rating of sampled texts. Findings under research question one equally affirms To et al (2013) which aimed to examine the LD and readability of four texts from English textbooks. The study revealed three of the four texts to be of high LD. Only the text for Upper-intermediate was found to have relatively lower LD of 46% according to Flesch's (1948) Reading Ease Scale. Ironically however, texts 2 and 3 which had high LD levels were found to be relatively difficult according to Flesch's (1948) Reading Ease Scale whilst text 1 was fairly easy to read with text 2 being the most challenging. It similarly affirms Ridwan and Yusuf (2016) whose study was to assess the level of LD in undergraduate thesis abstracts to determine how informative or loaded they were. From their analysis of 7 thesis abstracts, they uncovered that average LD level of the texts was 0.57 or 57% which means high LD level and 1:8 average GI ratio, indicating high GI level also, since the ratio is high (1:8). The current study is an extension of To et al (2013) and Ridwan and Yusuf (2016) to the extent that these two earlier studies were not interested in formular comparisons. Their focus was largely on determining lexical density and the resultant readability levels of the texts under study.

On readability, Gunning's (1952) readability analysis reveals a low readability rating of selected texts used in this study. This low readability rating translates into the generally very high LD ratings of the same texts under study. That is, a highly lexically dense text is expected to have a corresponding very low readability rating and this has been abundantly proven by this piece of finding. However, Flesch's (1948) readability analysis reveals a rather contradictory phenomenon. As stated above, a text that has high LD rating is logically expected to have a corresponding low readability index as seen in Gunning (1952) analysis using the Gunning Fog Index. However, Flesch's

(1948) readability analysis reveals a very high readability rating of texts used in the study. This finding stands opposed to the findings in the readability analysis of Gunning (1952). Sholichatun (2011) very much affirms this finding as it found 7 out of 10 texts to be unreadable to the intended grade. Given the comparative focus and the in-depth exploration of readability beyond lexical density values in this study, one may conclude that this study is an extension of Sholichatun (2011) in terms of literature.

In sum, given the close relationship between LD and readability as prime variables in determining text difficulty or general complexity, a grand overall LD and Readability average reveals a very high LD-Readability index of texts assigned to Ghanaian SHS students from their English textbooks. Lexical density and readability levels of texts in Ghanaian English textbooks are generally high across genre and academic levels. Implicatively, this would clearly affect academic progress among SHS students in Ghana as they find texts generally very difficult to read and understand.

Research Question Two: *What is the degree of text-grade variation of the selected texts from one grade to another in SHS English Textbooks in Ghana?*

4.3 Text-Grade Variation Trend

This segment is the analysis of data in respect of the second research question. As stated in the review of literature, there is an acceptable standard for determining the incremental difficulty of texts between grades. Halliday (1985b) and Flesch (1948) have estimated the maximum inter-grade variation index to be 33.3% and 35% respectively. Halliday's (1985b) proposition involves what he calls the *inter-grade variation refraction index of 1:11%,* whilst that of Flesch uses the direct readability value of a text as revealed by the formular. When the readability or LD value of a text falls outside these standards, it is deemed not fit for the ensuing grade for which it is intended.

Table 8: Text-Grade Variation Trend

	G'ng	Flesch	Ure	H'day
Narrative-SHS1&2	1	4	0	-5
Narrative-SHS2&3	0	-1	2	4
Descriptive-SHS1&2	1	8	1	9
Descriptive-SHS2&3	-2	-4	1	-3
Expository-SHS1&2	-3	-4	0	2
Expository-SHS2&3	-2	-3	-1	0

From table 8, the inter-grade variation indexes across genre and grade have been established. Using the overall averages per genre per grade from table 8, the overall average for a lower grade is subtracted from the overall average of the next grade. With an inter-grade variation refraction index of 1:11% (1 is to 11%), translating into the text-exit-grade variation formula of 33.3% maximum (Halliday,1985b), the assessment of inter-grade variation is done under this research question.

Similarly, Flesch (1948) stipulates that an inter-grade variation index of 35% maximum is acceptable. To this end, Gunning's narrative texts analysis for SHS 1 & 2 (11%); Ure's narrative texts analysis for SHS 2 & 3 (22%); Gunning's descriptive texts analysis for SHS 1 & 2 (11%); Ure's descriptive texts analysis for SHS 1 & 2 (11%); Ure's descriptive texts analysis for SHS2&3 (11%); and Halliday's expository texts analysis for SHS 1 & 2 (22%) reveal acceptable inter-grade variation levels.

Therefore, only 6 out of the 24 text-exit-grade variations are found to be within the acceptable standard of 33.3% (Halliday,1985b) and 35% (Flesch,1948). This represents only 25% of inter-grade variation acceptability. This is graphically represented below.

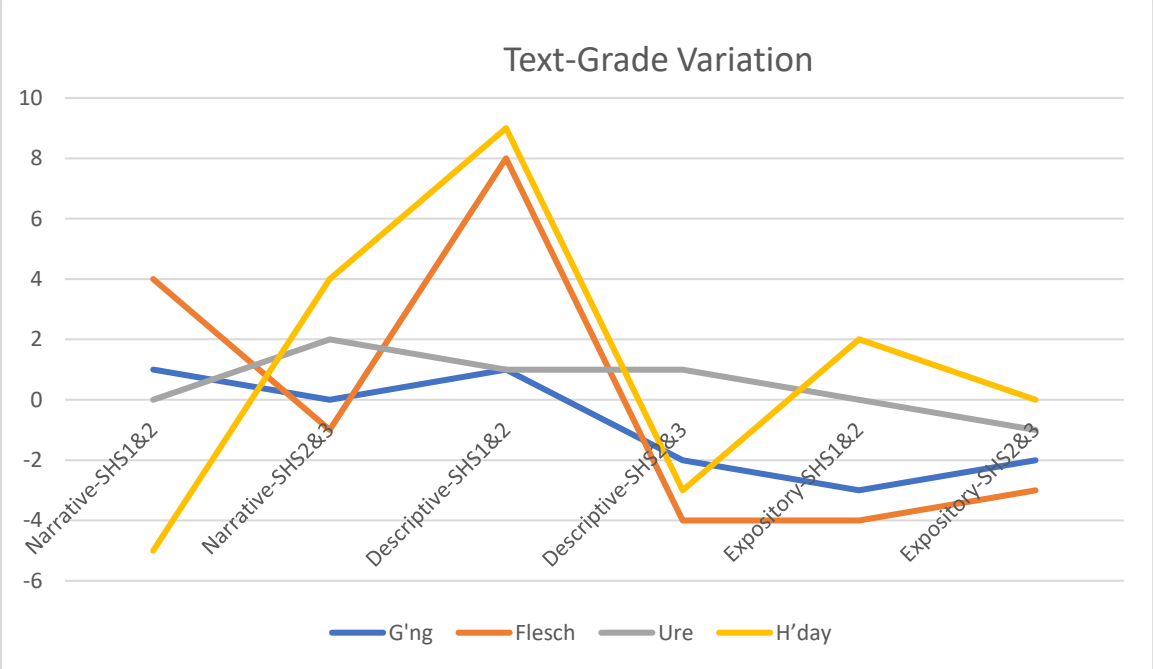


Figure 6: Text-Grade Variation Trend

4.4 Discussion of Findings: Research Question Two (2)

Text readability variation analysis is done according to the four indices and authorities under exploration in this study. The trend and margin of variation across genre and level is the focus here. Taking a cue from Gyasi (2017a) which revealed a positive relationship between readability and text comprehension, the extent to which text difficulty level vary between any two grades at any point is very vital in text appropriation to grades. When presented with a low readability text, the learner's comprehension of the text suffers.

LD variation trend analysis across genre and text level using Ure's (1971) results from the analysis reveal a 50% balance as the text-exit-grades of 3 texts were within the acceptable standard and 3 outside the standard. Whilst two of them recorded 0 exit-grade variation, one recorded -1 exit-grade variation. This stands in contrast to Halliday's (1985b) LD theory which stipulates that the difference in text difficulty according to academic levels should not exceed 33.3% (text-exit-grade variation

formular). This finding equally contradicts Flesch's (1948) readability-grade index ratings which states that text difficulty rating across academic levels should not exceed 35% incremental difficulty and 100% cumulative difficulty for three consecutive academic levels. For the Ghanaian Educational system, this paradigm fits very well as we have a 3-year SHS system. The finding further contradicts To (2018) which revealed that texts in the series of the textbook used in the study grew more and more complex consistently as their levels advanced. Text readability levels grew lower in commensuration with progressive academic levels. This is occasioned by the correspondingly high lexical density levels of the texts used, according to Halliday (1985b).

In this study, LD variation trend analysis using Halliday's (1985b) formular equally reveals a high variation index of up to 9 and 4. Conversely, Halliday's metric equally records low variation index of up to -5 and -3. Only one text-exit grade (expository analysis for SHS1&2) was found to be within the acceptable standard, with a variation percentage of 22%. This equally stands in contrast to Halliday's (1985b) theoretical propositions on LD variation according to academic levels as well as Flesch's (1948) readability-grade index ratings as explained above. The 33.3% (Halliday 1985b) and 35% (Flesch 1948) thresholds have been far exceeded. By implication, learners (e.g SHS 1 learners) would be met with texts that are not commensurate with their natural linguistic capacities to read and understand when they progress to the next academic level (SHS 2).This is regardless of how well prepared they may be for progression to the next level. The text difficulty gap between SHS 1 and SHS 2 is too wide, thereby impeding their ability to read the texts assigned at SHS 2.

Readability variation trend analysis using Gunning's (1952) readability formular reveals a generally inappropriate variation index. Of the 6 exit-grade variation indexes, only 2 are within standard (11% each) whilst the remaining 4 are 0% and below. The findings however contradict To (2018) which revealed that texts in the series of the textbook used in that study grew more and more complex consistently and commensurately as their levels advanced.

Readability variation analysis using Flesch's (1948) readability formular reveals a very high readability variation index of 8 and 4. The remaining 4 exit-grade variations are also to the extremes of -4 and -3. These scores indicate that texts assigned to Ghanaian SHS students in their English textbooks vary very greatly in terms of their readability levels. This should not be the case because 88% and 44% text-exit grade variation far exceed the 33.3% and 35% thresholds set out in the propositions of Halliday (1985b) ad Flesch (1948) in their theories. On the flip side, -33% and -44% are way outside the acceptable standard of inter-grade variation index. This finding thus, contradicts the two propositions on LD and readability by Halliday and Flesch respectively.

In sum, readability variation average index for texts used in Ghanaian English textbooks shows a wide gap of variation (far above or below the acceptable standard), meaning that SHS learners would have difficulties adjusting to new texts introduced to them at each new academic level, regardless of how prepared they may be before moving on to the next (new) academic level. This is unhelpful to the SHS learner, in that, extra linguistic effort or endowment is required for him/her to meet the demands of new academic levels owing to the abnormally vast gap of variation in text readability between previous and new academic levels. To this end, one may conclude that the degree of variation in terms of the readability of texts assigned to Ghanaian SHS

learners in English textbooks is inappropriate and generally very high. These findings appropriately corroborate those of To (2018).

Research Question Three: *How suitable are the English textbooks of Senior High School across genres of writing in Ghana?*

Table 9: Flesch's Reading Ease Scale (Original)

Flesch Reading Ease	Description of Style	Educational Attainment Level (USA)
0 - 30	Very Difficult	Postgraduate
30 - 50	Difficult	Undergraduate
50 - 60	Fairly Difficult	Grade10 – 12
60 - 70	Standard	Grade 8 – 9
70 - 80	Fairly Easy	Grade 7
80 - 90	Easy	Grade 6
90 - 100	Very Easy	Grade 5

Source: Kim et al (2018)

Table 10: Flesch's Reading Ease Scale (Adapted Translation)

Flesch Reading Ease	Description of Style	Educational Attainment Level (USA)
0 - 10	Very Easy	Grade 5
10 - 20	Easy	Grade 6
20 - 30	Fairly Easy	Grade 7
30 - 40	Standard	Grade 8 – 9
40 - 50	Fairly Difficult	Grade 10 – 12
50 - 70	Difficult	Undergraduate
70 - 100	Very Difficult	Postgraduate

Flesch (1948)

Based on the adapted translation version in table 10, the Flesch reading ease scale has been applied to Ghana's educational structure as shown in table 11.

Table 11: Flesch's Grade-Readability Scale Applied to Ghanaian Educational System

Educational Attainment Level (Ghana)	**Flesch Reading Ease Percentage**	**Educational Attainment Level (USA)**	**Description of Text Difficulty**
BS 01	N/A	N/A	N/A
BS 02	N/A	N/A	N/A
BS 03	N/A	N/A	N/A
BS 04	N/A	N/A	N/A
BS 05	0 -10	Grade 05	Very Easy
BS 06	11 - 20	Grade 06	Easy
JHS 01	21 - 30	Grade 07	Fairly Easy
JHS 02	31 - 35	Grade 8-9	Standard
JHS 03	36 - 40	Grade 10 - 12	Fairly Difficult
SHS 01	41- 43		
SHS 02	44 - 46		
SHS 03	47 - 50		
L 100 (Undergrad 01)	51 - 55	Undergraduate	Difficult
L 200 (Undergrad 02)	56- 60		
L 300 (Undergrad 03)	61 - 65		
L 400 (Undergrad 04)	66 - 70		
L 500 (Masters 01)	71 - 75	Post Graduate (Masters)	Very Difficult
L 600 (Masters 02)	76 - 80		
L 700 (PhD 01)	81 - 85	Post Graduate (PhD)	Very, Very Difficult
L 800 (PhD 02)	86 - 90		
L 900 (PhD 03)	91 - 95		
L 1000 (PhD 04)	96 - 100 and above		

4.5 Gunning (G'ng) and Flesch Readability (Rdb'ty) Values Per Genre Per Level

With the adapted translation in table 11 as the benchmark, the readability values of Gunning and Flesch have been measured on the Flesch reading ease scale. In all, only 2 texts have been found to suit their intended grades. These are narrative text 2 for SHS 1 learners using Flesch's readability formular (43%) and descriptive text 2 for SHS 2 learners using Flesch's readability formular (46%). It is significant to note that it is only Flesch's readability formular that found the 2 texts to be suitable to the respective grades whilst Gunning's readability metric did not yield same results. This represents

only 2% suitability of all texts used in this study. These 2 suitable texts are in bold print and underlined in table 12.

Table 12: Gunning (G'ng) and Flesch Readability (Rdb'ty) Values Per Genre Per Level

	Text 1		**Text 2**		**Text 3**		**Text 4**		**Text 5**		**Averages**	
	G'ng	Flesch	G'ng	Flesch	G'ng	Flesch	G'ng	Flesch	G'ng	Flesch	G'ng	Flesch
Narrative texts-SHS1	12	77	08	**43**	14	38	24	68	34	46	**18**	**54**
Narrative texts-SHS2	09	77	18	51	18	41	21	71	31	51	**19**	**58**
Narrative texts-SHS3	10	80	15	44	21	36	18	72	30	53	**19**	**57**
Descriptive texts-SHS 1	09	83	19	34	23	35	19	81	29	64	**20**	**59**
Descriptive texts-SHS 2	11	77	21	**46**	18	68	25	76	28	67	**21**	**67**
Descriptive texts-SHS 3	14	68	20	41`	15	63	28	72	17	71	**19**	**63**
Expository texts-SHS 1	15	80	14	56	18	71	30	69	11	69	**18**	**69**
Expository texts-SHS 2	14	71	16	47	18	77	18	68	09	64	**15**	**65**
Expository texts-SHS 3	10	77	13	40	20	65	27	67	14	60	**17**	**62**

4.6 Discussion of Findings: Research Question Three (3)

The adapted Flesch Grade-Readability Index serves as the launch pad or benchmark for answering this research question based on the findings from the analysis of data. The Flesch Grade-Readability Index or scale is an original scale adaptable to other educational systems (To et al 2013). The adapted version of the scale to the Ghanaian educational system is what has been used to measure the suitability or otherwise of the texts that have been assigned to respective grades. The adapted

translation covers Basic One up to PhD Year 3 or 4 (as the case may be) of the Ghanaian Educational System.

In Owu-Ewie (2014), it was found that most of the passages were above the age of learners and were therefore difficult for them to read and comprehend. Since age and academic grade have direct correlation in cognitive philosophy, it is proper to conclude that the texts used in that study did not suit the intended grades. Owu-Ewie (2014) is thus an affirmation of the findings in research question three of this study--that texts in SHS English textbooks in Ghana do not suit their intended grades.

In Nunoo et al (2021), findings showed that the selected textbooks had a problematic level of comprehension for many of their intended readership except for those who had additional resources for assistance. This is indicative of lack of suitability of these texts to their intended grades, a confirmation of the findings from this research question.

The findings using Ure's (1971) LD formula show that most of the forty-five (45) texts used for the study were meant for undergraduate and postgraduate level students by their levels of difficulty. Many of the texts according to this readability formula were found to be of equal difficulty level with texts for Level 100,200 and 300 undergraduate students. This is an interesting revelation, given the fact that texts that were assigned for SHS 1, 2 and 3 students had readability levels equal to those of undergraduate and postgraduate students. Few of the texts were also found to be suitable for basic and junior high school learners. For example, the expository text sample assigned to SHS 1 students was found to have the same readability level of texts meant for Level 600 students (Master's year 2); whilst the sampled text for narrative genre assigned to SHS 1 students was found to have the same readability level of texts meant

for grade 5 pupils. This finding does not corroborate the primary propositions of the Flesch Grade-Readability Index. This apparent contradiction in findings underscores the need to apply readability paradigms to texts before assigning them to academic levels. This affirms Bani-Amer's (2021) findings in which the study revealed that secondary stage textbooks for English for 12th Grade is suitable for 8th and 9th Grades whilst that for 11th Grade is suitable for 7th Grade. Bani-Amer (2021) concluded that secondary stage English textbooks do not meet standard requirements of readability indices because they are easier or harder for the target levels.

The findings similarly affirm those of Istiqomah (2015) which studied the readability of English textbooks used by second year SHS students. The textbooks were found not to be appropriate for SHS students but rather for Junior High School (JHS) students. These findings however contradict To (2018) which revealed a consistent reasonable increase in difficulty level. Overall, Ure's (1971) LD formula found that higher level texts were assigned to lower grades. It equally contradicts Prawinanto and Bram (2020) which found the average LD level of the text used for their study to be 47%, making it suitable for the intended 10th Graders.

Using Halliday's (1985b) LD formula for the analysis revealed gross misappropriation of texts to academic levels within the Ghanaian educational system, in much the same manner as Ure's (1971) findings. Of the total of forty-five (45) texts under study, over 35 were found to be suitable for learners at undergraduate level, ranging from Level 100 to Level 400.This is an incredible violation of the guiding tenets set out in the Flesch Grade-Readability Index for measuring text-grade suitability. One of the texts was found to be appropriate or suitable for the intended grade (Narrative text for SHS 3). The last text was found to be suitable for JHS 3 students when its actual intended grade was SHS 1. Generally, these findings do not affirm or corroborate the

key propositions of the Flesch Grade-Readability Index. The two texts which were found to fit their intended grades could be described as accidental or out of the fluke.

The descriptive text meant for SHS 3 was found to have readability level equal to that meant for students at the Masters level. This affirms Bani-Amer's (2021) findings in which the study revealed that secondary stage textbooks for English for 12th Grade is suitable for 8th and 9th Grades whilst that for 11th Grade is suitable for 7th Grade. Bani-Amer (2021) concluded that secondary stage English textbooks do not meet standard requirements of readability indices because they are easier or harder for their target levels.

In contrast however, Li and Zhang (2021) found a near-perfect appropriation of texts to academic levels, with volumes 1,2 and 4 of the same course books used showing a trend of increasing difficulty from low to high with only volume 3 having lower value than Volume 2. The findings similarly affirm Istiqomah (2015) which studied the readability of English textbooks used by second year SHS students. The textbooks were found not to be appropriate for SHS students but rather for Junior High School (JHS) students. These findings however contradict To (2018) which revealed that texts in the series of the textbook used grew more and more complex as their levels advanced. It equally contradicts Prawinanto and Bram (2020) which found the average LD level of the text used for their study to be 47%, making it suitable for the intended 10th Graders. Overall, Halliday's (1985b) LD formula found that higher level texts were assigned to lower grades.

In contrast to the findings of Ure (1971) and Halliday (1985b) regarding text-grade suitability, the findings of Gunning (1952) revealed that all forty-five (45) texts analyzed using the Gunning Fog Index were found to be suitable for Basic school

pupils, particularly Basic Five and Basic Six. Whilst the findings in Ure (1971) and Halliday (1985b) suggest that higher level texts were assigned to lower grades, the Gunning Fog Index findings suggest that lower-level texts were assigned to higher grades, with a very significant level gap of between 3 and 6 years. This finding equally stands in contrast to the ground propositions of the Flesch Grade-Readability Index. This affirms Bani-Amer's (2021) findings in which the study revealed that secondary stage textbooks for English for 12th Grade is suitable for 8th and 9th Grades whilst that for 11th Grade is suitable for 7th Grade. Bani-Amer (2021) concluded that secondary stage English textbooks do not meet standard requirements of readability indices because they are easier or harder than the expected ratings for the target levels. The findings similarly affirm Istiqomah (2015) which studied the readability of English textbooks used by second year SHS students. The textbooks were found not to be appropriate for SHS students but rather for Junior High School (JHS) students.

These findings however contradict To (2018) which revealed that texts in the series of the textbook used grew more and more complex as their levels advanced. It equally contradicts Prawinanto and Bram (2020) which found the average LD level of the text used for their study to be 47%, making it suitable for the intended 10th Graders. Overall, the Gunning Fog Index findings suggest that lower-level texts were assigned to higher grades.

The text-grade suitability analysis from Flesch (1948) readability formular showed that, of the total of forty-five (45) texts, over 30 were found to have readability levels equal to the readability level of texts meant for Postgraduate students (Masters & PhD).Therefore, among the four LD-Readability indices used in this study, three indices agree very clearly that higher level texts are usually assigned to lower grades than SHS in the Ghanaian educational system (Ure 1971; Halliday 1985b; & Flesch

1948) whilst one of the indices suggests that lower level texts are usually assigned to higher grades (Gunning Fog Index).

Of the three indices that agree on higher-text/lower-grade assignments, the Flesch Readability Index suggests that text readability levels are far higher than their assigned grades. This index finds the forty-five (45) texts to be for postgraduate students whilst the other two indices find the same texts to be meant for undergraduate students. This finding from the Flesch Grade-Readability formular stands in contrast to the founding propositions of the Flesch Grade-Readability Index as adapted for the Ghanaian educational system. This affirms Bani-Amer's (2021) findings in which the study revealed that secondary stage textbooks for English for 12th Grade is suitable for 8th and 9th Grades whilst that for 11th Grade is suitable for 7th Grade.

Bani-Amer (2021) concluded that secondary stage English textbooks do not meet standard requirements of readability indices because they are easier or harder than the expected indices for the target levels. The findings similarly affirm Istiqomah (2015) which studied the readability of English textbooks used by second year SHS students. The textbooks were found not to be appropriate for SHS students but rather for Junior High School (JHS) students. These findings however contradict To (2018) which revealed that texts in the series of the textbook used grew more and more complex as their levels advanced. It equally contradicts Prawinanto and Bram (2020) which found the average LD level of the text used for their study to be 47%, making it suitable for the intended 10th Graders. Overall, the Flesch readability formular found that far higher texts were assigned to lower grades. Though Bani-Amer (2021) employs the use of Halliday and Ure's LD formulae with Flesch's Reading Ease Scale used in rating the LD scores, it did not employ Flesch's Readability Formular itself. The current study however compares readability scores using Gunning and Flesch readability

formulae. This therefore makes the current study a significant extension of literature over other studies in this field.

Quite relatedly, the results in Gyasi (2017a) showed that a majority (63%) of the research articles used as data were graded as 'difficult' to read; that is, above the 'standard' readability level of 60 when measured on the FRE scale. This suggests that they generally did not suit their intended grades. In similar affirmation, findings in Gyasi (2013a) revealed that, the textbooks used for the study were difficult to read on the average and that the Integrated Science textbook was the most difficult among all the textbooks, followed by the Physics textbook. This is equally indicative of unsuitability of texts to intended grades.

In sum, the study in respect of research question three reveals that over 80% of texts assigned to SHS students are texts meant for undergraduate and postgraduate students whilst under 20% of them are texts meant for Basic school learners. Clearly, this is in contravention of the standards in text-grade allocation according to the Flesch Text-Grade Scale. Senior High School students in Ghana are thus treated unfairly in terms of what texts they are made to read at various levels of their academic progression. Undoubtedly, this impedes academic progress by either slowing down the learner (as in lower texts assigned to higher grades) or retarding learner progress (as in higher texts assigned to lower grades).To this end, one may conclude that the extent of suitability of texts assigned to SHS students in their English textbooks is only 2%,whilst the extent of unsuitability of English textbook texts assigned to leaners is 98% (only 2 out of the 90 analyzed versions), an indication of the highly arbitrary manner of text appropriation to academic levels at SHS level in Ghana.

Research Question Four: *How do lexical density and readability metrics agree in their application to same texts?*

4.7 Metric Consensus

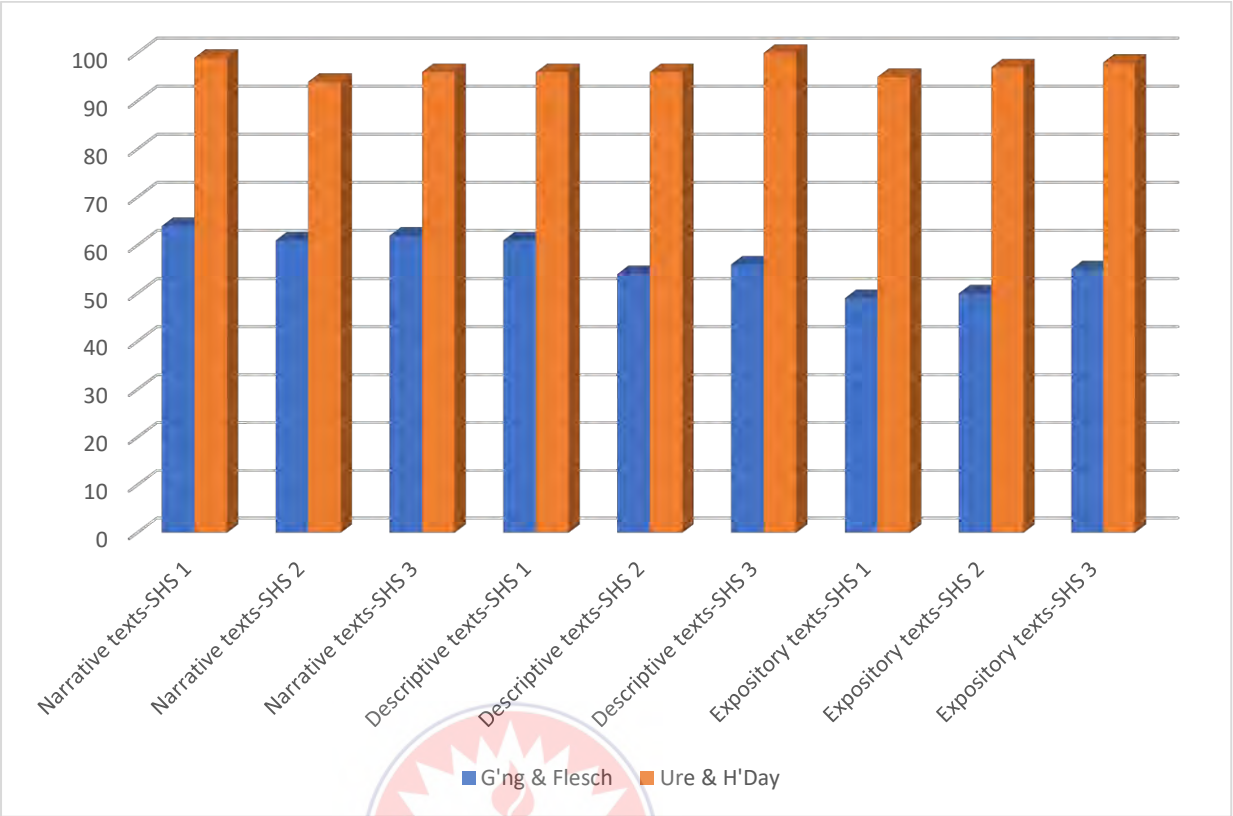
Generally, it is expected that the metrics in determining LD and readability should agree when applied to same texts. Research question four probes into the agreeability of readability and LD metrics as they are applied to same texts. This would help readability scholars to properly appraise the metrics at their disposal in doing readability studies. Generally, one expects the metrics to arrive at similar or same values when they are applied to same texts (one of the ground assumptions of this study). Table 13 conveys the metric consensus in percentage terms; Gunning and Flesch on one hand and Ure and Halliday on the other.

Table 13: Metric Consensus

Genre/ Grade	G'ng & Flesch	Ure & H'day
Narrative texts-SHS 1	64	99
Narrative texts-SHS 2	61	94
Narrative texts-SHS 3	62	96
Descriptive texts-SHS 1	61	96
Descriptive texts-SHS 2	54	96
Descriptive texts-SHS 3	56	100
Expository texts-SHS 1	49	95
Expository texts-SHS 2	50	97
Expository texts-SHS 3	55	98

From table 13, it is clear that Halliday and Ure's LD formulae have a very high (averagely above 95%) degree of agreeability in terms of their application to same texts. Average agreeability index for Gunning and Flesch's metrics also ranks fairly high (averagely above 55%). The LD-Readability values in table 13 are graphically represented in figure 7.

Figure 7: Metric Consensus



4.8 Discussion of Findings: Research Question Four (4)

As already seen in the aspectual analysis using the four indices, LD and Readability formulae do not necessarily agree in terms of findings when applied to the forty-five (45) texts under study. Notable among them in this regard is the Gunning Readability formula popularly, called the Gunning Fog Index. This formula produced vastly contrasting scores on readability compared with the scores from Flesch Readability formula. The LD formula findings as revealed by Halliday (1985b) and Ure (1971) are compared on one hand whilst the Readability formula findings as revealed by Gunning (1952) and Flesch (1948) are also compared on the other hand.

Gyasi (2013b) analyzed the readability of seven leaflets of malaria medicines that are very popular in Cape Coast, Ghana using the Flesch-Kincaid Reading Ease and Gunning Fog readability indexes. Results from the analysis using the two indexes

revealed that all the leaflets were very difficult to read as the mean value for the readability consensus for the two readability indexes was 21.04. This contradicts the findings from research question four in this study which reveal that readability indexes generally 'fairly' agree.

The agreeability Index of Ure (1971) LD formula and Halliday (1985b) LD formula could be described as generally high. The genre-grade averages are 49%,55% and 60% for SHS 1,2 and 3 respectively. This gives an overall grand agreeability average of 55% for the two formulae. On the basis of this, one may conclude therefore that the two formulae fairly agree (above average agreement) in their application to texts since the grand average agreeability score ranks above Flesch's (1948) 50% acceptable threshold. This finding amply satisfies Flesch's (1948) Formula-Agreeability Index of at least 50%.

Agreeability average index of Gunning (1952) and Flesch (1948) readability formulae stands at 44%, 44% and 45% for SHS 1,2 and 3 respectively in terms of genre-grade averages. Overall grand agreeability average is 44% for the two formulae. Using Flesch's (1948) Formula-Agreeability Index as the benchmark, one may conclude that there is low agreeability between the two formulae in terms of their application to texts, since the average agreeability score is lower than 50% (Flesch 1948). By Flesch's (1948) Formula-Agreeability Index therefore, these two formulae are found not to agree because the overall grand average agreeability score is less than 50%. This finding thus contradicts Flesch's (1948) theoretical proposition of at least 50% agreeability score.

The extent of formula-agreeability in this study is low (fairly agree) as pointed out above. This therefore stands in contrast to Bani-Amer (2021). Bani-Amer (2021) examined LD and readability in secondary stage English language textbooks in Jordan.

The study employed Ure (1971) and Halliday (1985b) LD formulae as well as the Gunning (1952) and Flesch (1948) readability indices. Ure (1971) and Halliday (1985b) LD indices agree that the two texts had medium LD levels. Regarding readability, Gunning (1952) and Flesch (1948) readability indices agree in that study that two texts were found to be syntactically easy to read. The two indices further revealed that secondary stage textbooks for English for 12th Grade is suitable for 8th and 9th Grades whilst that for 11th Grade is suitable for 7th Grade. The study concluded that secondary stage English textbooks do not meet standard requirements of readability indices because they are easier or harder than the expected indices for the target levels. English as a Foreign Language (EFL) teachers in Jordan are thus informed by the findings in this study to check complexity levels of English textbooks before administering them to the intended academic levels so as to promote effective teaching and learning of the Queen's language. These conclusions from Bani-Amer (2021) were drawn based on the general agreeability of the two LD formulae (Ure 1971 & Halliday 1985b) and the two readability formulae (Gunning 1952 & Flesch 1948).

Overall formula agreeability index for LD was 53% whilst that for readability was 56%, as against 54.7% and 44.3% respectively in this study. This falls within Flesch's (1948) acceptable formula-agreeability rating of at least 50%.

Employing three metrics in measuring LD and readability, Abuquba et al (2022) in their work sought to analyze the readability levels and lexical density of 100 English-as-a-Foreign-Language (EFL) students' written academic essays. It employed Halliday's (1985b) LD formula and Ure's (1971) LD formular; as well as Flesch's (1948) Reading Ease Index. Online text analyzers were employed to analyze and compare the EFL students' essays with essays written by English native speakers. The findings had it that readability levels of EFL students' essays were much below the

college level with shorter sentence lengths than in most published writings. Lexical density was found to be close to the threshold score of general written texts as proposed by Ure (1971), with more binding words, more sticky sentences, more mono-syllabic words and less variety in sentence openings. The two LD metrics used in the study (Ure 1971 & Halliday 1985b) agreed fairly (52%). Flesch's (1948) readability index was not compared with any other metric but was simply applied to the LD values to determine their suitability to grades. To that extent, this study provides an extension in literature over Abuquba et al (2022).

In sum, formula-agreeability in this study barely meets the threshold standard of 50% (49.5% rounded off to nearest whole number). Having met this threshold standard of 50% (Flesch 1948), it could be reliably concluded that LD and readability formulae or indices do not vary significantly when applied to texts, according to this study. Indeed, no two formulae are expected to produce exactly the same results as their theoretical assumptions and propositions vary in diverse ways. Also, modern day LD and readability scholars (O'Sullivan 2020; Eggins 2004) believe that the 50% standard threshold of Flesch (1948) is defectively unrealistic as various forms of writing anomalies or style, among other factors, could skew results arbitrarily. In view of this claim, some scholars in this field (O'Sullivan 2020; Eggins 2004; Halliday 1985b) argue that the standard threshold should be lowered to about 40-45%. If this argument is anything to follow, the average formula-agreeability rating of 50% for this study could be said to be 'high' rather than 'average'. The bottom line however, remains that, the formulae used in this study agree averagely in their application to texts. The study is thus, an extension of literature on readability with regards to LD-Readability formula agreeability.

Research Question 5: *How do metric and grader readability assessments reconcile?*

4.9 Metric and Grader Readability Assessments

One of the ground assumptions of this study is that, readability assessment of texts using metrics should largely reconcile with readability assessment made by learners as in their comprehension of texts assigned to them. Learner readability assessment can chiefly only be measured by testing their degree of understanding of a given text. This is because there is obviously an intrinsic nexus between readability and text comprehension. This segment of the study therefore attempts to establish that link by comparing readability values produced by applying metrics to texts and readability values produced by assessing learners' general comprehension of same texts. The comparative metric-grader readability assessment values are shown side by side in table 14.

Table 14: Metric and Grader Readability Assessment Values

	Text 1		Text 2		Text 3		Text 4		Text 5		Averages	
	G'ng Vs Graders	Flesch Vs Graders	G'ng Vs Graders	Flesch Vs Graders	G'ng Vs Graders	Flesch Vs Graders	G'ng Vs Graders	Flesch Vs Graders	G'ng Vs Graders	Flesch Vs Graders	G'ng Vs Graders	Flesch Vs Graders
Narrative texts-SHS1	12/16	77/23	08/38	43/28	14/32	38/39	24/41	68/37	34/35	46/26	**18/32**	**54/31**
Narrative texts-SHS2	09/39	77/44	18/18	51/34	18/26	41/33	21/34	71/38	31/35	51/28	**19/30**	**58/35**
Narrative texts-SHS3	10/33	80/34	15/31	44/38	21/33	36/21	18/37	72/40	30/47	53/37	**19/36**	**57/34**
Descriptive texts-SHS 1	09/35	83/43	19/32	34/46	23/21	35/35	19/18	81/30	29/36	64/49	**20/28**	**59/41**
Descriptive texts-SHS 2	11/44	77/39	21/25	46/36	18/36	68/24	25/30	76/43	28/36	67/32	**21/34**	**67/35**
Descriptive texts-SHS 3	14/26	68/48	20/31	41/34`	15/34	63/35	28/39	72/41	17/34	71/23	**19/33**	**63/36**
Expository texts-SHS 1	15/34	80/37	14/37	56/40	18/39	71/39	30/20	69/41	11/29	69/36	**18/32**	**69/39**
Expository texts-SHS 2	14/36	71/39	16/41	47/37	18/41	77/48	18/40	68/39	09/29	64/42	**15/37**	**65/41**
Expository texts-SHS 3	10/38	77/42	13/37	40/39	20/27	65/36	27/45	67/35	14/38	60/44	**17/37**	**62/39**

From table 14, the readability values of the sampled texts for each of the five texts for each academic grade and genre have been indicated. The readability value using each metric is first written, then followed by the readability value using grader assessments. The readability values using grader assessments were the averages of the fifty (50) graders for each grade. For example, the 12/16 readability assessment label for Narrative texts-SHS1 (see first horizontal column from top of table) means, the 12 is the readability value using the average readability assessment of the 50 graders for SHS1.

After that, overall averages of metric readability values and grader readability values are computed at the right end of the table. These overall averages are collated in table 15 and represented graphically below the table in figure 8.

Table 15: Average Metric and Grader Readability Assessment Values

GENRE-GRADE CATEGORY	G'NG FORMULA	GRADERS (SHS1-3)	FLESCH FORMULA	GRADERS (SHS1-3)
Narrative texts-SHS1	**18**	**32**	**54**	**31**
Narrative texts-SHS2	**19**	**30**	**58**	**35**
Narrative texts-SHS3	**19**	**36**	**57**	**34**
Descriptive texts-SHS 1	**20**	**28**	**59**	**41**
Descriptive texts-SHS 2	**21**	**34**	**67**	**35**
Descriptive texts-SHS 3	**19**	**33**	**63**	**36**
Expository texts-SHS 1	**18**	**32**	**69**	**39**
Expository texts-SHS 2	**15**	**37**	**65**	**41**
Expository texts-SHS 3	**17**	**37**	**62**	**39**

Using the Flesch adapted readability scale, the comparison of metric and grader readability values reveal a significant contradiction as can be seen from table 15. Whilst some texts were assessed by graders to be "readable" or "very readable", metric

assessments found same texts to be unreadable or very unreadable, as the case may be. This revelation in the analysis of data is very curious.

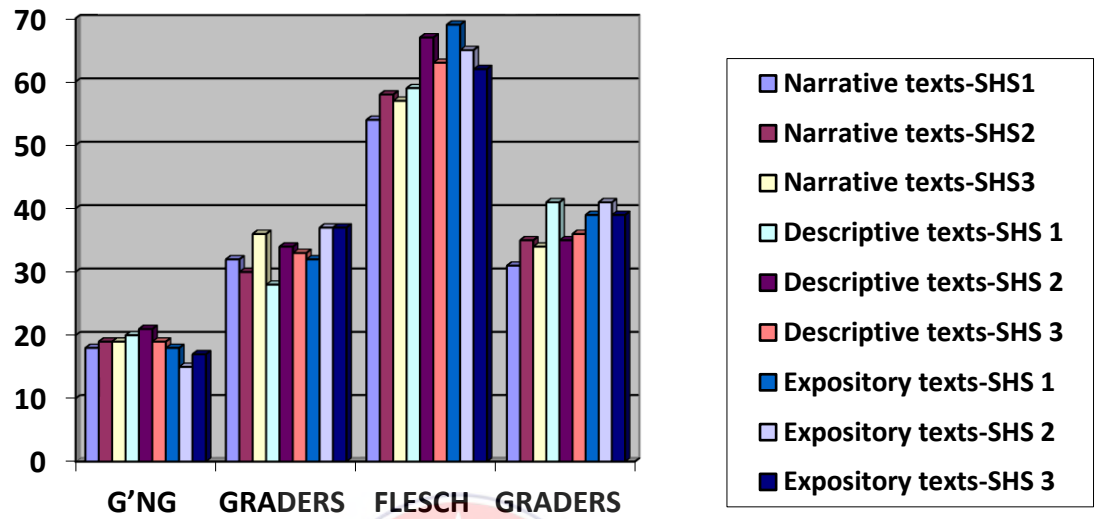


Figure 8: Average Metric and Grader Readability Assessment Values

4.10 Discussion of Findings: Research Question Five (5)

Metric and grader readability assessment values do not agree when applied to the forty-five (45) texts under this study. The analysis in tables 14 and 15 clearly indicate this. There is a large discrepancy seen in metric and grader judgments of readability. This is supported by the finding that, whereas less than 5% of the sampled texts were determined to be intelligible by metric readability evaluation, over 90% of the texts were found to be readable by grader assessment. This presents some important discoveries about the evaluation of readability using metrics and graders. Certain books were judged to be illegible by metric readability assessments, while they were found to be readable by grader readability assessments, and vice versa. The readability values for metrics are higher than those for grades. This assumes that the books were generally harder to read in the metric evaluations than they were in the grader exams.

Based on the Flesch adapted readability index, this evaluation was made. When the Flesch readability measure is compared to the Grader readability assessment, the Flesch readability values are higher. When the Gunning readability measure is compared to the graders' readability judgment, the Gunning readability values are found to be lower. This assumes that the texts were harder to read for the graders than they were for the Gunning readability score. When compared to Gunning and Flesch readability metrics, the results of grader readability assessments show that the sampled texts have an averagely high readability. When compared to readability metrics generally, this indicates a high degree of consistency in the grader readability assessment.

In sum, there is a very significant discrepancy between the readability assessments made by graders and metrics. Metric assessments show the opposite, despite the graders' general conclusion that the assigned texts were legible according to the Flesch Reading Ease Scale. The disparity in scores reaches 40% in certain instances. In this instance, the validity and reliability of the Flesch and Gunning reading metrics are called into question. When metric and grader readability assessment scores conflict, the grader readability score naturally wins out.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

This chapter is devoted to identifying the major findings of the study as revealed in the analysis of data. The contribution which the study has made to knowledge in this field of study is also in focus. The chapter concludes with recommendations and suggestions for future research work in the field, whilst identifying possible limitations. This is done in respect of each of the five (5) research questions in the study.

5.1 Summary of Findings

The findings of the study indicate that the texts in Ghanaian SHS English textbooks have high lexical density and low readability ratings. This is based on the fact from the findings that 3 out of the 4 metrics used yielded LD and readability values above 50%. This is well above the acceptable 'high' LD-Readability standard of 40% (Ure 1971). Resulting from this broad finding outlined, a number of findings emerged.

1. The narrative genre is the most readable of all genres of writing employed at senior high school in Ghana. This is indicative of a relatively low lexical density level of the sampled narrative texts used in this study.
2. The expository genre is the most unreadable of all genres of writing employed at the senior school in Ghana. This pre-supposes a high lexical density level of sampled expository texts used in this study.
3. The descriptive genre is found to be averagely readable to senior high school students in Ghana. The lexical density level of sampled texts from this genre could therefore be said to be averagely high.

4. A high LD level translates directly into a low readability level and vice versa. This is demonstrated in the low readability scores from Gunning's formular reflecting the corresponding high lexical density scores.
5. Text or vocabulary length is no decider of high or low LD or readability. Some shorter texts have higher LD and readability values than some longer texts. What matters is the kind of vocabulary used: content/lexical words versus grammatical words.
6. Indeed, text excerpt analysis is not a good mechanism to draw conclusions and generalizations in a readability study as observed by To (2018) and Kim et al (2018). The pilot analysis of whole and excerpt texts adequately confirmed this position.

Also, there is a very wide LD-Readability variation gap between grades in Ghanaian SHS English textbook texts. This is premised on the finding that 3 out of the 4 metrics used had inter-grade LD-Readability variation averages of above 50%, which does not conform to Halliday's (1985b) and Flesch's (1948) standard inter-grade variation index of 33.3% and 35% respectively. Consequent to the above broad revelation, a number of findings emerged from the study.

1. The Gunning Fog Index finds inter-grade LD-Readability variation of texts in Ghanaian English textbooks to be within acceptable standards, according to Halliday (1985b) and Flesch (1948) theoretical propositions.
2. Flesch's (1948) readability scale finds texts in senior high school English textbooks in Ghana to be readable for all grades. This suggests that inter-grade LD-readability variation index for these texts are within standard (accepted) limits as stipulated by Halliday and Flesch. This contradicts the fact that the same texts were found to be of high lexical density.

3. Senior high school learners in Ghana are faced with texts in English textbooks of almost twice difficulty level at each grade transition point. This impedes learner progress.

Further, texts in Ghanaian Senior High School English textbooks do not suit their intended academic levels in accordance with the Flesch Grade-Readability Index. This is manifested in the fact that only 2 of the 90 analyzed versions of the texts on readability were found to be fit for its intended grade. This reveals some findings regarding text-grade suitability.

1. Most of the texts meant for SHS students in Ghana have LD-Readability levels far above Senior High School grades. They mostly suit undergraduate and postgraduate grades.
2. Some texts assigned to senior high learners were found to be suitable for learners at the basic school level.
3. The descriptive genre of writing on the average is generally found to be of near-suitability to intended grades. It ranks mid-way between the narrative genre and the expository genre in terms of LD-Readability ratings.
4. Among the four metrics used, the Flesch readability formula is the only metric that found 2 analyzed text versions to be suitable to their intended grades. Given the curious nature of this revelation, one may state unequivocally that the Flesch readability formula has the highest predictability and precision rate in determining readability compared to the other 3 metrics used in this study.

Additionally, the Lexical Density and Readability formulae used generally agree in their application to the selected texts. This is based on the fact that overall

agreeability average in this study meets the acceptable standard of 50% (Flesch, 1948). A number of findings are therefore made based on the above revelation.

1. The Gunning Fog Index has the highest formula-disagreeability rating among LD-Readability indices. This is manifested by the very low agreeability average of 11% as against the three other metrics which recorded agreeability averages of above 50%.
2. Halliday and Ure LD formulae record very close values when applied to same texts. This is implicative of a very strong degree of agreeability of these two metrics in their application to same texts.
3. The Gunning Fog Index and Flesch Readability Index record widely varied values when applied to same texts. This means that the two metrics do not agree in their application to same texts.
4. Generally, lexical density and readability metrics fairly agree when they are applied to same texts. This is evident in the close LD and readability values recorded from the application of the 4 metrics to the same texts.

Finally, metric and grader readability assessments generally revealed a wide disparity. This is based on the fact that over ninety percent (90%) of the sampled texts were found to be readable according to grader assessment, whilst less than five percent (5%) of same texts were found to be readable according to metric readability assessment. This reveals some key findings regarding metric and grader readability assessment.

1. Whilst metric readability assessment of some texts found them to be unreadable, grader readability assessment of same texts found them to be readable, and vice versa.

2. Generally, metric readability values are higher than grader readability values. This presupposes that the metric assessments found texts to be generally more difficult to read than how the grader assessments found same texts. This assessment is based on the Flesch adapted readability index.
3. Generally, grader readability assessment compared with Flesch readability metric reveals that Flesch readability values are higher.
4. Generally, grader readability assessment compared with Gunning readability metric reveals that Gunning readability values are lower than those of the graders. This presupposes that the graders found the texts to be more difficult to read than how the Gunning readability metric found them to be.
5. Generally, grader readability assessments reveal an averagely high readability of sampled texts as they are compared with both Gunning and Flesch readability metrics. This suggests a high consistency level of grader readability assessment when compared with readability metrics in general.

5.2 Contribution to Knowledge

From the main findings outlined above, it is clear that this study has contributed significantly to the field of text readability. Firstly, aside Gunning (1952) readability index, all the other three LD-Readability indices used in this study agree strongly in terms of their application to texts. The LD and readability values are very similar (mostly between 50% and 60%). For researchers and students in this field, it is an established knowledge that LD-Readability indices 'strongly agree' when they are applied to same texts. From the review of vast related literature in this study, only two studies are known to have attempted touching on formular-agreeability (Abuquba et al 2022 & Bani-Amer 2021). However, findings from these two studies are largely limited

in terms of generalization of findings as they employed the use of text excerpts and not full texts as in this study.

Secondly, this study has established the knowledge that Narrative texts are the most easy-to-read texts in Ghanaian SHS English textbooks. On the contrary, Expository texts are identified as being the most hard-to-read texts in Ghanaian SHS English textbooks. Admittedly, some readings in the literature in this study and field suggests same. However, their conclusions are limited by data adequacy as in their use of text excerpts as against whole texts as used in this study.

Thirdly, the extensive review of related literature in this study expands and strengthens existing knowledge in this field of study. Review of related literature in this study was very succinct, meticulous and targeted as it traced the origins and inception of the idea of Lexical density and readability from founding scholars such as Thorndike (1921) through Ure and Halliday (1971 & 1985b respectively) to 'modern day' readability scholars such as To (2018), To et al (2013), Eggins (2004), Turkben (2019), Bani-Amer (2021) and Fadhillah (2018) among others. Without doubt, the reviewed literature in this work serves as one of the best stocks of knowledge for modern day readability researchers, students and observers.

Fourthly, this study has strongly established the view that SHS students in Ghana are met with obstructions as in arbitrary text appropriation as they change grades. This is because LD-Readability variation between and among texts is very high. Indeed, no study in the reviewed literature in this work took interest in readability variation across grades. This study therefore fills that void in existing literature with particular lessons for the Ghanaian educational system.

Fifthly, this study has adequately established knowledge in terms of text-grade suitability in Ghanaian Senior High Schools. In the reviewed literature, it is established that most texts do not generally suit their academic levels (Turkben 2019, Fadhillah 2018, Nesia & Ginting 2014, Aulia 2019, Nunoo et al 2021, Owu-Ewie 2018).Gyasi (2011), Gyasi (2013a), Gyasi (2013b),Gyasi (2017a), Gyasi (2017b),Gyasi (2017c), Gyasi (2017d), Gyasi and Owusu-Ansah (2018),Gyasi (2019a), Gyasi (2019b),Gyasi and Tettey (2019),Fosu (2016),Nunoo et al (2021), Owu-Ewie (2018) and Owu-Ewie (2014) pertain to the Ghanaian educational system. However, they are limited in various ways. In terms of capacity to generalize findings, most of them are journal articles. It is only Gyasi (2017a) that is a PhD thesis on readability. However, it is also limited as it focuses largely on readability and less on lexical density, and it was not interested in genre comparisons, text-grade relations and the use of textbooks. The point must however be made that Gyasi (2017a) is the most related study in terms of form, substance and geography, as it served as a guide for the analysis on readability. At least, this study gives further affirmation to the findings in earlier works.

Finally, metric and grader readability assessments do not match to a very large extent. Whilst in most cases the graders found their assigned texts to be readable under the Flesch Reading Ease Scale, metric assessments reveal the opposite. In some cases, the score difference can be as high as 40%. This raises questions of the reliability and validity of readability metrics, in this case, the Flesch and Gunning readability metrics. Obviously, where there is a clash between metric and grader readability assessment scores, the grader readability score takes precedence.

In sum, this study provides one of the most current and exhaustive review of literature on readability. Its novelty includes the comparison of readability metrics across grades and genres of writing at the senior high school level in Ghana as well as

its use of whole texts in the analysis. The study equally uncovered knowledge in relatively new aspects of readability such as readability inter-grade variation. Overall, the study affirms and validates findings of most existing literature in this field of study with its extensive literature review and detailed analysis of data.

5.3 Conclusions

Research question one has clearly revealed the fact that texts in Ghanaian SHS English textbooks have high Lexical density values which translates directly into low readability of these texts to their intended academic grades (Ure 1971, Halliday 1985b). This is evidently clear in the LD and readability values computed using the LD and Readability formulae employed in this study. This revelation by research question one implies that SHS English students in Ghana are challenged to be able to read and understand texts whose levels of difficulty are above their academic grades. This definitely has telling consequences on learner progress.

Findings from research question two clearly shows that the degree of LD and readability variation across genres and grades is very high. Halliday (1985b) and Flesch (1948) have set 33.3% and 35% respectively as the standard thresholds for acceptable LD-Readability variation. However, analysis under research question two indicates that overall, LD-Readability variation index stands at 50%. This is far above the acceptable ratings. This suggests that an SHS student of English language in Ghana is faced with incommensurate text difficulty level at each point of grade transition.

The analysis in research question three clearly reveals the fact that texts in Ghanaian English textbooks do not suit their intended academic levels to a very large extent. Indeed, for the varied 90 versions (for only readability) of analysis across genre and level, only 2 of the versions were found to be suited to their intended level,

according to the Flesch (1948) Readability Model. This translates into only 2% general suitability of texts with unsuitability rating of 98%. The revelation under this research question therefore draws the conclusion that texts in Ghanaian SHS English textbooks are arbitrarily appropriated to grades.

The analysis in research question four clearly reveals the fact that readability and lexical density metrics agree to a very large extent in terms of their application to same texts. The recommended agreeability rating is 50% (Flesch 1948). Overall average formular-agreeability in this analysis suggests that the four formulae employed in this study 'fairly' agree (50%). Indeed, no two formulae are expected to produce exactly the same results as their theoretical assumptions and propositions vary in diverse ways.

Also, modern day LD and readability scholars (O'Sullivan et al 2020, Eggins 2004) believe that the 50% standard threshold of Flesch (1948) is defectively unrealistic as various forms of writing anomalies or style, among other factors, could skew results arbitrarily. In view of this claim, some scholars in this field (O'Sullivan et al 2020, Eggins 2004, Halliday 1985b) argue that the standard threshold should be lowered to about 40-45%. If this argument is anything to follow, the average formular-agreeability rating of 50% for this study could be said to be 'high' rather than 'average'. This means readability and lexical density metrics generally agree, to a large extent, when they are applied to same texts.

The analysis in research question five clearly reveals the fact that metric and grader readability assessments do not reconcile properly. This raises questions of the reliability and validity of readability metrics in general. Clearly, when there is a clash

between metric and grader readability assessment values, the grader readability score is considered.

In sum, texts in Ghanaian Senior High School English textbooks are found to be grossly inappropriate for their intended audience, with wide gaps of readability variations across grades and genres. Whilst readability metrics largely agree in their application to texts, some genres are found to have lower readability compared to others. The study recommends the pre-determination of readability of texts to their intended grades whilst avoiding the use of one readability metric to draw conclusions. Though a great piece of research in the field of readability, this study just like all studies, is limited in some ways, thereby providing the fertile grounds for further research on this topic. The comparison of texts from different textbooks, a study of readability at other educational levels and the involvement of all known genres of writing at senior high school within the Ghanaian Educational System are part of suggestions for further research on this topic. It is further suggested that where there is a clash between readability assessment values of graders and readability metrics, the grader values should be used.

5.4 Recommendations for the Study

Based on the findings of this study, these recommendations have been proffered:

1. Readability status of texts should be established before assigning them to learners within the Ghanaian Educational System. This would ensure the right appropriation of texts to grades.
2. In introducing learners to reading, narrative texts should begin the process ending with expository texts. This would produce better learning outcomes since learners would progress from easier to difficult texts.

3. Apart from pre-determining readability levels of texts before their assignment to grades, the readability variation ratio of texts should also be pre-determined before assigning them to intended grades. This serves to check the wide gaps of text difficulty between one grade and the next.
4. In determining readability suitability to grades, the use of more than one readability metric is highly recommended. This would make room for comparison and best decision making.
5. Texts which do not suit their intended grades should not be included in the textbook meant for the particular grade. This would check learner-obstructions regarding reading competence.
6. The Gunning Fog Index should not be used solely for determining readability. This recommendation is informed by the very high disagreeability index it has against the three other readability metrics employed in this study.
7. Text excerpts should not be used to conclude on the readability of texts. Text length does not always translate directly into high or low LD or readability. Whole textual analysis is recommended to be able to draw valid conclusions.
8. Whilst metric readability assessment remains vital in assigning texts to grades, it can be strengthened by confirming metric readability assessment values with grader readability assessment values.
9. Where metric readability assessment reveals a text to be unreadable and grader readability assessment reveals same text to be readable, or vice versa, the grader assessment supersedes the metric assessment since grader assessment reflects reality more than metric assessment.

5.5 Recommendations for Further Studies

It is a well-known fact that no single study in a particular field can amply exhaust all the knowledge in the field. Indeed, the findings of a study will always fuel the curiosity of researchers in a particular field as other gaps and lapses usually emerge. Therefore, the following suggestions are proposed for further studies.

1. Further research on this topic is recommended using data from two or more English textbooks. This would expand the comparability of findings and provide for broader generalization of findings. This study used texts from one textbook and this limits the extent to which findings could be generalized.
2. Further research on this topic is recommended for other academic levels within the Ghanaian Educational System. This would inform policy at various levels of education in Ghana regarding reading competence which is a fundamental good for academic progress.
3. Further research on this topic is recommended to include all other genres of writing in Ghanaian Senior High Schools. This study limited itself to Narrative, Descriptive and Expository genres of writing (based WAEC Chief Examiner's Report 2020). Findings could be very different with other genres of writing.
4. Further research on this topic is recommended using texts from different subject areas (e.g. Social Studies and Physics). This would allow for comparison of LD-Readability across disciplines.
5. Further research on this topic is recommended to do a wider metric-grader readability assessment to cover more graders from diverse educational institutions, using some of the most widely acclaimed readability metrics.

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APPENDICES

The four (4) LD and Readability Formulae used in this study are simultaneously applied to each of the forty-five (45) texts, giving a total of one hundred and eighty (180) different analysis of the original forty-five (45) texts. Since all 180 analyzed versions of the 45 original separate texts cannot be used as appendices, thirty-six (36) analyzed versions have been used as appendices. These 36 analyzed versions constitute a full representation of sample analysis across the 3 academic levels,3 genres of writing and the 4 LD/readability metrics used in this study (i.e, 3*3*4=36). The original sampled texts were drawn from *Global Series* English textbook used in Ghana. The 36 analyzed texts is therefore the complete sample representation of the entire analyses, hence the use of the 36 analyzed texts as appendices.

Appendix 1: Ure's (1971) Lexical Density Analysis-SHS 1 Narrative Genre (pp7)

KEY:

Bold print (B) = Content/lexical words

Non-bold print (B) = grammatical/functional words

NB: (1) It must be noted that content and lexical words are identified here based on their context of use.

(2) All lexical density and readability scores have been rounded off to the nearest whole number.

Jane, a **28-year-old secretary, working** in **one** of the **new banks** in **Calabar** was **filled** with **ecstasy** the **moment** she got **married** to **John**. She **changed** her **lifestyle** and **quickly realized** that her **husband** and **children** will **demand attention** which she must **give**. She also **told** herself that she would no **longer go everywhere** and **do everything** she **liked** without **due regard** to the **interest** of her **husband** and **children.**

The **early years** of her **marriage** had been **characterized** by **turbulence** between her and her **husband**. Their **difference** in **upbringing** had **aggravated** their **uneasy relationship**. Her **husband** was a **product** of a **broken home**. His **parents** were **financially poor**, but his **mothe**r had **struggled** to **give** him a **university education**. He **grew** up a **reckless man** who **didn't care** for the **feelings** of others**. Jane grew** up in a **reasonably wealthy** and **loving family**. The **incompatibility drove** a **wedge** between them and **made** their **relationship fragile.**

Her **earnest desire** in **marriage** was to have a **secure home**. **Therefore**, she **guarded** her **home** with a **fierce determination** and she **wouldn't be satisfied** with **half measures**. She **made sure** that **there** was a **cordial relationship** between her, her **father-in-law** and **mother-in-law**, who were **sometimes determined** to **break** up her **marriage**. **Therefore**, she **fought prejudice**, **misunderstanding**, **envy** and the **opposition** of her **in-laws**, **especially** those from her **husband's siblings. Jane** had to **grapple along** with **routine domestic chores like tidying** up the **home, preparing** the **children** for **school**, **shopping** for the **family needs** and **entertaining** the **guests** for the **family**. This **daily task** of **housekeeping, coupled** with **office work**, **left** her **exhausted** and **weary** at the **end** of **almost every day**. She **always bore** the **guilt feeling** as she **dropped** her **child** off at a **day care center each morning**.

On this **particular day**, she **managed** to **close** at **about six o'clock**, with a **grudging permission** by her **boss** who was **always overdrawing** her. This **made** her to **drive** with **reckless speed**, **changing lane now** and **then** as she **sought** the **fastest moving lane**. She **drove** as one under **tension**, **because** her **one-year-old daughter left** at the **day care center** in her **neighborhood** was the **last** to be **picked** up. On **reaching there**, she **discovered** that her **daughter** had **cried** herself out, **refusing** to **take** her **milk** and **be comforted**. **Jane rushed** out of the **car**, **hugged** and **kissed** her.

The **fear** of the **future** had **deepened** the **emotional pressure** on **Jane**: what would be the **future** of her **marriage**? What would be the **future** of her **children's welfare**? Her **uncertainty** of **tomorrow** had **forced** her to **hold tenaciously** to her **employment** at the **expense** of **parenting.**

Variables:

Total content/lexical words=227

Total words=448

- **Ure's (1971) LD Formula**

$$\text{LD} = \frac{Number\ of\ content/lexical\ words}{Total\ number\ of\ words} \times 100$$

Application:

$$\text{LD} = \frac{227}{448} \times 100$$

LD=51%

Appendix 2: Ure's (1971) Lexical Density Analysis-SHS 2 Narrative Genre (pp337)

One day a **neighbor called Okoye came** in to **see Unoka**. He was **reclining** on a **mud bed** in his **hut playing** on the **flute.** He **immediately rose** and **shook hands** with **Okoye**, who **then unrolled** the **goatskin** which he **carried under** his **arm**, and **sat down**. **Unoka went** into an **inner room** and **soon returned** with a **small wooden disc containing** a **kola nut**, **some alligator pepper** and a **lump** of **white chalk**.

'I have **kola**,' he **announced when** he **sat down**, and **passed** the **disc over** to his **guest**. '**Thank** you. He who **brings kola brings life**. But I **think** you ought to **break** it' **replied Okoye passing back** the **disc.**

'**No**, it is for you, I **think**' and they **argued like** this for a **few moments** before **Unoka accepted** the **honor** of **breaking** the **kola**. **Okoye**, **meanwhile**, **took** the **lump** of **chalk**, **drew** some **lines** on the **floor**, and **then painted** his **big toe**. As he **broke** the **kola, Unoka prayed** to their **ancestors** for **life** and **health**, and for **protection** against their **enemies. When** they had **eaten,** they **talked** about **many things**, about the **impending war** with the **village** of **Mbiano. Unoka** was **never happy when** it **came** to **wars**. He was in **fact** a **coward** and could not **bear** the **sight** of **blood**. And so he **changed** the **subject** and **talked** about **music,** and his **face beamed**. He could **hear** in his **mind's ear** the **blood-stirring** and **intricate rhythms** of the **Ekwe** and the **Udu** and the **Ogene**, and he could **hear** his **own flute weaving** in and out of them, **decorating** them with a **colorful** and **plaintive tune**. The **total effect** was **gay** and **brisk**, but if one **picked** out the **flute** as it **went up** and **down** and **then broke** up into **short snatches**, one **saw** that **there** was **sorrow** and **grief there**.

Variables:

Total content/lexical words=159

Total words=310

- **Ure's (1971) LD Formula**

$$LD = \frac{Number\ of\ content/lexical\ words}{Total\ number\ of\ words} \times 100$$

Application:

$$LD = \frac{159}{310} \times 100$$

LD=51%

Appendix 3: Ure's (1971) Lexical Density Analysis-SHS 3 Narrative Genre (pp406)

In what **appears** to be a **price** to **pay** for **ignoring persistent appeals** to **form** a **neighborhood watchdog committee,** our **Bantama residence** was **burgled** on the **night of 20th May, 2012**. This **took place when** I was the **only person left home**.

My **parents** were **away** from **home** on a **two-day visit** to **Accra** to **transact business**. My **two elderly brothers** had **also gone** to our **hometown** to **visit** our **ailing grandmother**. I **felt lonely** and **bored** at **home** and was **thinking** of a **way** to **while away time**. **Just then, Joe**, a **good friend** of mine **came** round with **information** that **Ghana Breweries Limited** was **launching** a **new malt drink**. The **venue** was the **cosy** and **spacious Adehyeman Gardens**.

Within ten minutes of **Joe's arrival**, we were on our **way** to **exploit** this **opportunity** to **dance** and have **fun all night** at **no cost**. At **12.45am**, it **dawned** on me that **Daddy** had **given** me **strict instructions** not to **wander away** from **home**. My **friend frowned** on the **idea** of our **leaving so soon when** I **explained** the **situation** to him. I **took** a **taxi** and **left** him **there.**

I **stepped** into our **compound** at **exactly 1.30am** and **immediately felt** the **presence** of **people** in the **house**. **After closing** the **main gate**, I **realized** that **Spark**, our **Alsatian dog**, had been **shot** in the **head** and was **lying** in a **pool** of **blood**. The **door** to the **living room** has **also** been **forced open**. I **mustered courage** and **entered only** to **burst** upon **three men busily packing** our **belongings** into a **huge box**. These **included** a **Samsung LCD television**, with **serial number 077226628,** a **Sanyo DVD player** with **serial number 6224802**. **Also removed** were a **Samsung Galaxy tablet**, a **Philips washing machine**, a **Toshiba audio system** and a **wall clock**.

The **robbers** were **hooded** and **appeared panicky** on **seeing** me. A **warning shot** was **fired**. **One** of them **limped** towards me and **stopped** within **striking distance**. I **tore** the **mask** off his **face**, and **realized** that he **looked familiar**. However, I cannot **recollect where** I **knew** him. He was **shaven** to the **skull** and **spotted** a **long beard**. I **also noticed** a **large scar** on his **forehead**. He **bared** his **teeth** and **gave** me a **power-laden blow.** The **last thing** I **saw** of him was a **cola-stained teeth.**

I **regained consciousness sooner than expected** but **realized** that my **safety lay** in **making** them **take** me for **dead** or **unconscious.** They **began using names**. I **heard one say**, "**Foreman, let's move**". **Two whispered** in an **unfamiliar dialect** but the **names Bashiru** and **Mojo filtered through**. A **vehicle moved** into the **compound** and the **huge box** was **carried** out of the **living room** by **four stocky men**. **Two** others **held** the **main gate wide open** as the **vehicle passed through**. **Then** they **jumped** into it. **Luckily**, I **saw** the **registration number** of the **vehicle as BT 7062 K** and it **looked** very **much like** a **Mitsubishi pick-up**.

After their **departure**, I **rang** the **police** but they **arrived too late** to **meet** them or **set** up **road blocks** to **frustrate** their **escape.**

Variables:
Total content/lexical words=293
Total words=520

- **Ure's (1971) LD Formula**

$$LD = \frac{Number\ of\ content/lexical\ words}{Total\ number\ of\ words} \times 100$$

Application:

$$LD = \frac{293}{520} \times 100$$

LD=56%

Appendix 4: Ure's (1971) Lexical Density Analysis-SHS 1 Descriptive Genre (pp52)

During this **time Okonkwo's fame** had **grown like** a **bush fire** in the **harmattan**. He was **tall** and **huge**, and his **bushy eyebrows** and **wide nose gave** him a **very severe look**. He **breathed heavily**, and it was **said** that, **when** he **slept**, his **wives** and **children** in their out **houses** could **hear** him **breathe**. **When** he **walked**, his **heels hardly touched** the **ground** and he **seemed** to **walk** on **springs**, as if he was **going** to **pounce** on **somebody**. And he did **pounce** on **people quite often**. He had a **slight stammer** and **whenever** he was **angry** and could not **get** his **words** out **quickly enough,** he would **use** his **fists**.

The **last match** was between the **leaders** of the **teams.** They were **among** the **best wrestlers** in **all** the **nine villages**. The **crowd wondered** who would **throw** the other this **year**. Some **said Okafo** was the **better man**; others **said** he was not the **equal** of **Ikezue**.

Dusk was **already approaching when** their **contest began**. The **drums went mad** and the **crowds also.** They **surged forward** as the **two young men danced** into the **circle**. The **palm fronds** were **helpless** in **keeping** them **back**.

Ikezue held out his **right hand**. **Okafo seized** it and they **closed** in. It was a **fierce contest**. The **wrestlers** were **now almost still** in each **other's grip**. The **muscles** on their **thighs** and on their **backs stood** out **twitched**. It **looked like** an **equal match**.

The **two judges** were **already moving forward** to **separate** them **when Ikezue**, **now desperate, went down quickly** on **one knee** in an **attempt** to **fling** his **man backward** over his **head**. It was a **sad miscalculation**. **Quick** as the **lightening** of **Amadiora, Okafo raised** his **right leg** and **swung** it over his **rival's head**. The **crowd burst** into **thunderous roar, Okafo** was **swept** off his **feet** by his **supporters** and **carried home shoulder high**.

Variables:

Total content/lexical words=167
Total words=316

- **Ure's (1971) LD Formula**

$$LD = \frac{Number\ of\ content/lexical\ words}{Total\ number\ of\ words} \times 100$$

Application:

$$LD = \frac{167}{316} \times 100$$

LD=53%

Appendix 5: Ure's (1971) Lexical Density Analysis-SHS 2: Descriptive Genre (pp338)

The **albatross** has been **described** as "the **grandest living flying machine** on **Earth**", and for a **good reason**. With a **wingspan** of **three meters**, this **largest** of all **seabirds** can **reach** a **flying speed** of **more than 115 kilometers** an **hour**. The **albatross** may **appear ungainly** on **land**, but in the **sky,** it is **simply magnificent** to **behold.**

Of the **approximately twenty recognized species** of **albatross, some fifteen species** can be **found** in the **ocean waters surrounding New Zealand**. The **sole mainland breeding colony** in **southern Hemisphere** is **Taiaroa Head**, at the **tip** of the **Otago Peninsula**, on **New Zealand's South Island.**

There, the **northern royal albatross begins breeding** between the **ages** of **six** and **ten years. Breeding continues throughout** its **life**, which can be **quite long. Some** of these **birds** have been **known** to **live well** over **half** a **century**! The **albatross lays one egg every second year spending** the **interim year** at **sea**. **Customarily**, the **bird stays** with **one partner** for **life.**

Both the **male** and the **female albatross take part** in **nest building**, which **begins** in **September. Then,** in **November,** the **female lays** an **egg** that may **weigh** up to **500 grams**. For **some eighty days**, the **parents share** in **incubating until** the **egg hatches** in **early February. Then**, the **parents take turns guarding** and **feeding** the **chick,** whose **diet consists** of a **regurgitated mush** of **fish** and **squid**. At **six months** of **age**, the **chick** can **weigh** up to **12 kilograms** – **considerably more than** an **adult albatross**!

Variables:

Total content/lexical words=153

Total words=251

- **Ure's (1971) LD Formula**

$$LD = \frac{Number\ of\ content/lexical\ words}{Total\ number\ of\ words} \times 100$$

Application:

$$LD = \frac{153}{251} \times 100$$

LD=61%

Appendix 6: Ure's (1971) Lexical Density Analysis-SHS 3 Descriptive Genre (pp428)

An **estate where fields** of **sugarcane** had **once crept like** an **open secret** across the **land** had been **converted** into a **village** that **absorbed some three thousand people**. An **English landowner, Mr. Creighton**, had **died**, and the **estate fell** to his **son through** whom it **passed** to **another son** who in his **turn died**, **surrendering** it to yet **another. Generations** had **lived** and **died** in this **remote corner** of a **small British colony**, the **oldest** and **least adulterated** of **British colonies**: **Barbados** or **Little England** as it was **called** in the **local school texts**. To the **east where** the **land rose gently** to a **hill, there** was a **large brick building surrounded** by a **wood** and a **high stone wall** that **bore bits** of **bottle along** the **top**. The **landlords lived there amidst** the **trees** within the **wall**. **Below** and **around** it, the **land spread** out into a **flat unbroken monotony** of **small houses** and **white marl roads**. From any **point** of the **land**, one could **see** on a **clear day** the **large brick house hoisted** on the **hill. When** the **weather wasn't too warm, tea** was **served** on the **wide flat roof**, and the **villagers catching sight through** the **trees** of the **shifting figures crept** behind their **fences**, or **stole** through the **wood away** from the **wall** to **see how** it was **done**. **Pacing** the **roof,** the **landlord**, **accompanied** by his **friends, indicated** in **all directions** the **limits** of the **land**. The **friends** were **mainly planters** whose **estates** in the **country** had **remained agricultural**; or **otherwise, there** were **English visitors** who were **absentee owners** of the **estates** which they had **come** to **see.** The **landlord**, one **gathered**, **explained** the **layout** of the **land,** the **customs** of the **villagers** and the **duties** which he **performed as caretaker** of this **estate.** The **villagers enthralled** by the **thought** of **tea** in the **open air looked** on, **unseen, open-mouthed**.

Variables:

Total content/lexical words=174

Total words=316

- **Ure's (1971) LD Formula**

$$LD = \frac{Number\ of\ content/lexical\ words}{Total\ number\ of\ words} \times 100$$

Application:

$$LD = \frac{174}{316} \times 100$$

LD=55%

Appendix 7: Ure's (1971) Lexical Density Analysis-SHS 1: Expository Genre (pp156)

A **political party** is an **organized group** of **people** who **control** a **government**. In **democratic countries**, **political parties compete** against one another in **elections** to **keep** or **gain control** of a **government**. In the **United States** and **Nigeria**, **political parties** are **active** on the **national, state** or **senatorial** and **local levels**. They **help** in **forming governments** at **national, state** and **local levels**.

Political parties are **absolutely necessary** to a **democratic government**. **Most modern democracies** are **representative democracies**. That is, the **people elect representatives** to **act as** their **agents** in **making** and **enforcing laws**. In a **representative democracy, some primary elections** are **conducted** for **nominating candidates** of **parties' choice**. **Political parties** are **voluntary organizations**. They **want** as **many members** as **possible**. **Some** of these **parties** have **rules** and **membership dues**. Others have **particularly no rules** and **require** no **dues**.

Most dictatorships allow only one political party – the **party** that **controls** the **government.** In **communist nations** for **example**, the **communist party** is **always** in **power.** It **tightly controls** who may **run** for **elections.**

In **democratic countries, political parties perform several important tasks**. These **tasks include** the **selection** of **candidates** for **public office** and **helping** in the **organization** of the **government. Political parties also provide opposition** to the **party** in **power** and the **raising** of **funds needed** to **conduct election campaigns**. Other **functions** of **political parties** in **democracies include informing voters** about **political affairs** and about **problems** that **need government action**. In **one-party nations**, the **chief functions** of **political parties** are to **select candidates** for **office** and to **organize** the **government.**

Variables:

Total content/lexical words=158

Total words=258

- **Ure's (1971) LD Formula**

$$\text{LD} = \frac{Number\ of\ content/lexical\ words}{Total\ number\ of\ words} \times 100$$

Application:

$$\text{LD} = \frac{158}{258} \times 100$$

LD=61%

Appendix 8: Ure's (1971) Lexical Density Analysis-SHS 2 Expository Genre (pp196)

Learning to **speak** one's **language comes naturally** to a **human being**; we **learn** it without **formal instruction**. But **writing** is an **unnatural activity**; it must **be taught formally** and **studied deliberately. Indeed**, **many** of the **problems** that **arise** in **learning** to **write** are **simple problems** of **finding proper written equivalent** for the **various features** of **speech**. The **spelling** of our **words** is a **clumsy attempt** to **produce** the **sound** of our **voices.** The **punctuation** of our **sentences** and the **settings** of **paragraphs** are **designed** to **give some approximations** of the **pauses** and **intonation** we **use automatically** to **give shape** and **point** to our **speaking**.

The **writer** of **English** (or any **other language**) **loses** a **whole world** of **gestures**, **facial expressions** and **tone** of **voice** the **minute** he **decides** to **write** something **rather than say** it **aloud**. He **loses** the **immediacy** of **direct contact** with his **audience**. If **there** were no **compensation** at **all** for all these **disadvantages**, **then communicating** with **other people through** the **medium** of **squiggles** on **paper** would **be as unsatisfactory as trying** to **wash** your **feet** with your **socks** on.

Writing takes more effort than speech, but the **effort** we **make simply** to **capture** our **words** on **paper** can **also lead** us to **compose things** that are **worth** the **effort.** The **unusual energy** that **goes** into **achievement** in any **art** or **sport** can and should **function finally** to **help** the **individual increase** his **own powers** and **perfect** his **abilities**. **Three hundred** and **fifty years ago**, a **clever man pointed** out that **practice** in **speaking makes** a **man ready** or **quick** in his **responses**. **While practice** in **writing makes** a **man** "**exact**", it **helps** him to **polish** and **perfect** his **thoughts**.

Variables:

Total content/lexical words=159

Total words=283

- **Ure's (1971) LD Formula**

$$\text{LD} = \frac{Number\ of\ content/lexical\ words}{Total\ number\ of\ words} \times 100$$

Application:

$$\text{LD} = \frac{159}{283} \times 100$$

LD=56%

Appendix 9: Ure's (1971) Lexical Density Analysis-SHS 3 Expository Genre (pp456)

Delicious dishes have **added flavor** if they are **home made**. With a **little effort**, you can **win** the **love** and **respect** of **relatives** and **friends** with the **preparation** of **white** and **red beans salad**. It has **been** my **favorite dish** for **many years** and I **just needed** to **sit** by **Mom one Saturday** to **pick** up the **method** of **preparation.**

*To **prepare white** and **red beans salad**, you **need** the **following ingredients**:*

1 milk tin each of **white** and **red beans;**

2 big-sized onions;

3 medium-sized tomatoes;

1 spring onion;

4 heaped dessert spoonfuls of **tuna flakes**;

½ teaspoonful of **black** or **red pepper**;

1 teaspoonful of **cooking oil;**

2 teaspoonful of **vinegar**;

Having got these **ingredients,** you are **set** to **making** a **tasty beans salad**. **First,** you **pour** the **white** and **red beans** into **two separate bowls** and **sort** out **foreign particles**. That **done**, **soak** the **beans** for between **four** and **six hours**, **again separately**. **Then drain** the **water** and **boil** with **salt separately till** they are **soft**.

You **then drain** the **cooked beans** and **pour** into **separate plates** for **some three minutes**. **Cut** the **onions** and **tomatoes** into **thin slices**, also **slice** the **spring onions** into **tiny pieces**. You've **now got** to the **point** of **mixing**. **Pour** the **white** and **red beans** into a **bowl** and **mix together**. **Next**, **blend** your **mixture** with the **chopped onions** and **tomatoes**. **Then whip** the **vinegar** and **cooking oil** to **mix thoroughly** and **gently add** it to the **beans.**

Finally, sprinkle black or **red pepper** on the **tuna flakes** and **add** to **beans**. **Spread chopped spring onions** to **make** your **beans salad look** and **taste better**. You are **through** with your **white** and **red beans salad** and **ready** to **serve** with **cooked rice** and **fried plantain**. **Pull** a **chair** towards the **table** and **enjoy** a **really delicious meal**.

Variables:

Total content/lexical words=191

Total words=306

- **Ure's (1971) LD Formula**

$$\text{LD} = \frac{Number\ of\ content/lexical\ words}{Total\ number\ of\ words} \times 100$$

Application:

$$\text{LD} = \frac{191}{306} \times 100$$

LD=62%

In sum, Ure's (1971) Lexical Density Formular has been applied to the forty-five (45) texts under study but the nine (9) sample analysis here are for illustration. The LD computational values for each of the nine (9) texts using Ure's (1971) formular have been determined in percentage terms as can be seen in the foregoing analysis. These computational values are collated for the graphic analysis of data.

Appendix 10: Halliday's (1985b) Lexical Density Analysis-SHS 1 Narrative Genre (pp7)

KEY:

Bold print (B) = Content/lexical words

//= Boundaries for Ranking Clauses

Underlined phrases = phrasal verbs (should be counted as single words)

NB: In calculating LD here, the fraction (e.g, 221/44) is rounded to the nearest whole number and then expressed in percentage terms.

Jane, a **28 year old secretary, working** in **one** of the **new banks** in **Calabar,** was **filled** with **ecstasy//** the **moment** she got **married** to **John**. //She **changed** her **lifestyle** //and **quickly realized** that her **husband** and **children** will **demand attention//** which she must **give//**. She also **told** herself// that she would **no longer go everywhere//** and **do everything** she **liked** without **due regard** to the **interest** of her **husband** and **children//.**

The **early years** of her **marriage** had been **characterized** by **turbulence** between her and her **husband//**. Their **difference** in **upbringing** had **aggravated** their **uneasy relationship//**. Her **husband** was a **product** of a **broken home//**. His **parents** were **financially poor//**, but his **mother** had **struggled** to **give** him a **university education//**. He **grew up** a **reckless man** //who **didn't care** for the **feelings** of others**//. Jane grew up** in a **reasonably wealthy** and **loving family**//. The **incompatibility drove** a **wedge** between them// and **made** their **relationship fragile//.**

Her **earnest desire** in **marriage** was to have a **secure home//**. Therefore, she **guarded** her **home** with a **fierce determination**// and she **wouldn't be satisfied** with **half measures//**. She **made sure** that **there** was a **cordial relationship** between her, her **father-in-law** and **mother-in-law//**, who were **sometimes determined** to **break up** her **marriage//**. Therefore, she **fought prejudice**, **misunderstanding**, **envy** and the **opposition** of her **in-laws**, **especially** those from her **husband's siblings//. Jane** had to **grapple along** with **routine domestic chores like tidying up** the **home, preparing** the **children** for **school**, **shopping** for the **family needs** and **entertaining** the **guests** for the **family//**. This **daily task** of **housekeeping, coupled** with **office work**, **left** her **exhausted//** and **weary** at the **end** of **almost every day//**. She **always bore** the **guilt feeling** //as she **dropped** her **child** off at a **day care center each morning//**.

On this **particular day**, she **managed** to **close** at **about six o'clock**, with a **grudging permission** by her **boss//** who was **always overdrawing** her//. This **made** her to **drive** with **reckless speed**, **changing lane now** and **then//** as she **sought** the **fastest moving lane//**. She **drove** as one under **tension//**, **because** her **one year old daughter left** at the **day care center** in her **neighborhood//** was the **last** to be **picked** up//. On **reaching there**, she **discovered** that her **daughter** had **cried** herself out, **refusing** to **take** her **milk** and **be comforted//**. **Jane rushed out** of the **car**,// **hugged** //and **kissed** her//.

The **fear** of the **future** had **deepened** the **emotional pressure** on **Jane**:// what would be the **future** of her **marriage**? //What would be the **future** of her **children's welfare**? // Her **uncertainty** of **tomorrow** had **forced** her to **hold tenaciously** to her **employment** at the **expense** of **parenting//.**

Variables

Total content/lexical items=221

Total Ranking Clauses=44

- **Halliday's (1985b) LD Formula**

$$LD = \frac{Number\ of\ content/lexical\ items}{Number\ of\ ranking\ clauses} \times (10)^{x}$$

Application:

$$LD = \frac{221}{44} \times (10)^{x}$$

LD=50%

Appendix 11: Halliday's (1985b) Lexical Density Analysis-SHS 2: Narrative Genre (pp337)

One day, a **neighbor called Okoye came** in to **see Unoka//**. He was **reclining** on a **mud bed** in his **hut playing** on the **flute//.** He **immediately rose** //and **shook hands** with **Okoye**, // who **then unrolled** the **goatskin//** which he **carrie**d **under** his **arm**, // and **sat down**. // **Unoka went** into an **inner room//** and **soon returned** with a **small wooden disc containing** a **kola nut**, **some alligator pepper** and a **lump** of **white chalk//**.

'I have **kola**,'// he **announced// when** he **sat down**, // and **passed** the **disc over** to his **guest//**. '**Thank** you. // He who **brings kola// brings life//**. But I **think** you **ought to break** it'//, **replied Okoye passing back** the **disc//.**

'**No**, it is for you, // I **think**'// and they **argued like** this for a **few moments//** before **Unoka accepted** the **honor** of **breaking** the **kola//**. **Okoye**, **meanwhile**, **took** the **lump** of **chalk**, // **drew** some **lines** on the **floor**, // and **then painted** his **big toe//**. As he **broke** the **kola, // Unoka prayed** to their **ancestors** for **life** and **health**, and for **protection** against their **enemies//. When** they had **eaten, //** they **talked** about **many things**, about the **impending war** with the **village** of **Mbiano//. Unoka** was **never happy// when** it **came** to **wars//**. He was in **fact** a **coward//** and could not **bear** the **sight** of **blood//**. And so, he **changed** the **subject** //and **talked** about **music, //** and his **face beamed//**. He could **hear** in his **mind's ear** the **blood-stirring** and **intricate rhythms** of the **Ekwe** and the **Udu** and the **Ogene**, // and he could **hear** his **own flute weaving in** and out of them, **decorating** them with a **colorful** and **plaintive tune//**. The **total effect** was **gay** and **brisk**, // but if one **picked out** the **flute//** as it **went up** and **down//** and **then broke up** into **short snatches**, //one **saw//** that **there** was **sorrow** and **grief there//**.

Variables

Total content/lexical items=154

Total Ranking Clauses=44

- **Halliday's (1985b) LD Formula**

$$LD = \frac{Number\ of\ content/lexical\ items}{Number\ of\ ranking\ clauses} \times (10)^{x}$$

Application:

$$LD = \frac{154}{44} \times (10)^{x}$$

LD=35%

Appendix 12: Halliday's (1985b) Lexical Density Analysis-SHS 3 Narrative Genre (pp406)

In what **appears** to be a **price** to **pay** for **ignoring persistent appeals** to **form** a **neighborhood watchdog committee, //** our **Bantama residence** was **burgled** on the **night of 20th May, 2012//**. This **took place// when** I was //the **only person left home//**.

My **parents** were **away** from **home** on a **two-day visit** to **Accra** to **transact business//**. My **two elderly brothers** had also **gone** to our **hometown** to **visit** our **ailing grandmother//**. I **felt lonely** and **bored** at **home//** and was **thinking** of a **way** to **while away time//. Just then, Joe**, a **good friend** of mine **came round** with **information//** that **Ghana Breweries Limited** was **launching** a **new malt drink//**. The **venue** was the **cosy** and **spacious Adehyeman Gardens//**.

Within **ten minutes** of **Joe's arrival**, we were on our **way** to **exploit** this **opportunity** to **dance** and have **fun all night** at no **cost//**. At **12.45am**, it **dawned** on me //that **Daddy** had **given** me **strict instructions** not to **wander away** from **home//**. My **friend frowned** on the **idea** of our **leaving** so **soon// when** I **explained** the **situation** to him//. I **took** a **taxi** //and **left** him **there//.**

I **stepped into** our **compound** at **exactly 1.30am//** and **immediately felt** the **presence** of **people** in the **house//**. After **closing** the **main gate**, I **realized** that **Spark**, our **Alsatian dog**, had been **shot** in the **head//** and was **lying** in a **pool** of **blood//**. The **door** to the **living room** has **also** been **forced open//**. I **mustered courage//** and **entered only** to **burst** upon **three men busily packing** our **belongings** into a **huge box//**. These **included** a **Samsung LCD television**, with **serial number 077226628,** a **Sanyo DVD player** with **serial number 6224802**. //**Also removed** were a **Samsung Galaxy tablet**, a **Philips washing machine**, a **Toshiba audio system** and a **wall clock//**.

The **robbers** were **hooded** //and **appeared panicky** on **seeing** me//. A **warning shot** was **fired//**. **One** of them **limped** towards me// and **stopped** within **striking distance//**. I **tore** the **mask** off his **face**, // and **realized** that he **looked familiar//**. However, I cannot **recollect// where** I **knew** him//. He was **shaven** to the **skull//** and **spotted** a **long beard//**. I also **noticed** a **large scar** on his **forehead//**. He **bared** his **teeth//** and **gave** me a **power-laden blow//.** The **last thing** I **saw** of him// was a **cola-stained teeth//.**

I **regained consciousness sooner than expected//** but **realized** that my **safety lay** in **making** them **take** me for **dead** or **unconscious//.** They **began using names//**. I **heard one say**, // "**Foreman, let's move**"//. **Two whispered** in an **unfamiliar dialect//** but the **names Bashiru** and **Mojo filtered through//**. A **vehicle moved** into the **compound//** and the **huge box** was **carried out** of the **living room** by **four stocky men//**. **Two** others **held** the **main gate wide open//** as the **vehicle passed through//**. **Then** they **jumped into** it//. **Luckily**, I **saw** the **registration number** of the **vehicle as BT 7062 K** //and it **looked** very **much like** a **Mitsubishi pick-up//**.

After their **departure**, I **rang** the **police** //but they **arrived too late** to **meet** them// or **set up road blocks** to **frustrate** their **escape//.**

Variables
Total content/lexical items=289
Total Ranking Clauses=60
Halliday's (1985b) LD Formula

$$LD = \frac{Number\ of\ content/lexical\ items}{Number\ of\ ranking\ clauses} \times (10)^{x}$$

Application:

$$LD = \frac{289}{60} \times (10)^{x}$$

LD=48%

Appendix 13: Halliday's (1985b) Lexical Density Analysis-SHS 1 Descriptive Genre (pp52)

During this **time, Okonkwo's fame** had **grown like** a **bush fire** in the **harmattan//**. He was **tall** and **huge**, // and his **bushy eyebrows** and **wide nose gave** him a **very severe look//**. He **breathed heavily**, //and it was **said** that, // **when** he **slept**, //his **wives** and **children** in their out **houses** could **hear** him **breathe//**. **When** he **walked**, // his **heels hardly touched** the **ground** //and he **seemed** to **walk** on **springs**, // as if he was **going** to **pounce** on **somebody//**. And he did **pounce** on **people quite often//**. He had a **slight stammer//** and **whenever** he was **angry** //and could not **get** his **words** out **quickly enough,** // he would **use** his **fists//**.

The **last match** was between the **leaders** of the **teams//.** They were **among** the **best wrestlers** in **all** the **nine villages//**. The **crowd wondered** //who would **throw** the other this **year//**. Some **said// Okafo** was the **better man**;// others **said//** he was not the **equal** of **Ikezue//**.

Dusk was **already approaching// when** their **contest began//**. The **drums went mad//** and the **crowds** also. // They **surged forward//** as the **two young men danced** into the **circle//**. The **palm fronds** were **helpless** in **keeping** them **back//**.

Ikezue held out his **right hand//**. **Okafo seized** it// and they **closed in**//. It was a **fierce contest//**. The **wrestlers** were **now almost still** in each **other's grip//**. The **muscles** on their **thighs** and on their **backs stood out twitched//**. It **looked like** an **equal match//**.

The **two judges** were **already moving forward** to **separate** them// **when Ikezue**, **now desperate, went down quickly** on **one knee** in an **attempt** to **fling** his **man backward** over his **head//**. It was a **sad miscalculation**//. **Quick** as the **lightening** of **Amadiora, Okafo raised** his **right leg**// and **swung** it over his **rival's head//**. The **crowd burst into thunderous roar, // Okafo** was **swept off** his **feet** by his **supporters//** and **carried home shoulder high//**.

Variables:

Total content/lexical items=162

Total Ranking Clauses=46

- **Halliday's (1985b) LD Formula**

$$LD = \frac{Number\ of\ content/lexical\ items}{Number\ of\ ranking\ clauses} \times (10)^{x}$$

Application:

$$LD = \frac{162}{46} \times (10)^{x}$$

LD=35%

Appendix 14: Halliday's (1985b) Lexical Density Analysis-SHS 2 Descriptive Genre (pp338)

The **albatross** has been **described** as "the **grandest living flying machine** on **Earth**", and for a **good reason//**. With a **wingspan** of **three meters**, this **largest** of **all seabirds** can **reach** a **flying speed** of **more than 115 kilometers** an **hour//**. The **albatross** may **appear ungainly** on **land**, // but in the **sky,** it is **simply magnificent** to **behold//.**

Of the **approximately twenty recognized species** of **albatross, some fifteen species** can be **found** in the **ocean waters surrounding New Zealand//**. The **sole mainland breeding colony** in **southern Hemisphere** is **Taiaroa Head**, at the **tip** of the **Otago Peninsula**, on **New Zealand's South Island//.**

There, the **northern royal albatross begins breeding** between the **ages** of **six** and **ten years//. Breeding continues throughout** its **life**, //which can be **quite long//.** Some of these **birds** have been **known** to **live** well over **half** a **century**! // The **albatross lays one egg every second year, spending** the **interim year** at **sea//**. **Customarily**, the **bird stays** with **one partner** for **life//.**

Both the **male** and the **female albatross take part** in **nest building**, //which **begins** in **September//. Then,** in **November,** the **female lays** an **egg//** that may **weigh** up to **500 grams//**. For **some eighty days**, the **parents share in incubating//** until the **egg hatches** in **early February//. Then**, the **parents take turns guarding** and **feeding** the **chick, //** whose **diet consists of** a **regurgitated mush** of **fish** and **squid//**. At **six months** of **age**, the **chick** can **weigh** up to **12 kilograms** – **considerably more than** an **adult albatross**! //

Variables:

Total content/lexical items=151

Total Ranking Clauses=21

- **Halliday's (1985b) LD Formula**

$$LD = \frac{Number\ of\ content/lexical\ items}{Number\ of\ ranking\ clauses} \times (10)^{x}$$

Application:

$$LD = \frac{151}{21} \times (10)^{x}$$

LD=72%

Appendix 15: Halliday's (1985b) Lexical Density Analysis-SHS 3 Descriptive Genre (pp428)

An **estate where fields** of **sugarcane** had **once crept like** an **open secret** across the **land** //had been **converted into** a **village//** that **absorbed some three thousand people//**. An **English landowner, Mr. Creighton**, had **died**,// and the **estate fell to** his **son// through** whom it **passed** to **another son** //who in his **turn died**, **surrendering** it to yet **another//. Generations** had **lived//** and **died** in this **remote corner** of a **small British colony**, the **oldest** and **least adulterated** of **British colonies**: **Barbados** or **Little England//** as it was **called** in the **local school texts//**. To the **east where** the **land rose gently** to a **hill,// there** was a **large brick building surrounded** by a **wood** and a **high stone wall//** that **bore bits** of **bottle** along the **top//**. The **landlords lived there amidst** the **trees** within the **wall//**. **Below** and **around** it, the **land spread out** into a **flat unbroken monotony** of **small houses** and **white marl roads//**. From any **point** of the **land**, one could **see** on a **clear day** the **large brick house hoisted** on the **hill//. When** the **weather wasn't too warm, //tea** was **served** on the **wide flat roof**, //and the **villagers catching sight through** the **trees** of the **shifting figures crept** behind their **fences**,// or **stole through** the **wood away** from the **wall** to **see** //**how** it was **done//**. **Pacing** the **roof,** the **landlord**, **accompanied** by his **friends, indicated** in **all directions** the **limits** of the **land//**. The **friends** were **mainly planters//** whose **estates** in the **country** had **remained agricultural**;// or **otherwise there** were **English visitors//** who were **absentee owners** of the **estates//** which they had **come** to **see//.** The **landlord**, one **gathered**, //**explained** the **layout** of the **land,** the **customs** of the **villagers** and the **duties//** which he **performed as caretaker** of this **estate//.** The **villagers, enthralled** by the **thought** of **tea** in the **open air looked on**, **unseen, open-mouthed//**.

Variables:

Total content/lexical items=169

Total Ranking Clauses=31

- **Halliday's (1985b) LD Formula**

$$LD = \frac{Number\ of\ content/lexical\ items}{Number\ of\ ranking\ clauses} \times (10)^{x}$$

Application:

$$LD = \frac{169}{31} \times (10)^{x}$$

LD=55%

Appendix 16: Halliday's (1985b) Lexical Density Analysis-SHS 1 Expository Genre (pp156)

A **political party** is an **organized group** of **people** //who **control** a **government//**. In **democratic countries**, **political parties compete** against **one another** in **elections** to **keep** or **gain control of** a **government//**. In the **United States** and **Nigeria**, **political parties** are **active** on the **national, state** or **senatorial** and **local levels//**. They **help** in **forming governments** at **national, state** and **local levels//**. **Political parties** are **absolutely necessary** to a **democratic government//**. **Most modern democracies** are **representative democracies//**. That is, //the **people elect representatives** to **act as** their **agents** in **making** and **enforcing laws//**. In a **representative democracy, some primary elections** are **conducted** for **nominating candidates** of **parties' choice//**. **Political parties** are **voluntary organizations//**. They **want** as **many members** as **possible//**. Some of these **parties** have **rules** and **membership dues//**. Others have **particularly no rules** //and **require** no **dues//**.

Most dictatorships allow only one **political party** //– the **party** that **controls** the **government//.** In **communist nations** for **example**, the **communist party** is **always** in **power//.** It **tightly controls//** who may **run for elections//.**

In **democratic countries, political parties perform several important tasks//**. These **tasks include** the **selection** of **candidates** for **public office** and **helping** in the **organization** of the **government//. Political parties also provide opposition** to the **party** in **power** and the **raising** of **funds needed** to **conduct election campaigns//**. **Other functions** of **political parties** in **democracies include informing voters** about **political affairs** and about **problems//** that **need government action//**. In **one-party nations**, the **chief functions** of **political parties** are to **select candidates** for **office** //and to **organize** the **government//.**

Variables:

Total content/lexical items=156

Total Ranking Clauses=27

- **Halliday's (1985b) LD Formula**

$$LD = \frac{Number\ of\ content/lexical\ items}{Number\ of\ ranking\ clauses} \times (10)^{*}$$

Application:

$$LD = \frac{156}{27} \times (10)^{*}$$

LD=58%

Appendix 17: Halliday's (1985b) Lexical Density Analysis-SHS 2 Expository Genre (pp196)

Learning to **speak** one's **language comes naturally** to a **human being**, // we **learn** it without **formal instruction//**. But **writing** is an **unnatural activity**;// it must **be taught formally//** and **studied deliberately//. Indeed**, **many** of the **problems** that **arise** in **learning** to **write** are **simple problems** of **finding proper written equivalent** for the **various features** of **speech//**. The **spelling** of our **words** is a **clumsy attempt** to **produce** the **sound** of our **voices//.** The **punctuation** of our **sentences** and the **settings** of **paragraphs** are **designed** to **give some approximations** of the **pauses** and **intonation//** we **use automatically** to **give shape** and **point** to our **speaking//**.

The **writer** of **English** (or any **other language**) **loses** a **whole world** of **gestures**, **facial expressions** and **tone** of **voice//** the **minute** he **decides** to **write** something// **rather** than **say** it **aloud//**. He **loses** the **immediacy** of **direct contact** with his **audience//**. If **there** were no **compensation** at **all** for all these **disadvantages**,//**then communicating** with **other people through** the **medium** of **squiggles** on **paper** would **be as unsatisfactory as trying** to **wash** your **feet** with your **socks** on//.

Writing takes more effort than speech, //but the **effort** we **make simply** to **capture** our **words** on **paper** //can **also lead** us to **compose things** //that are **worth** the **effort//.** The **unusual energy** that **goes** into **achievement** in any **art** or **sport//** can and should **function finally** to **help** the **individual increase** his **own powers//** and **perfect** his **abilities//**. **Three hundred** and **fifty years ago**, a **clever man pointed out** that **practice** in **speaking makes** a **man ready** or **quick** in his **responses//**. **While practice** in **writing makes** a **man** "**exact**", //it **helps** him to **polish//** and **perfect** his **thoughts//**.

Variables:

Total content/lexical items=158

Total Ranking Clauses=27

- **Halliday's (1985b) LD Formula**

$$LD = \frac{Number\ of\ content/lexical\ items}{Number\ of\ ranking\ clauses} \times (10)^{x}$$

Application:

$$LD = \frac{158}{27} \times (10)^{x}$$

LD=59%

Appendix 18: Halliday's (1985b) Lexical Density Analysis -SHS 3 Expository Genre (pp456)

Delicious dishes have **added flavor//** if they are **home-made//**. With a **little effort**, you can **win** the **love** and **respect** of **relatives** and **friends** with the **preparation** of **white** and **red beans salad//**. It has been my **favorite dish** for **many years//** and I **just needed** to **sit** by **Mom one Saturday** to **pick up** the **method** of **preparation//.**

*To **prepare white** and **red beans salad**, you **need** the **following ingredients**:*

1 milk tin each of **white** and **red beans;**

2 big-sized onions;

3 medium-sized tomatoes;

1 spring onion;

4 heaped dessert spoonfuls of **tuna flakes**;

½ teaspoonful of **black** or **red pepper**;

1 teaspoonful of **cooking oil;**

and 2 teaspoonful of **vinegar**.//

Having got these **ingredients,** you are **set** to **making** a **tasty beans salad//. First,** you **pour** the **white** and **red beans** into **two separate bowls** //and **sort out foreign particles//**. That **done**, **soak** the **beans** for between **four** and **six hours**, **again separately//**. Then **drain** the **water//** and **boil** with **salt separately// till** they are **soft//**.

You **then drain** the **cooked beans//** and **pour into separate plates** for **some three minutes//. Cut** the **onions** and **tomatoes** into **thin slices**, // also **slice** the **spring onions** into **tiny pieces//**. You've **now got** to the **point** of **mixing//. Pour** the **white** and **red beans** into a **bowl//** and **mix together//. Next**, **blend** your **mixture** with the **chopped onions** and **tomatoes//. Then whip** the **vinegar** and **cooking oil** to **mix thoroughly//** and **gently add** it to the **beans//.**

Finally, sprinkle black or **red pepper** on the **tuna flakes//** and **add to beans//. Spread chopped spring onions** to **make** your **beans salad look** and **taste better//**. You are **through with** your **white** and **red beans salad//** and **ready** to **serve** with **cooked rice** and **fried plantain//. Pull** a **chair towards** the **table//** and **enjoy** a **really delicious meal//**.

Variables:

Total content/lexical items=187

Total Ranking Clauses=30

- **Halliday's (1985b) LD Formula**

$$LD = \frac{Number\ of\ content/lexical\ items}{Number\ of\ ranking\ clauses} \times (10)^{x}$$

Application:

$$LD = \frac{187}{30} \times (10)^{x}$$

LD=62%

In sum, Halliday's (1985b) Lexical Density Formular has been applied to all the 45 texts under study. The 9 sample analysis here are however for illustration. The LD computational values for each of the nine (9) texts using Halliday's (1985b) formular have been determined in percentage terms as can be seen in the foregoing analysis. These computational values are collated for the graphic analysis of data.

Appendix 19: Gunning's (1952) Readability Analysis-SHS 1 Narrative Genre (pp7)

KEY:

Bold print (B) =3+ Syllable words/complex words**;**

//=sentence boundaries

NB:

1. The Gunning Fog Index is what is used to determine the complex words in this analysis. Some words identified as complex or having three or more syllables using this formula, do not necessarily agree with other mechanisms for determining complex words. For example, in the Online Syllable Dictionary, "married" and "marriage" are classified as di-syllabic words and therefore not complex words whilst the Gunning Fog Index classifies them as tri-syllabic and therefore complex words.

2. The Gunning Fog Index is calculated out of 100.Therefore results are expressed in percentage terms to the nearest whole number.

Jane, a 28 year old **secretary**, working in one of the new banks in **Calabar** was filled with **ecstasy** the moment she got **married** to John. // She changed her **lifestyle** and quickly **realized** that her husband and children will demand **attention** which she must give. // She also told herself that she would no longer go **everywhere** and do **everything** she liked without due regard to the **interest** of her husband and children. //

The early years of her **marriage** had been **characterized** by **turbulence** between her and her husband.//Their **difference** in **upbringing** had **aggravated** their **uneasy relationship**.// Her husband was a product of a broken home.// His parents were **financially** poor, but his mother had struggled to give him a **university education**.// He grew up a reckless man who didn't care for the feelings of others.// Jane grew up in a **reasonably** wealthy and loving **family**.// The **incompatibility** drove a wedge between them and made their **relationship** fragile.//

Her earnest desire in **marriage** was to have a secure home.// Therefore, she guarded her home with a fierce **determination** and she wouldn't be **satisfied** with half measures.// She made sure that there was a cordial **relationship** between her, her **father-in-law** and **mother-in-law**, who were sometimes **determined** to break up her marriage.// Therefore, she fought **prejudice**, **misunderstanding**, envy and the **opposition** of her in-laws, **especially** those from her husband's siblings.// Jane had to grapple along with routine **domestic** chores like **tidying** up the home, **preparing** the children for school, shopping for the **family** needs and **entertaining** the guests for the **family**. //This daily task of **housekeeping,** coupled with office work, left her **exhausted** and weary at the end of almost **every** day. // She always bore the guilt feeling as she dropped her child off at a day care center each morning. //

On this **particular** day, she managed to close at about six o'clock, with a grudging **permission** by her boss who was always **overdrawing** her.// This made her to drive with reckless speed, changing lane now and then as she sought the fastest moving lane.// She drove as one under tension, because her one year old daughter left at the day care center in her **neighborhood** was the last to be picked up.// On reaching there, she **discovered** that her daughter had cried herself out, **refusing** to take her milk and be **comforted**.// Jane rushed out of the car, hugged and kissed her.//

The fear of the future had deepened the **emotional** pressure on Jane: what would be the future of her marriage? //What would be the future of her children's welfare? // Her **uncertainty** of **tomorrow** had forced her to hold **tenaciously** to her **employment** at the expense of **parenting**. //

Variables:

Total words=448;

3+ syllable words/complex words=57;

Total sentences=25

Gunning's (1952) Readability Formula (Gunning Fog Index- GFI)

$0.4 \times [(\frac{Total\ words}{Total\ sentences}(+100)\frac{Complex\ Words}{Total\ Words})]$

NB: Complex words are words with 3 or more syllables.

Application:

GFI= $0.4 \times [(\frac{448}{25}) +100)\frac{57}{448})]$

GFI= 12%

Appendix 20: Gunning's (1952) Readability Analysis-SHS 2 Narrative Genre (pp337)

One day a neighbor called Okoye came in to see **Unoka.**// He was **reclining** on a mud bed in his hut playing on the flute.// He **immediately** rose and shook hands with **Okoye**, who then unrolled the goatskin which he carried under his arm, and sat down.// **Unoka** went into an inner room and soon returned with a small wooden disc **containing** a kola nut, some **alligator** pepper and a lump of white chalk.//

'I have kola,' he announced when he sat down, and passed the disc over to his guest.// 'Thank you. //He who brings kola brings life. //But I think you ought to break it' replied **Okoye** passing back the disc.//

'No, it is for you, I think' and they argued like this for a few moments before **Unoka** accepted the honor of breaking the kola.// **Okoye**, meanwhile, took the lump of chalk, drew some lines on the floor, and then painted his big toe. //As he broke the kola, **Unoka** prayed to their ancestors for life and health, and for **protection** against their **enemies**.//When they had eaten, they talked about many things, about the impending war with the village of **Mbiano.** //**Unoka** was never happy when it came to wars.// He was in fact a coward and could not bear the sight of blood.// And so he changed the subject and talked about music, and his face beamed.// He could hear in his mind's ear the blood-stirring and **intricate** rhythms of the Ekwe and the Udu and the Ogene, and he could hear his own flute weaving in and out of them, **decorating** them with a colorful and plaintive tune.// The total effect was gay and brisk, but if one picked out the flute as it went up and down and then broke up into short snatches, one saw that there was sorrow and grief there.//

Variables:

Total words =310;

3+ syllable words/complex words=17;

Total sentences=17

Gunning's (1952) Readability Formula (Gunning Fog Index- GFI)

$0.4 \times [(\frac{Total\ words}{Total\ sentences}(+100)\frac{Complex\ Words}{Total\ Words})]$

NB: Complex words are words with 3 or more syllables.

Application:

GFI= $0.4 \times [(\frac{310}{17}) +100)\frac{17}{310})]$

GFI= 9%

Appendix 21: Gunning's (1952) Readability Analysis-SHS 3 Narrative Genre (pp406)

In what appears to be a price to pay for ignoring **persistent** appeals to form a **neighborhood** watchdog **committee**, our **Bantama residence** was burgled on the night of 20th May, 2012.// This took place when I was the only person left home.//

My parents were away from home on a two-day visit to Accra to transact **business**.// My two **elderly** brothers had also gone to our **hometown** to visit our ailing **grandmother.**// I felt **lonely** and bored at home and was thinking of a way to while away time.//Just then, Joe, a good friend of mine came round with **information** that Ghana **Breweries** Limited was launching a new malt drink. //The venue was the cosy and **spacious Adehyeman** Gardens.//

Within ten minutes of Joe's **arrival,** we were on our way to exploit this **opportunity** to dance and have fun all night at no cost.//At 12.45am, it dawned on me that Daddy had given me strict **instructions** not to wander away from home. // My friend frowned on the **idea** of our leaving so soon when I explained the **situation** to him.// I took a taxi and left him there.//

I stepped into our compound at **exactly** 1.30am and **immediately** felt the presence of people in the house.// After closing the main gate, I realized that Spark, our **Alsatian** dog, had been shot in the head and was lying in a pool of blood.// The door to the living room had also been forced open.// I mustered courage and entered only to burst upon three men **busily** packing our **belongings** into a huge box.// These included a Samsung LCD **television**, with **serial** number 077226628, a **Sanyo** DVD player with **serial** number 6224802.// Also removed were a Samsung **Galaxy** tablet, a Philips washing machine, a **Toshiba audio** system and a wall clock.//

The robbers were hooded and appeared **panicky** on seeing me.// A warning shot was fired.// One of them limped towards me and stopped within striking distance.// I tore the mask off his face, and realized that he looked **familiar**.// **However**, I cannot **recollect** where I knew him.// He was shaven to the skull and spotted a long beard. I also noticed a large scar on his **forehead**. He bared his teeth and gave me a **power-laden** blow.// The last thing I saw of him was a **cola-stained** teeth.//

I regained **consciousness** sooner than expected but realized that my **safety** lay in making them take me for dead or **unconscious**.// They began using names.//I heard one say, "**Foreman**, let's move". //Two whispered in an **unfamiliar dialect** but the names **Bashiru** and Mojo filtered through.// A vehicle moved into the compound and the huge box was **carried** out of the living room by four stocky men.// Two others held the main gate wide open as the vehicle passed through.// Then they jumped into it.// **Luckily,** I saw the **registration** number of the vehicle as BT 7062 K and it looked very much like a **Mitsubishi** pick-up.//

After their **departure**, I rang the police but they arrived too late to meet them or set up road blocks to frustrate their escape.//

Variables:

Total words =520;

3+ syllable words/complex words=50;

Total sentences=35

Gunning's (1952) Readability Formula (Gunning Fog Index- GFI)

$0.4 \times [(\frac{Total\ words}{Total\ sentences}(+100)\frac{Complex\ Words}{Total\ Words})]$

NB: Complex words are words with 3 or more syllables.

Application:

GFI= $0.4 \times [(\frac{520}{35}) +100)\frac{50}{520})]$

GFI= 10%

Appendix 22: Gunning's (1952) Readability Analysis-SHS 1 Descriptive Genre (pp52)

During this time **Okonkwo's** fame had grown like a bush fire in the **harmattan**.// He was tall and huge, and his bushy **eyebrows** and wide nose gave him a very severe look.// He breathed **heavily,** and it was said that, when he slept, his wives and children in their out houses could hear him breathe.// When he walked, his heels hardly touched the ground and he seemed to walk on springs, as if he was going to pounce on **somebody**.// And he did pounce on people quite often.// He had a slight stammer and **whenever** he was angry and could not get his words out **quickly** enough, he would use his fists.//

The last match was between the leaders of the teams. //They were among the best wrestlers in all the nine villages.// The crowd wondered who would throw the other this year. // Some said **Okafo** was the better man; others said he was not the **equal** of **Ikezue**.//

Dusk was **already** approaching when their contest began.// The drums went mad and the crowds also.// They surged forward as the two young men danced into the circle.// The palm fronds were helpless in keeping them back.//

Ikezue held out his right hand. **Okafo** seized it and they closed in.// It was a fierce contest.// The wrestlers were now almost still in each other's grip. //The muscles on their thighs and on their backs stood out twitched. It looked like an **equal** match.//

The two judges were **already** moving forward to **separate** them when **Ikezue**, now **desperate,** went down **quickly** on one knee in an attempt to fling his man backward over his head.// It was a sad **miscalculation.**// Quick as the lightening of **Amadiora, Okafo** raised his right leg and swung it over his rival's head.// The crowd burst into **thunderous** roar, **Okafo** was swept off his feet by his **supporters** and **carried** home shoulder high.//

Variables:

Total words =316;

3+ syllable words/complex words=26;

Total sentences=24

Gunning's (1952) Readability Formula (Gunning Fog Index- GFI)

$0.4 \times [(\frac{Total\ words}{Total\ sentences}) + 100\ )\frac{Complex\ Words}{Total\ Words})]$

NB: Complex words are words with 3 or more syllables.

Application:

$GFI = 0.4 \times [(\frac{316}{24}) + 100\ )\frac{26}{316})]$

GFI= 9%

Appendix 23: Gunning's (1952) Readability Analysis-SHS 2 Descriptive Genre (pp338)

The **albatross** has been described as "the grandest living flying machine on Earth", and for a good reason.// With a wingspan of three meters, this largest of all seabirds can reach a flying speed of more than 115 **kilometers** an hour.// The **albatross** may appear **ungainly** on land, but in the sky, it is simply **magnificent** to behold.//

Of the **approximately** twenty **recognized** species of **albatross,** some fifteen species can be found in the ocean waters surrounding New Zealand.// The sole mainland breeding **colony** in southern **Hemisphere** is **Taiaroa** Head, at the tip of the **Otago Peninsula**, on New Zealand's South Island.//

There, the northern royal **albatross** begins breeding between the ages of six and ten years.// Breeding **continues** throughout its life, which can be quite long.// Some of these birds have been known to live well over half a **century**! //The **albatross** lays one egg **every** second year spending the **interim** year at sea.// **Customarily**, the bird stays with one partner for life.//

Both the male and the female **albatross** take part in nest building, which begins in **September.** //Then, in **November**, the female lays an egg that may weigh up to 500 grams.// For some eighty days, the parents share in **incubating** until the egg hatches in early **February.**// Then, the parents take turns guarding and feeding the chick, whose diet consists of a **regurgitated** mush of fish and squid.// At six months of age, the chick can weigh up to 12 **kilograms** – **considerably** more than an adult **albatross**!//

Variables:

Total words =251;

3+ syllable words/complex words=29;

Total sentences=15

Gunning's (1952) Readability Formula (Gunning Fog Index- GFI)

$0.4 \times [(\frac{Total\ words}{Total\ sentences}) + 100\ )\frac{Complex\ Words}{Total\ Words})]$

NB: Complex words are words with 3 or more syllables.

Application:

$GFI = 0.4 \times [(\frac{251}{15}) + 100\ )\frac{29}{251})]$

GFI= 11%

Appendix 24: Gunning's (1952) Readability Analysis-SHS 3 Descriptive Genre (pp428)

An estate where fields of **sugarcane** had once crept like an open secret across the land had been converted into a village that absorbed some three thousand people.// An English **landowner**, Mr. Creighton, had died, and the estate fell to his son through whom it passed to **another** son who in his turn died, **surrendering** it to yet **another**.// **Generations** had lived and died in this remote corner of a small British **colony**, the oldest and least **adulterated** of British **colonies**: **Barbados** or Little England as it was called in the local school texts.// To the east where the land rose gently to a hill, there was a large brick building surrounded by a wood and a high stone wall that bore bits of bottle along the top.// The landlords lived there amidst the trees within the wall.// Below and around it, the land spread out into a flat **unbroken monotony** of small houses and white marl roads.// From any point of the land, one could see on a clear day the large brick house hoisted on the hill.// When the weather wasn't too warm, tea was served on the wide flat roof, and the **villagers** catching sight through the trees of the shifting figures crept behind their fences, or stole through the wood away from the wall to see how it was done.// Pacing the roof, the landlord, **accompanied** by his friends, **indicated** in all **directions** the limits of the land.// The friends were mainly planters whose estates in the country had remained **agricultural**; or **otherwise** there were English **visitors** who were **absentee** owners of the estates which they had come to see.// The landlord, one gathered, explained the layout of the land, the customs of the **villagers** and the duties which he performed as **caretaker** of this estate. //The **villagers** enthralled by the thought of tea in the open air looked on, unseen, **open-mouthed**.//

Variables:

Total words =316;

3+ syllable words/complex words=24;

Total sentences=12

Gunning's (1952) Readability Formula (Gunning Fog Index- GFI)

$0.4 \times [(\frac{Total\ words}{Total\ sentences}) + 100\ )\frac{Complex\ Words}{Total\ Words})]$

NB: Complex words are words with 3 or more syllables.

Application:

GFI= $0.4 \times [(\frac{316}{12}) + 100\ )\frac{24}{316})]$

GFI= 14%

Appendix 25: Gunning's (1952) Readability Analysis-SHS 1 Expository Genre (pp156)

A **political** party is an **organized** group of people who control a **government**.// In **democratic** countries, **political** parties compete against one **another** in **elections** to keep or gain control of a **government**.// In the United States and **Nigeria**, **political** parties are active on the **national**, state or **senatoria**l and local levels.// They help in forming **governments** at **national,** state and local levels.//

Political parties are **absolutely necessary** to a **democratic government**.// Most modern **democracies** are **representative democracies**.// That is, the people elect **representatives** to act as their agents in making and enforcing laws. //In a **representative democracy**, some **primary elections** are conducted for **nominating candidates** of parties' choice.// **Political** parties are **voluntary organizations**.// They want as many members as possible.//Some of these parties have rules and **membership** dues.// Others have **particularly** no rules and **require** no dues.//

Most **dictatorships** allow only one **political** party – the party that controls the **governmen**t.// In **communist** nations for example, the **communist** party is always in power.// It tightly controls who may run for **elections.**//

In **democratic** countries, **political** parties perform **several importan**t tasks.// These tasks include the **selection** of **candidates** for public office and helping in the **organization** of the **government**.// **Political** parties also provide **opposition** to the party in power and the raising of funds needed to conduct **election** campaigns.// Other functions of **political** parties in **democracies** include informing voters about **political** affairs and about problems that need **government** action.//In **one-party** nations, the chief functions of **political** parties are to select **candidates** for office and to **organize** the **government**.//

Variables:

Total words =258;

3+ syllable words/complex words=61;

Total sentences=20

Gunning's (1952) Readability Formula (Gunning Fog Index- GFI)

$0.4 \times [(\frac{Total\ words}{Total\ sentences}) + 100\ )\frac{Complex\ Words}{Total\ Words})]$

NB: Complex words are words with 3 or more syllables.

Application:

GFI= $0.4 \times [(\frac{258}{20}) + 100\ )\frac{61}{258})]$

GFI= 15%

Appendix 26: Gunning's (1952) Readability Analysis-SHS 2 Expository Genre (pp196)

Learning to speak one's **language** comes **naturally** to a human being, we learn it without formal **instruction**.// But writing is an **unnatural activity**; it must be taught **formally** and **studied deliberately**.// Indeed, many of the problems that arise in learning to write are simple problems of finding proper written **equivalent** for the **various** features of speech.// The spelling of our words is a clumsy attempt to produce the sound of our voices.// The **punctuation** of our sentences and the settings of **paragraphs** are designed to give some **approximations** of the pauses and **intonation** we use **automatically** to give shape and point to our speaking.//

The writer of English (or any other **language**) loses a whole world of gestures, **facial expressions** and tone of voice the minute he decides to write something rather than say it aloud.// He loses the **immediacy** of direct contact with his **audience**.// If there were no **compensation** at all for all these **disadvantages**, then **communicating** with other people through the **medium** of squiggles on paper would be as **unsatisfactory** as trying to wash your feet with your socks on.//

Writing takes more effort than speech, but the effort we make simply to capture our words on paper can also lead us to compose things that are worth the effort.// The **unusual energy** that goes into **achievement** in any art or sport can and should function **finally** to help the **individual** increase his own powers and perfect his **abilities**.// Three hundred and fifty years ago, a clever man pointed out that practice in speaking makes a man ready or quick in his responses**.**// While practice in writing makes a man "**exact**", it helps him to polish and perfect his thoughts.//

Variables:

Total words =283;

3+ syllable words/complex words=32;

Total sentences=12

Gunning's (1952) Readability Formula (Gunning Fog Index- GFI)

$0.4 \times [(\frac{Total\ words}{Total\ sentences}) + 100\ )\frac{Complex\ Words}{Total\ Words})]$

NB: Complex words are words with 3 or more syllables.

Application:

GFI= $0.4 \times [(\frac{283}{12}) + 100\ )\frac{32}{283})]$

GFI= 14%

Appendix 27: Gunning's (1952) Readability Analysis-SHS 3 Expository Genre (pp456)

Delicious dishes have added flavor if they are home-made.// With a little effort, you can win the love and respect of **relatives** and friends with the **preparation** of white and red beans salad.// It has been my **favorite** dish for many years and I just needed to sit by Mom one **Saturday** to pick up the method of **preparation.**//

To prepare white and red beans salad, you need the following **ingredients**:

1 milk tin each of white and red beans;
2 big-sized onions;
3 **medium-sized tomatoes**;
1 spring onion;
4 heaped dessert spoonfuls of tuna flakes;
½ **teaspoonful** of black or red pepper;
1 **teaspoonful** of cooking oil;
and 2 **teaspoonful** of **vinegar**.//

Having got these **ingredients,** you are set to making a tasty beans salad.// First, you pour the white and red beans into two **separate** bowls and sort out foreign particles.// That done, soak the beans for between four and six hours, again **separately**.// Then drain the water and boil with salt **separately** till they are soft.//

You then drain the cooked beans and pour into **separate** plates for some three minutes.// Cut the onions and **tomatoes** into thin slices, also slice the spring onions into tiny pieces.// You've now got to the point of mixing.// Pour the white and red beans into a bowl and mix **together.**// Next, blend your mixture with the chopped onions and **tomatoes**.// Then whip the **vinegar** and cooking oil to mix **thoroughly** and gently add it to the beans. //

Finally, sprinkle black or red pepper on the tuna flakes and add to beans.// Spread chopped spring onions to make your beans salad look and taste better.// You are through with your white and red beans salad and ready to serve with cooked rice and fried plantain.// Pull a chair towards the table and enjoy a really **delicious** meal.//

Variables:

Total words =306;

3+ syllable words/complex words=25;

Total sentences=17

Gunning's (1952) Readability Formula (Gunning Fog Index- GFI)

$0.4 \times [(\frac{Total\ words}{Total\ sentences}) + 100\ )\frac{Complex\ Words}{Total\ Words})]$

NB: Complex words are words with 3 or more syllables.

Application:

$GFI = 0.4 \times [(\frac{306}{17}) + 100\ )\frac{25}{306})]$

GFI= 10%

In sum, Gunning's (1952) Readability Formular has been applied to all the 45 texts under study. The 9 sample analysis here are for illustration. The readability computational values for each of the nine (9) texts using Gunning's (1952) formular have been determined in percentage terms as can be seen in the foregoing analysis. These computational values are collated for the graphic analysis of data.

Appendix 28: Flesch's (1948) Readability Analysis-SHS 1 Narrative Genre (pp7)

KEY:

FKGL=Flesch Kincaid Grade Level (calculated using Microsoft Word);

/=syllable boundaries;

//=sentence boundaries.

NB: The Flesch Kincaid Grade Level is used in determining total number of syllables here. To determine total number of syllables in a text using the Flesch Kincaid Grade Level;

1. Divide total number of words by total number of sentences to get Average Sentence Length (ASL).
2. Multiply the result by 0.39.
3. Subtract the result from the FKGL.
4. Add 15.59 to the result.
5. Divide the sum (result) by 11.8 to get Average number of Syllables per Word (ASW).
6. Multiply the ASW by total number of words.
7. Round the result to the nearest whole number, and that figure is the total Number of syllables in the text.

(Flesch 1948)

NB: The breakdown of words into syllables here is done using the Online Syllable Dictionary. Unlike Gunning (1952) which provides the Gunning Fog Index for determining complex words, Flesch (1948) provides no mechanism for breaking words down into syllables. He only makes reference to total number of syllables in the formula and since the widely accepted resource for syllabic breakdown in contemporary syntax is the Online Syllable Dictionary, that is what informs my choice of this resource for the analysis in this section. The syllable count using the Online Syllable Dictionary may therefore differ from that using the FKGL. However, the FKGL figure shall be used to calculate readability.

Jane, a 28 year old sec/re/tar/y, wor/king in one of the new banks in Ca/la/bar was filled with ec/sta/sy the mo/ment she got mar/ried to John.// She changed her life/style and quick/ly re/al/ized that her hus/band and chil/dren will de/mand at/ten/tion which she must give.// She al/so told her/self that she would no long/er go e/very/where and do e/very/thing she liked with/out due re/gard to the in/ter/est of her hus/band and chil/dren.//

The ear/ly years of her ma/rri/age had been char/ac/ter/ized by tur/bu/lence be/tween her and her hus/band.//Their dif/fer/ence in up/bring/ing had ag/gra/vat/ed their un/eas/y re/la/tion/ship.// Her hus/band was a prod/uct of a bro/ken home.// His par/ents were fi/nan/cial/ly poor, but his moth/er had strug/gled to give him a u/ni/ver/si/ty ed/u/ca/tion.// He grew up a reck/less man who didn't care for the fee/lings of oth/ers.// Jane grew up in a rea/son/a/bly wealth/y and lov/ing fam/i/ly.// The in/com/pat/i/bil/i/ty drove a wedge be/tween them and made their re/la/tion/ship frag/ile.//

Her ear/nest de/sire in mar/riage was to have a se/cure home.// There/fore, she guard/ed her home with a fierce de/ter/mi/na/tion and she wouldn't be sat/is/fied with half mea/sures.// She made sure that there was a cor/dial re/la/tion/ship be/tween her, her fath/er/-in-/law and moth/er/-in-/law, who were some/times de/ter/mined to break up her mar/riage.// There/fore, she fought prej/u/dice, mis/un/der/stand/ing, en/vy and the op/po/si/tion of her in/-laws, es/pe/cial/ly those from her hus/band's sib/lings.// Jane had to grap/ple a/long with rou/tine do/mes/tic chores like ti/dy/ing up the home, pre/par/ing the chil/dren for school,

shop/ping for the fam/i/ly needs and en/ter/tain/ing the guests for the fam/i/ly. //This dai/ly task of house/keep/ing, coupled with of/fice work, left her ex/haust/ed and wea/ry at the end of al/most eve/ry day.// She al/ways bore the guilt feel/ing as she dropped her child off at a day care cen/ter each morn/ing.//

On this par/tic/u/lar day, she man/aged to close at a/bout six o'/clock, with a grudg/ing per/mis/sion by her boss who was al/ways o/ver/draw/ing her.// This made her to drive with reck/less speed, chang/ing lane now and then as she sought the fast/est mov/ing lane.// She drove as one un/der ten/sion, be/cause her one year old daugh/ter left at the day care cen/ter in her neigh/bor/hood was the last to be picked up.// On reach/ing there, she dis/cov/ered that her daugh/ter had cried her/self out, re/fus/ing to take her milk and be com/fort/ed.// Jane rushed out of the car, hugged and kissed her.//

The fear of the fu/ture had dee/pened the e/mo/tio/nal pre/ssure on Jane: what would be the fu/ture of her mar/riage?// What would be the fu/ture of her chil/dren's wel/fare?// Her un/cer/tain/ty of to/mor/row had forced her to hold te/na/cious/ly to her em/ploy/ment at the ex/pense of par/ent/ing.//

Variables:
Total words =448;
Total syllables= 594 ;
Total sentences=25;
FKGL=9.4

Flesch's (1948) Reading Ease (FRE)/Readability Formula

FRE = 206.835 – (1.015 x ASL) – (84.6 x ASW)

ASL=Average sentence length

ASW=Average number of syllables per word

FRE= 77%

Appendix 29: Flesch's (1948) Readability Analysis-SHS 2 Narrative Genre (pp337)

One day a neigh/bor called O/ko/ye came in to see U/no/ka.// He was re/clin/ing on a mud bed in his hut play/ing on the flute.// He im/me/di/ate/ly rose and shook hands with O/ko/ye, who then un/rolled the goat/skin which he car/ried un/der his arm, and sat down.// U/no/ka went in/to an in/ner room and soon re/turned with a small wood/en disc con/tain/ing a ko/la nut, some al/li/ga/tor pep/per and a lump of white chalk.//

'I have ko/la,' he an/nounced when he sat down, and passed the disc o/ver to his guest.// 'Thank you. //He who brings ko/la brings life. //But I think you ought to break it',re/plied O/ko/ye pass/ing back the disc.//

'No, it is for you, I think' and they ar/gued like this for a few mo/ments be/fore U/no/ka ac/cept/ed the honor of break/ing the ko/la.// O/ko/ye, mean/while, took the lump of chalk, drew some lines on the floor, and then paint/ed his big toe. //As he broke the ko/la, U/no/ka prayed to their an/ces/tors for life and health, and for pro/tec/tion a/gainst their en/e/mies.// When they had eat/en, they talked a/bout many things, about the im/pend/ing war with the vil/lage of M/bia/no. //U/no/ka was nev/er hap/py when it came to wars.// He was in fact a cow/ard and could not bear the sight of blood.// And so he changed the sub/ject and talked a/bout mu/sic, and his face beamed.// He could hear in his mind's ear the blood/-stir/ring and in/tri/cate rhythms of the E/kwe and the U/du and the O/gene, and he could hear his own flute weav/ing in and out of them, dec/o/rat/ing them with a col/or/ful and plain/tive tune.// The to/tal ef/fect was gay and brisk, but if one picked out the flute as it went up and down and then broke up into short snat/ches, one saw that there was sor/row and grief there.//

Variables:

Total words =310;

Total syllables=409;

Total sentences=17;

FKGL=6.8

Flesch's (1948) Reading Ease (FRE)/Readability Formula

FRE = 206.835 – (1.015 x ASL) – (84.6 x ASW)

ASL=Average sentence length

ASW=Average number of syllables per word

FRE= 77%

Appendix 30: Flesch's (1948) Readability Analysis-SHS 3 Narrative Genre (pp406)

In what ap/pears to be a price to pay for ig/nor/ing per/sist/ent ap/peals to form a neigh/bor/hood watch/dog com/mit/tee, our Ban/ta/ma re/si/dence was burgled on the night of 20th May, 2012.// This took place when I was the on/ly per/son left home.//

My par/ents were a/way from home on a two/-day vi/sit to Ac/cra to tran/sact busi/ness.// My two el/der/ly broth/ers had al/so gone to our home/town to vi/sit our ail/ing grand/moth/er.// I felt lone/ly and bored at home and was think/ing of a way to while a/way time.//Just then, Joe, a good friend of mine came round with in/for/ma/tion that Gha/na Brew/er/ies Lim/it/ed was launch/ing a new malt drink. //The ven/ue was the co/sy and spa/cious A/de/hye/man Gar/dens.//

With/in ten min/utes of Joe's ar/ri/val, we were on our way to ex/ploit this op/por/tu/ni/ty to dance and have fun all night at no cost.//At 12.45am, it dawned on me that Dad/dy had giv/en me strict in/struc/tions not to wan/der a/way from home. // My friend frowned on the i/de/a of our leav/ing so soon when I ex/plained the si/tua/tion to him.// I took a tax/i and left him there.//

I stepped in/to our com/pound at ex/act/ly 1.30am and im/me/di/ate/ly felt the pres/ence of peo/ple in the house.// Af/ter clos/ing the main gate, I re/al/ized that Spark, our Al/sa/tian dog, had been shot in the head and was ly/ing in a pool of blood.// The door to the liv/ing room had al/so been forced o/pen.// I must/ered cour/age and en/tered on/ly to burst up/on three men bus/i/ly pack/ing our be/long/ings in/to a huge box.// These in/clud/ed a Sam/sung LCD tel/e/vi/sion, with se/ri/al num/ber 077226628, a San/yo DVD play/er with se/ri/al num/ber 6224802.// Al/so re/moved were a Sam/sung Ga/la/xy tab/let, a Phi/lips wash/ing ma/chine, a To/shi/ba au/di/o sys/tem and a wall clock.//

The rob/bers were hood/ed and ap/peared pan/ick/y on see/ing me.// A warn/ing shot was fired.// One of them limped to/wards me and stopped with/in strik/ing dis/tance.// I tore the mask off his face, and re/al/ized that he looked fa/mil/iar.// How/ev/er, I can/not rec/ol/lect where I knew him.// He was shav/en to the skull and spot/ted a long beard. I al/so no/ticed a large scar on his fore/head. He bared his teeth and gave me a pow/er/-lad/en blow.// The last thing I saw of him was a co/la-stained teeth.//

I re/gained con/scious/ness soon/er than ex/pec/ted but re/al/ized that my safe/ty lay in mak/ing them take me for dead or un/con/scious.// They be/gan us/ing names.//I heard one say, "Fore/man, let's move".//Two whis/pered in an un/fa/mil/iar di/a/lect but the names Ba/shi/ru and Mo/jo fil/tered through.// A ve/hi/cle moved in/to the com/pound and the huge box was car/ried out of the liv/ing room by four stock/y men.// Two oth/ers held the main gate wide o/pen as the ve/hi/cle passed through.//Then they jumped in/to it.// Luck/i/ly, I saw the re/gis/tra/tion num/ber of the ve/hi/cle as BT 7062 K and it looked very much like a Mi/tsu/bi/shi pick/-up.//

Af/ter their de/par/ture, I rang the po/lice but they ar/rived too late to meet them or set up road blocks to frus/trate their es/cape.//

Variables:

Total words =520;

Total syllables=689;

Total sentences=35;

FKGL=7.5

Flesch's (1948) Reading Ease (FRE)/Readability Formula

FRE = 206.835 – (1.015 x ASL) – (84.6 x ASW)

ASL=Average sentence length

ASW=Average number of syllables per word

FRE= 80%

Appendix 31: Flesch's (1948) Readability Analysis-SHS 1 Descriptive Genre (pp52)

Du/ring this time O/kon/kwo's fame had grown like a bush fire in the har/mat/tan.// He was tall and huge, and his bu/shy eye/brows and wide nose gave him a very se/vere look.// He breathed heav/i/ly, and it was said that, when he slept, his wives and chil/dren in their out hous/es could hear him breathe.// When he walked, his heels hard/ly touched the ground and he seemed to walk on springs, as if he was go/ing to pounce on some/body.// And he did pounce on peo/ple quite of/ten.// He had a slight stam/mer and when/ev/er he was an/gry and could not get his words out quick/ly e/nough, he would use his fists.//

The last match was be/tween the lead/ers of the teams. //They were a/mong the best wrest/lers in all the nine vil/lag/es.// The crowd wond/ered who would throw the oth/er this year. // Some said O/ka/fo was the bet/ter man; oth/ers said he was not the e/qual of I/ke/zue.//

Dusk was al/read/y ap/proach/ing when their con/test be/gan.// The drums went mad and the crowds al/so.// They surged for/ward as the two young men danced into the cir/cle.// The palm fronds were help/less in keep/ing them back.//

I/ke/zue held out his right hand. O/ka/fo seized it and they closed in.// It was a fierce con/test.// The wrest/lers were now al/most still in each oth/er's grip. //The mus/cles on their thighs and on their backs stood out twitched. It looked like an e/qual match.//

The two judg/es were al/read/y mov/ing for/ward to sep/a/rate them when I/ke/zue, now des/per/ate, went down quick/ly on one knee in an at/tempt to fling his man back/ward o/ver his head.// It was a sad mis/cal/cu/la/tion.// Quick as the light/ning of Ama/dio/ra, O/ka/fo raised his right leg and swung it o/ver his ri/val's head.// The crowd burst in/to thun/der/ous roar, O/ka/fo was swept off his feet by his sup/por/ters and car/ried home shoul/der high.//

Variables:
Total words =316;
Total syllables=417;
Total sentences=24;
FKGL=4.9

Flesch's (1948) Reading Ease (FRE)/Readability Formula

FRE = 206.835 – (1.015 x ASL) – (84.6 x ASW)

ASL=Average sentence length

ASW=Average number of syllables per word

FRE= 83%

Appendix 32: Flesch's (1948) Readability Analysis-SHS 2 Descriptive Genre (pp338)

The al/ba/tross has been de/scribed as "the grand/est liv/ing fly/ing ma/chine on Earth", and for a good rea/son.// With a wing/span of three me/ters, this larg/est of all sea/birds can reach a fly/ing speed of more than 115 kil/o/me/ters an hour.// The al/ba/tross may ap/pear un/gain/ly on land, but in the sky, it is simp/ly mag/ni/fi/cent to be/hold.//

Of the ap/prox/i/mate/ly twen/ty re/cog/nized spe/cies of al/ba/tross, some fif/teen spe/cies can be found in the o/cean wa/ters sur/round/ing New Zea/land.// The sole main/land breed/ing co/lo/ny in south/ern He/mis/phere is Ta/ia/roa Head, at the tip of the O/ta/go Pe/nin/sula, on New Zea/land's South Is/land.//

There, the north/ern ro/yal al/ba/tross be/gins breed/ing be/tween the ag/es of six and ten years.// Breed/ing con/ti/nues through/out its life, which can be quite long.// Some of these birds have been known to live well o/ver half a cen/tu/ry! //The al/ba/tross lays one egg e/very sec/ond year spend/ing the in/ter/im year at sea.// Cus/tom/ar/i/ly, the bird stays with one part/ner for life.//

Both the male and the fe/male al/ba/tross take part in nest build/ing, which be/gins in Sep/tem/ber. //Then, in No/vem/ber, the fe/male lays an egg that may weigh up to 500 grams.// For some eight/y days, the par/ents share in in/cu/bat/ing un/til the egg ha/tches in ear/ly Feb/ru/ar/y.// Then, the par/ents take turns guard/ing and feed/ing the chick, whose di/et con/sists of a re/gur/gi/tat/ed mush of fish and squid.// At six months of age, the chick can weigh up to 12 ki/lo/grams – con/sid/er/a/bly more than an adult al/ba/tross!//

Variables:

Total words =251;

Total syllables= 334;

Total sentences=15;

FKGL=8.7

Flesch's (1948) Reading Ease (FRE)/Readability Formula

FRE = 206.835 – (1.015 x ASL) – (84.6 x ASW)

ASL=Average sentence length

ASW=Average number of syllables per word

FRE= 77%

Appendix 33: Flesch's (1948) Readability Analysis-SHS 3 Descriptive Genre (pp428)

An es/tate where fields of su/gar/cane had once crept like an o/pen se/cret a/cross the land had been con/vert/ed into a vil/lage that ab/sorbed some three thou/sand peo/ple.// An Eng/lish land own/er, Mr. Creigh/ton, had died, and the es/tate fell to his son through whom it passed to an/oth/er son who in his turn died, sur/ren/der/ing it to yet an/oth/er.// Ge/ne/ra/tions had lived and died in this re/mote corn/er of a small Bri/tish co/lo/ny, the ol/dest and least a/dul/ter/at/ed of Bri/tish co/lo/nies: Bar/ba/dos or Lit/tle Eng/land as it was called in the lo/cal school texts.// To the east where the land rose gent/ly to a hill, there was a large brick build/ing sur/round/ed by a wood and a high stone wall that bore bits of bot/tle a/long the top.// The land/lords lived there a/midst the trees with/in the wall.// Be/low and a/round it, the land spread out in/to a flat un/bro/ken mo/no/to/ny of small hous/es and white marl roads.// From any point of the land, one could see on a clear day the large brick house hoist/ed on the hill.// When the weath/er wasn't too warm, tea was served on the wide flat roof, and the vil/lag/ers catch/ing sight through the trees of the shift/ing fi/gures crept be/hind their fen/ces, or stole through the wood a/way from the wall to see how it was done.// Pac/ing the roof, the land/lord, ac/com/pa/nied by his friends, in/di/cat/ed in all di/rec/tions the lim/its of the land.// The friends were main/ly plant/ers whose es/tates in the coun/try had re/mained ag/ri/cul/tur/al; or oth/er/wise there were Eng/lish vi/si/tors who were ab/sen/tee own/ers of the es/tates which they had come to see.// The land/lord, one gath/ered, ex/plained the lay/out of the land, the cus/toms of the vil/lag/ers and the du/ties which he per/formed as care/ta/ker of this es/tate. //The vil/lag/ers en/thralled by the thought of tea in the o/pen air looked on, un/seen, o/pen-/mouthed.//

variables:

Total words =316;

Total syllables=418;

Total sentences=12;

FKGL=10.3

Flesch's (1948) Reading Ease (FRE)/Readability Formula

FRE = 206.835 – (1.015 x ASL) – (84.6 x ASW)

ASL=Average sentence length

ASW=Average number of syllables per word

FRE=68%

Appendix 34: Flesch's (1948) Readability Analysis-SHS 1 Expository Genre (pp156)

A po/lit/i/cal par/ty is an or/gan/ized group of peo/ple who con/trol a gov/ern/ment.// In dem/o/crat/ic coun/tries, po/lit/i/cal par/ties com/pete a/gainst one an/oth/er in e/lec/tions to keep or gain con/trol of a gov/ern/ment.// In the U/nit/ed States and Ni/ge/ri/a, po/lit/i/cal par/ties are ac/tive on the na/tion/al, state or sen/a/to/ri/al and lo/cal le/vels.// They help in for/ming go/vern/ments at na/tio/nal, state and lo/cal lev/els.//

Po/lit/i/cal par/ties are ab/so/lute/ly nec/es/sar/y to a dem/o/crat/ic gov/ern/ment.// Most mod/ern dem/o/cra/cies are rep/re/sent/a/tive dem/o/cra/cies.// That is, the peo/ple e/lect rep/re/sent/a/tives to act as their a/gents in mak/ing and en/forc/ing laws. //In a rep/re/sent/a/tive dem/o/cra/cy, some pri/ma/ry e/lec/tions are con/duct/ed for nom/i/nat/ing can/di/dates of par/ties' choice.// Po/lit/i/cal par/ties are vol/un/tar/y or/gan/i/za/tions.// They want as man/y mem/bers as pos/si/ble.//Some of these par/ties have rules and mem/ber/ship dues.// Oth/ers have par/tic/u/lar/ly no rules and re/quire no dues.//

Most dic/ta/tor/ships a/llow on/ly one po/lit/i/cal par/ty – the par/ty that con/trols the gov/ern/ment.// In com/mu/nist na/tions for ex/am/ple, the com/mu/nist par/ty is al/ways in pow/er.// It tight/ly con/trols who may run for e/lec/tions.//

In dem/o/crat/ic coun/tries, po/lit/i/cal par/ties per/form sev/er/al im/por/tant tasks.// These tasks in/clude the se/lec/tion of can/di/dates for pub/lic of/fice and help/ing in the or/gan/i/za/tion of the gov/ern/ment.// Po/lit/i/cal par/ties al/so pro/vide op/po/si/tion to the par/ty in pow/er and the rais/ing of funds need/ed to con/duct e/lec/tion cam/paigns.// Oth/er func/tions of po/lit/i/cal par/ties in dem/o/cra/cies in/clude in/form/ing vot/ers a/bout po/lit/i/cal af/fairs and a/bout prob/lems that need gov/ern/ment ac/tion.//In one/-par/ty na/tions, the chief func/tions of po/lit/i/cal par/ties are to se/lect can/di/dates for of/fice and to or/gan/ize the gov/ern/ment.//

Variables:

Total words =258;

Total syllables= 348;

Total sentences=20;

FKGL=12.3

Flesch's (1948) Reading Ease Scale/Readability Formula

FRE = 206.835 – (1.015 x ASL) – (84.6 x ASW)

ASL=Average sentence length

ASW=Average number of syllables per word

FRE=80%

Appendix 35: Flesch's (1948) Readability Analysis-SHS 2 Expository Genre (pp196)

Learn/ing to speak one's lan/guage comes na/tu/ral/ly to a hu/man being, we learn it with/out for/mal in/struc/tion.// But wri/ting is an un/nat/u/ral ac/ti/vi/ty; it must be taught for/mal/ly and stud/ied de/lib/er/ate/ly.// In/deed, man/y of the prob/lems that a/rise in learn/ing to write are sim/ple prob/lems of find/ing prop/er writ/ten e/quiv/a/lent for the var/i/ous fea/tures of speech.// The spell/ing of our words is a clum/sy at/tempt to pro/duce the sound of our voic/es.// The punc/tu/a/tion of our sen/tenc/es and the sett/ings of para/graphs are de/signed to give some ap/prox/i/ma/tions of the paus/es and in/to/na/tion we use au/to/mat/i/cal/ly to give shape and point to our speak/ing.//

The writ/er of Eng/lish (or an/y oth/er lan/guage) los/es a whole world of ges/tures, fa/cial ex/pres/sions and tone of voice the min/ute he de/cides to write some/thing rath/er than say it a/loud.// He los/es the im/me/di/a/cy of di/rect con/tact with his au/di/ence.// If there were no com/pen/sa/tion at all for all these dis/ad/van/tag/es, then com/mu/ni/cat/ing with oth/er peo/ple through the me/di/um of squig/gles on pap/er would be as un/sat/is/fac/to/ry as try/ing to wash your feet with your socks on.//

Writ/ing takes more ef/fort than speech, but the ef/fort we make sim/ply to cap/ture our words on pap/er can also lead us to com/pose things that are worth the ef/fort.// The un/u/su/al en/er/gy that goes into a/chieve/ment in any art or sport can and should func/tion fin/al/ly to help the in/di/vid/u/al in/crease his own pow/ers and per/fect his a/bil/i/ties.// Three hun/dred and fif/ty years a/go, a clev/er man point/ed out that prac/tice in speak/ing makes a man read/y or quick in his res/pons/es.// While prac/tice in writ/ing makes a man "ex/act", it helps him to po/lish and per/fect his thoughts.//

Variables:

Total words =283;

Total syllables=376;

Total sentences=12;

FKGL=11.2

Flesch's (1948) Reading Ease Scale/Readability Formula

FRE = 206.835 – (1.015 x ASL) – (84.6 x ASW)

ASL=Average sentence length

ASW=Average number of syllables per word

FRE=71%

Appendix 36: Flesch's (1948) Readability Analysis -SHS 3 Expository Genre (pp456)

De/li/cious dish/es have add/ed fla/vor if they are home/-made.// With a lit/tle ef/fort, you can win the love and res/pect of re/la/tives and friends with the prep/a/ra/tion of white and red beans sal/ad.// It has been my fa/vor/ite dish for man/y years and I just need/ed to sit by Mom one Sat/ur/day to pick up the meth/od of prep/a/ra/tion.//

To pre/pare white and red beans sal/ad, you need the fol/low/ing in/gre/di/ents:

1 milk tin each of white and red beans;
2 big/-sized on/ions;
3 me/di/um/-sized to/ma/toes;
1 spring on/ion;
4 heaped des/sert spoon/fuls of tu/na flakes;
½ tea/spoon/ful of black or red pep/per;
1 tea/spoon/ful of cook/ing oil;
and 2 tea/spoon/ful of vin/e/gar.//

Hav/ing got these in/gre/di/ents, you are set to mak/ing a tast/y beans sal/ad.// First, you pour the white and red beans into two sep/a/rate bowls and sort out for/eign par/ti/cles.// That done, soak the beans for be/tween four and six hours, again sep/a/rate/ly.// Then drain the wat/er and boil with salt sep/a/rate/ly till they are soft.//

You then drain the cooked beans and pour into sep/a/rate plates for some three min/utes.// Cut the on/ions and to/ma/toes in/to thin slic/es, al/so slice the spring on/ions in/to ti/ny pie/ces.// You/'ve now got to the point of mix/ing.// Pour the white and red beans in/to a bowl and mix to/geth/er.// Next, blend your mix/ture with the chopped on/ions and to/ma/toes.// Then whip the vin/e/gar and cook/ing oil to mix thor/ough/ly and gen/tly add it to the beans.//

Fi/nal/ly, sprin/kle black or red pep/per on the tu/na flakes and add to beans.// Spread chopped spring on/ions to make your beans sal/ad look and taste bet/ter.// You are through with your white and red beans sal/ad and read/y to serve with cooked rice and fried plan/tain.// Pull a chair to/wards the ta/ble and en/joy a re/al/ly de/li/cious meal.//

Variables:

Total words =306;

Total syllables= 404;

Total sentences=17;

FKGL=6.3

FRE = 206.835 – (1.015 x ASL) – (84.6 x ASW)

ASL=Average sentence length

ASW=Average number of syllables per word

FRE=77%

In sum, Flesch's (1948) Readability Formular has been applied to all the 45 texts under study. The 9 sample analysis here are for illustration. The readability computational values for each of the nine (9) texts using Flesch's (1948) formular have been determined in percentage terms as can be seen in the foregoing analysis. These computational values are collated for the graphic analysis of data.