

Assessing Linguistic Complexity in Elementary and Secondary English Textbooks: An SFL Perspective

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ABSTRACT

Linguistic complexity (LC) is one of the important indicators that can be used to assess the comprehensibility of school textbooks, especially of English textbooks designed for ESL learners. Among theories that inform researchers about the opacity of text, Systemic Functional Linguistics (SFL) offers a convincing argument on how a diversity of linguistic items impacts LC. Moreover, systemicists have devised some standards that analyse LC more reliably. Using SFL as the theoretical framework, this study aims to explore the extents of lexical density (LD), nominalization, and grammatical intricacy (GI) within and across elementary and secondary English textbooks. Considering the three central constructs of linguistic complexity (LC), I have probed whether there is a gradual progression in LC within and across the selected study levels. The first five units from the English textbook used at each grade acted as the sample of the analysis. With the analysis tool of manual reading of lexical and grammatical items, nominalization instances, ranking clauses, and clause complexes, I interpreted the data to answer my research questions. The data shows that as per Ure's defined criterion, some units within the five study levels do not correspond to the LD level of the written text. Moreover, the LD of some units is lower, while some units have higher LD values than the Hallidayan described limits. The use of nominalization does not conform to the suggested age and grade levels. The same is the case with GI. Hence the study has found that the selected textbooks fail to show a systematic and gradual progression of LC within and across the study levels. Several suitable pedagogical interventions have been suggested.

Key words: Systemic Functional Linguistics, lexical density, nominalization, grammatical intricacy.

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LIST OF ABBREVIATIONS

SFL	Systemic Functional Linguistics
LD	Lexical density
GI	Grammatical intricacy
LC	Linguistic complexity

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DEDICATION

I dedicate my thesis to my parents (Abbu and Ammi).

CHAPTER 1

INTRODUCTION

As a tool of communication, language plays instrumental role in the expression of our feelings, thoughts, and beliefs. Since what language describes is essentially complex in its nature, language itself remains primarily one of the most complex natural phenomena (Hendrikse and Van Zweel, 2010). Therefore, in EFL settings, the complexity of language learning becomes more evident when we consider traditional English teaching through textbooks like Pakistani ESL context. In such contexts, it is textbooks which not only determine lesson objectives but also chart dominant teaching maps for instructors (Putra & Lukmana, 2017). Palinscar and Duke (as cited in Putra & Lukmana, 2017, p. 1) also assert that even “when the teachers elect not to teach from the text, text plays a significant role in determining the curriculum.” In other words, textbooks used in the classrooms usually inform teachers of the relevance of their teaching decisions. Thus, it seems necessary for teachers that they have not only proper understanding of the text on which student’s success depends but also appropriate knowledge of both the linguistic elements found in the text and their range of aspects that typify “the nature of text” (Beck, McKeown & Worthy, 1995, p. 220). Unless ELT instructors can analyse the text used in their classroom, the effectiveness of the target textbooks in school education remains questionable. Schleppegrell’s (2004) observation seems cogent that every investigation of the linguistic hurdles to learning entails close understanding of learners’ difficulties in accessing the textual meaning because their limitations to express their views in speech and writing about the target learning content clearly demonstrate that the texts were incomprehensible to them.

Unarguably, while some written texts are easy to read and comprehend, others are difficult, and still, others are even more challenging. Among the elements that have a direct impact on the difficulty level of written text used in the classroom, linguistic complexity (LC) forms a central construct. However, to bring a comprehensive definition of what LC refers to is itself complicated, and to describe linguistic complexity exactly is a hard nut to crack (Halliday as cited in To, 2015). That is why different scholars have associated LC with various grammatical features of texts. While some connect it with passivization, others link it with the recursive

rule and deep structure. Besides them, the advocates of the Systemic Functional Linguistics (SFL) perspective maintain that lexical density (LD), nominalization, and grammatical intricacy (GI) are salient features that commonly characterize complex text (Halliday & Martin, 1994). Since SFL is a linguistic theory that sees “language as a social semiotic system and meaning-making resource” (Halliday & Matthiessen as cited in To, 2015, p. 2), its major concern is with how the people’s use of language is tied to the meaning appropriate for the accomplishment of communication task performed in the social context (Martin & Rose, as cited in To, 2015).

The very first feature to determine the linguistic complexity of the written text in SFL is LD. In written texts, LD depends on the number of lexical items chosen for the target task. In other words, LD is the measurement of instructional data that any text packs into it while the grammatical items serve “as a glue which holds the lexical items in place” (Didau, 2013, p. 1). The information is conveyed via lexical items while the grammatical words or function words within the text provide the required framework to adjust them. Therefore, at the textual level, LD is directly linked to the range of packing or scattering lexical items in a text. In other words, the presence of more lexical items leads to an increased LD of the text, for a larger quantity of information in the form of meaning packed in the text makes it more highly dense. Thus, variation in the number of lexical items indicates how the message within the text is organized. It is pertinent to mention here that the LD of the written text has always been found to be higher than that of the spoken language (Eggins, 2004). Moreover, it has also been observed that in the textbooks chosen for learners, LD shows a gradual and systematic increase when students move to higher grades during their education career (To et al., 2013). In other words, the students of higher grades are required to understand the texts of higher LD by unpacking a greater number of lexical items in which every item stores important information in it. However, in the beginning years of their formal school education, the students are exposed to the knowledge contained in the least complex texts for which fewer lexical items are used in each clause and, thus LD is kept at a minimum level. Contrary to this, the text of advanced levels is characterized by more abstract language, and with a greater number of content words, the LD of the prose is gradually increased so that the students’ proficiency to handle complex text can be enhanced (Shlepppegrell, 2004). The

increase in LD can serve its purpose if it follows consistent and gradual expansion because the fluctuated, sporadic, and inconsistent LD spread within the same level and across different study levels is problematic (Sari, 2018). In short, for the students' smooth movement to the next level, the role of steady and regular increase in LD cannot be overlooked.

Nominalization is the second feature through which this study probes LC of the written text. Nominalization is one of those factors that directly increase the LC of text by adding condensation and compactness to it. It has been observed that the contribution of nominalization towards higher LC of academic and scientific discourse is more than any other factor (Banks, 2005; Halliday & Martin 2003; Halliday & Matthiessen, 2014; Martin, 2008). Since nominalization is a process of noun formation from other word classes, it usually brings conciseness to the discourse (Eggins, 2004; Humphrey et al., 2012). We can say that the use of verification for verify, madness for mad, and arrival for arrive involves nominalization. However, it is not always a verb or an adjective that can be nominalized; rather, an adverb or conjunction involving different processes can become a noun. When the writer of the text prefers to use nominalization, it not only impacts sophistication and bulkiness of the prose but also the produced text becomes more difficult for the learners due to its heavy cognitive load (Wenyan, 2012). Moreover, with the use of nominalization, the verbal clause is turned into a nominal group which can pack a greater number of lexical items used as pre-modifiers, post-modifiers, or both. Resultantly, the text with more instances of nominalization is always denser and thicker. Eggins (2004) maintains that although heavily nominalized language seems to be pompous and exaggerated in its tone with the language opaquer, it is indispensable for creating the desired effect in certain contexts. Therefore, when the advanced scholars engage in knowledge construction and systematization of text, they highly depend on extensive use of nominalization (Martin, 2008). There are two major advantages of using nominalization in the text: first, it enhances the rhetorical impact of the text; second, it impacts information storage capacity of a sentence. In other words, nominalization acting as a cohesive tool brings coherence and conciseness to the written prose (Humphrey et al., 2012). Text comprehension entails that the learners can unpack and decode nominalized text, and subsequently pack information into dense and obscure

text. Unless the students develop such comprehension skills, they cannot handle abstraction and technicality in the text. That is why, it is recommended that the use of nominalization is developed gradually: when students move from the lower to the higher grades, they are exposed to more nominalizations that pack more information in phrases.

The third major characteristic of the study is that it has investigated LC by measuring the GI of the text. To Halliday, GI is an essential factor that characterizes LC (Halliday as cited in To, 2015). Therefore, he proposed that it is always pertinent for a researcher to include the GI when they aim to study sophistication of the text at the clause level. To him, GI refers to the structure of clause complexes produced with the application of combinatory operations on simple clauses. The operations require the use of different kinds of conjunctions to create complex or compound sentences. In the SFL, taxis decide the connection between clauses. Taxis include parataxis and hypotaxis (Halliday & Matthiessen, 2014). Parataxis is “the relation between two like elements of equal status, one initiating and the other continuing” (Halliday & Matthiessen, 2014, p. 374). Hypotaxis is “the relation between a dependant element and the dominant element on which it is dependent” (Halliday & Matthiessen, 2014, p. 374).

Since English textbooks act as a primary source for the teaching of English as ESL/EFL, the study of taxis found in them seems necessary. In fact, students’ first language is concerned, it is acquired in the natural setting, but in the learning of a second language, learners usually rely on textbooks. We know that second language learning is a continuous phenomenon in which the learners move from letters to words, from words to phrases, from phrases to clauses, and ultimately from clause to clause complexes, thus expanding their comprehension ability to a higher level. At the textual level, the language of the textbooks becomes complex with the use of different devices. Textual or LC forms a decisive characteristic in determining whether the students succeed in understanding the ideas contained in the prose used in English textbooks. Moreover, for furthering a comprehensive grasp of the concepts explicated in the texts, the textbook writers are advised to regulate closely the LC of the prose they create for the target learners so that they can suitably scaffold the learners’ skills to the desired next level. Such an endeavour on the writers’ part can stimulate the

learners' progress in not only their more meaning interaction with the content but also the immediate improvement of their language skills. Linguistic or textual complexity is fundamental to the current pedagogy (Kwapien et al., 2010). Since in the Pakistani context, the writers or compilers of English textbooks lack the advanced literacy skills of native speakers, there are more chances that they have not considered LC while producing or adapting the text. Since the examination of the elementary and secondary level textbooks to check their consistency with the accepted pattern of a gradual increase in LC can prove helpful to the ELT teachers, the textbook writers, and ESL/EFL learners, the present study planned to measure LC in English textbooks.

1.1 Statement of the Problem

The importance of textbooks in the language classroom cannot be overlooked. Textbooks as learning material remain central in providing the immediate resource that the teacher uses for explicit instruction on linguistic features. Since textbooks are designed to impart knowledge to learners in a properly organized manner, the linguistic features of the text used in them are expected to follow a certain consistent pattern, especially, the LC of text used in them is a matter of concern to learners. According to Harmer (2008), before the selection of a book as course material at a study level, the decision-makers are advised to check its appropriateness for the study level. Endorsing the views of Putra and Lukmana (2017), I believe that learners can grasp the ideas of a text only when these are written in a language that is neither too complex for learners to understand nor so simple that it demands little serious cognitive effort from them to process information. In this way, the LC level is suggested to increase gradually with each level to make the students feel at ease in learning a new language. In other words, the LC of the textbooks needs to be in accordance with the grades. Inconsistent and inappropriate LC poses serious problems to students in satisfactory comprehension of the topics they are taught in the class. To check the conformity of the textbooks their assessment and evaluation is necessary. My observations on the sample textbooks signal a wide range of inconsistencies in LC in the textbooks, which makes it pertinent to probe it within the same level and across the five study levels. The assessment of LC is made by adopting the SFL framework. This framework is selected as it offers a multidimensional working scheme to probe

the issue of LC. The primary objective of the study is to examine LC quantitatively and qualitatively, which is done to determine whether the textbooks' LC is in accordance with the study levels. The assessment of LC checks the suitability of the textbooks. The appropriacy which arises out of the level of LC is necessary to achieve the desired learning goals. Therefore, the present study explored whether there was the desired consistency in a gradual increase in the LC of the selected textbooks within a certain grade and across different levels. This study is directly beneficial for the students and indirectly advantageous for the teachers and syllabus designers. It provides an insight into the matter that the aspect of LC may be considered before publishing and disseminating the textbooks for the learners. In this way, familiarity with the concept of LC can prove helpful to textbook writers or compilers in writing suitable textbooks for the students.

1.2 Research Objectives

1. To quantify the linguistic complexity in terms of Hallidayan concepts of lexical density, nominalization, and grammatical intricacy within and across elementary and secondary-level textbooks.
2. To investigate the tendency of variation of linguistic complexity within and across different levels of selected textbooks.

1.3 Research Questions

Q. 1. What is the extent of lexical density, nominalization, and grammatical intricacy within and across elementary and secondary-level textbooks?

Q. 2. How does linguistic complexity vary in the selected textbooks?

1.4 Significance and Rationale of the Study

The central role of textbooks during the formal education of students when they move from their primary years to adolescence and beyond demands that the LC of their texts show gradual progression. How LC is calculated becomes a significant and recognized research field. As Nathan et al., (2002) argue, even though textbooks are considered the primary and principal means of learning, their composition and organization are the least attended research area. Students are usually found to be

lacking in linguistic knowledge necessary to comprehend the language's challenges. Similarly, teachers are required to be more closely aware of their students' difficulties in handling LC while they teach through textbooks. Teachers, as well as learners, confront this challenge of LC in one way or the other. LC not only includes the ratio of lexical items in the text but also deals with the compact, opaque, and condensed style of written language that the learners face while reading a text. In other words, LC creates serious hurdles in the students' understanding of the text. Therefore, for a significant decrease in learners' cognitive burden, it is important to consider whether the cognitive load is regulated according to the gradual progression of LC in textbooks within a grade and across the different grades. The systematic progression in LC in terms of LD, nominalization, and GI in the textbooks makes students feel comfortable in not only the learning of content but also the comprehension of the written text.

Several years of my teaching experience as an English teacher at elementary and secondary levels in institutions under the ambit of the Federal Directorate of Education offered me a valuable opportunity to critically examine English textbooks. My random but educated guess is that there is a lack of consistency in their increase of LC within the same grade and across different levels. Therefore, it seems pertinent and appropriate to measure and report the LC of English textbooks being used in Federal schools so that the findings can offer insightful clues directly to the syllabus designers and indirectly to the ELT teachers and ESL/EFL school learners in their more effective teaching and clearer comprehension of the textbooks, respectively.

This research offers another view to understand the LC in English textbooks. Thus, it can surely prove helpful to the syllabus designers in their selection and creation of appropriate content for the target grade. Subsequently, this selection and appropriation of the learning content to the target level can improve students' reading and comprehension abilities. The study provides insight and practical implications for selecting EFL textbooks across Pakistan. This study can be a springboard for many other such studies that can be conducted on science, history, and geography textbooks used at the primary, elementary, and secondary or post-secondary levels. The LC across science and non-science textbooks can be comparatively assessed, starting with the assessment of LC from grade I to and moving to XII. The findings of the current

study can act as guidelines for the syllabus designers of English. Since research on the LC in textbooks is relatively least explored, various perspectives can be used to focus on other dimensions of the phenomenon under study.

1.5 Delimitation

The study is delimited to English textbooks of grades 6 to 10 which are taught in the educational institutions situated in Islamabad Capital Territory (ICT) and working within the ambit of the Federal Directorate of Education Islamabad. I have confined myself to address only three aspects of LC, i.e., LD, nominalization, and GI, and omitted other aspects due to time constraints.

1.6 Chapter Breakdown

This study comprises five chapters: introduction, literature review, research methodology, data analysis, and conclusion and recommendations.

Chapter No. 1 Introduction

Starting with the background, I have provided the reader with the necessary information to explicate and establish the research problem. The chapter also contains the problem statement, research objectives, research questions, significance and rationale of the study, and its delimitation.

Chapter No. 2 Literature Review

This chapter details how the topic has been studied in the literature by different scholars. It also offers a detailed discussion on the definitions of key terms and how they have been expanded. Moreover, it presents an analytical review of various theories related to the current research. Several studies similar to the current research are also included in the chapter.

Chapter No. 3 Research Methodology

The chapter includes different topics such as research approach, research sample, data collection, and data analysis of the three features of LC. The explication of the theoretical framework is also found in the chapter.

Chapter No.4 Data Analysis

This chapter contains a detailed analysis of the first five units of the sample textbooks and shows how the three features of LC are found in them. There is also a discussion on the variation of LC in the textbooks.

Chapter No.5 Conclusion and Recommendations

In this chapter, the summary of findings is followed by suggestions for textbook writers and syllabus designers. In the end, there are given some recommendations for future researchers.

CHAPTER 2

LITERATURE REVIEW

This chapter encompasses various dimensions of the study. Incorporating the background of the term “assessment” the study includes an in-depth discussion on multiple perspectives to study LC, I have explained how LC differs from syntactic complexity. After this, I have elaborated the relationship among three aspects: LC, comprehensibility, and background knowledge. The effect of LC on readability also forms an important point of discussion. In SFL, Hallidayan concept of LC is explained, and the reader is guided to focus on different contributory aspects of LC like LD and GI. The relationship between LD and readability is also explained. The coming section explores the role of GI in spoken and written language and how to measure it in textbooks. Different definitions of nominalization, nouns, and nominal groups precede the classification of nominalization, their different uses, and their varying impact on the LC of written texts. In the end, the chapter have an insight into the gradual progression of LC within a level and across different study levels.

Section 2.1 outlines the term “assessment”.

2.1 What is Assessment?

Assessment is a necessary part of education. It serves as a tool to measure the adequacy of knowledge of an individual. Broadfoot and Black (2004) see it as a communicative device between the world of education and that of the wider society. For many years the word “assessment” was used primarily to describe processes of evaluating the effectiveness of sequences of instructional activities when the sequence was completed (William, 2011). At the end of every sequence and after every learning process, the learning ends in an assessment that informs about how much the learning process was successful. In other words, assessment informs about the effectiveness of the accomplished task. According to Bound (2009, p. 29), “Assessment is positioned as part of a world evaluating individuals in an educational system separated from engagement in the everyday challenges of work.” As this study deals with the textbooks’ analysis, it assesses the quality of the selected textbooks regarding LC to see whether these are appropriate for the selected study levels.

After foregrounding the term “assessment”, I include how LC is studied from different perspectives, how different theories view it, and how different linguists define it.

2.2 Linguistic Complexity

Although LC is a widely popular topic in language learning research, what constitutes LC remains indefinite. Miestamo et al., (2008) divide LC into two major categories: global and local. To them, global complexity refers to the whole language complexity, which encompasses a complete grammar of almost all the dialects and all other aspects of the language. Since tools for measuring global complexity are unavailable, its assessment remains a big challenge. The second category known as local complexity can be called domain-specific LC and relates to certain sub-domains like phonological, morphological, syntactic, semantic, and pragmatic complexity.

Crystal (as cited in To, 2015, p. 24) defines LC as a “difficulty to learn.” However, to equate LC with difficulty is problematic because the difficulty is directly linked with practice and habit formation. Not only does practice causes the difficulty level show decline, but also habit formation increases the users’ ability to access information and materials. Droop and Verhoeven (1998) associate complexity with readability because complexity has remarkably high impact on readability. Textual difficulty poses a serious challenge to readers in their comprehension of linguistic texts. Hunt (1970) asserts that various transformational operations conducted on a sentence make it more complex. This idea can be observed in transforming simple sentences into negative, interrogative, or imperative. The same can be seen in the case of a change from active to passive. In Hudson’s (1971) view, LC determines whether the reader’s interaction can be maintained consistently, or repeatedly fails.

In traditional school language education, grammar teaching entails error analysis of sentences so students can understand specific rules. Those who follow the rules are socially considered well-educated, while those who do not attend to them are considered poorly educated (Yule, 2016). Traditional school grammar serves two primary purposes: refinement of mind and learners’ mastery of grammatical forms. Thus, learners gradually attain proficiency in the socially acceptable and correct usage of these forms in grammar (Weaver, 1998). Traditional grammar is concerned with

conventional categories commonly known as parts of speech. The notion of markedness proposed by Givon (1995) circumscribes the prescriptive approach and traditional categories. Givon (1995, p. 25) states that “the markedness is structurally more complex and the unmarked more simple.” The main, informative, affirmative, and active sentences have been believed to be unmarked clause types (Givon, 1995). Therefore, they are easy to understand while the others, like subordinate sentences, imperative sentences, interrogative sentences, negative sentences, and passive voice, are more complex. The complexity of language or LC is based on the learners' comprehension level of the string of words. The learners can easily understand a series of words following the traditional fashion of subject, verb, and object (SOV) agreement without adding negative auxiliaries. On the other hand, the expressions that do not follow the SOV linearity such as interrogative sentences create high cognitive load on learners. It has been observed that the lower the LC, the greater the comprehension. In other words, the LC of declarative, affirmative, active sentences and single clause sentences is low, so they are easy for learners to understand. On the other hand, the high LC of imperative, interrogative, negative, and passive sentences and complex or compound sentences makes them difficult for learners to comprehend.

Chomsky (1957) in his famous book *Syntactic Structures* proposed generative or transformational-generative grammar. Transformational-generative grammar, commonly known as TGG, is a set of clearly defined rules by which all well-formed sentences can be generated (Robins, 2013). Thus, the idea of recursion is responsible for the complicatedness. Recursion creates “indefinite extensibility in syntax” (Robins, 2014, p. 285). Lengthy sentence structures are constructed through a series of choices. To (2015) claims that lengthy sentences which incorporate many ideas are difficult to understand. In this way, the complexity of language can be counted by the length of the sentences because lengthy sentences are more complex to comprehend. The Chomskyan model called *Phrase Structure Grammar* is the second important model used for the description of language, and it is believed to be robust and satisfactory. A classic example of ‘old man and woman’ which can be explained in two ways signals that LC may be the product of syntactic ambiguity.

Afterwards, Chomsky (2014) introduced an exhaustive theory of transformational grammar. The semantic component was the salient difference that

led to the surface and deep structures (Chomsky, 2014). Chomsky (2014) asserts that different deep structures can be drawn for the same surface structure. Similarly, different surface structures may share the same deep structure. LC in terms of syntactic ambiguity can be observed in different interpretations of the same surface structure. Such syntactic ambiguity is the marked feature of only written language because in spoken language, the context and stress pattern determines what interpretation the speaker desires. A famous sentence, ‘Flying planes can be dangerous,’ can be interpreted in two different ways. In one way, it is explained, it is a complex and dangerous art and profession to fly a plane, and in the other, it is interpreted that the aircraft flying overheads can be precarious. But this is possible only in written discourse. In spoken language, the context, the paralinguistic features, and pragmatic factors help the listener reach exact and unambiguous meanings. After discussing different definitions of the term LC from a variety of perspectives, I now move to distinguish syntactic complexity from LC.

2.3 Syntactic Complexity vs. Linguistic Complexity

Syntactic complexity refers to the range of language forms used in language construction (Ortega, 2003, as cited in Lu, 2008). Average sentence length is another critical factor that makes the sentence syntactically more complex and challenging to comprehend. The average sentence length is measured in terms of letters, syllables, words, and the number of clauses (Agnihorti & Khanna, 1992). In fact, the sentences vary in their syntactical complexity, but there is no hard and fast rule to measure this complexity. In contrast, LC can be measured with a specific formula given by Halliday in his SFL theory. This comparison shows that LC is completely different from syntactic complexity. After the comparison, we can discuss the relationship of LC with textual comprehensibility and learners’ background knowledge.

2.4 Linguistic Complexity, Comprehensibility, and Background Knowledge

Background knowledge of a particular field facilitates the comprehension of a text of that field in children and adults (Anderson & Pearson, 1984). As a package of lexical items and grammatical structures, background knowledge provides insight into the choice of a specific register and its related lexical items and grammatical structures to

grasp the text. People with high domain knowledge learn the text better than those who lack such expertise. Adams et al., (1995) explored a relationship between a specific domain of background knowledge and text comprehension among fourth-to-seven-grade students. The study concluded that domain knowledge and reading skills contribute to a text's understanding and reading speed. Readers with good reading skills rely on their reading skills to compensate for their lack of knowledge in a particular domain, while poor readers rely on their background knowledge to compensate for their lack of reading skills. In the same way, religious affiliations (Lipson, 1983), and cultural schemata (Pritchard, 1990) also have a significant impact on readers' comprehension and greatly facilitate them to understand the texts better. Droops & Verhoeven (1998) examined the role and effect of background knowledge on reading and comprehension of first and second language among Netherland third graders. The study aimed to explore the impact of cultural background and LC on reading comprehension. The findings showed that the children of immigrants entered a complex language; they initially spoke their native language in their homes, and then the Dutch language was mixed with their native language through their playmates. Three types of text were given to the students to examine the effects of LC and cultural background knowledge on comprehension of the texts. First, the texts contained materials found in Dutch culture. The second category contained texts on the topics popular in the minority of Near Eastern culture. The third category included texts that were believed to be of equal familiarity levels for both groups. The factor of LC was handled by dividing the texts into two levels so that the relation of LC with background knowledge could be studied. The results showed that each group performed better in the text that was closely related to their cultural background. Regarding the LC, the Dutch students showed the best results in all the texts. In contrast, the Turk and Moroccan students provided the best only in the texts related to their cultural background. After elaborating on the relationship between LC, comprehensibility, and background knowledge, it seems pertinent to sketch the interlink between LC and readability. The following section discusses the interdependence of LC and readability.

2.5 Linguistic Complexity and Readability

Readability is the ease of reading and comprehending L2 written text. (Oakland & Lane, 2004; Badgett, 2010). In its broader sense, readability directly refers to the comprehensibility of the text (Homan et al., 1994). It is seen that written texts low in LC are easily understood by readers, and they retain the reading speed and persistence of the learners. Syntactic complexity affects the readability and comprehensibility of the written text. Eslami (2014) explored the effects of syntactic complexity on male and female EFL Iranian students. The researcher modified the original text into two different versions. The first was more complex than the original, and the second was less complicated than the original. For the modification of the original text, the factors like the length of sentences, number of clauses in a sentence, number of relative clauses, and types of sentences were considered. The more complicated version had lengthy sentences and comprised several complex and compound sentences. In contrast, the sentences of less complex text than the original were split into short sentences and were of shorter length. By taking three different versions, i.e., expanded, authentic, and reduced versions of a written text, and assessing the students' readability, the researcher found that no remarkable change was noticed in highly proficient students. In contrast, mid and low-proficient professionals' performance was significantly different on the original and reduced levels compared to an expanded level of the written text. The researcher took syntactic complexity as LC in which the number of relative clauses in a sentence, incorporation of the complex, compound, and complex-compound sentences, and the length of a sentence mark the complexity of a text. Since the discussion on various perspectives of LC and the factors affecting it is almost complete, I move to the Hallidayan concept of LC which serves as the study's theoretical framework.

2.6 Hallidayan Concept of Linguistic Complexity

Halliday's Systemic Functional Grammar (SFG) is one of the popular language theories proposed in the twentieth century. His book *An Introduction to Functional Grammar* offers relevant information on LC (Halliday et al., 2014). According to Halliday, functional grammar can be interpreted in three ways; firstly, it explains the diversified aspects of the use of language. It provides justification for every chunk of text in the context that is structured in such a way to satisfy human needs. Secondly,

meaning as an essential component of language is always functional. Finally, functional grammar interprets every language unit as a function in the total linguistic body. Martin et al. (1997, p. 3) clarify that functional grammar views language patterns as forms serving a functional purpose. To be more exact, “it is not a grammar of etiquette; rather, it provides you with tools for understanding why the text is the way it is.” In fact, it is different from Chomskyan transformational generative grammar in its approach to study language. It sees language as a set or system of rules that govern semantic, syntactic, morphological, and phonological domains of language (Siewierska, 1991).

From a Hallidayan SFL perspective, LC can be determined by three central concepts, i.e., LD (Halliday, 1989), nominalization (Halliday & Martin, 1994), and grammatical intricacy (Halliday, 1989). In his book *Spoken and Written Language* (1989), Halliday states that LD determines the complexity of written language. Furthermore, he claims that spoken language and written discourse widely differ in their LC. Associating LD with LC, he explains that LD refers to the number of lexical items such as nouns, verbs, and adjectives (Halliday, 1989). In other words, LD directly contributes to LC. Halliday (1989) compares the LD of written proses with spoken language. My study pivots on three factors that affect LC. As I have a detailed discussion on the LC, its various viewpoints, and careful note on the Hallidayan concept and the factors that affect the LC. I outline the first factor involving LC in the coming section.

2.6.1 Lexical density

The term lexical density refers to the ratio of content words to the total number of words (Johansson, 2008). Therefore, it can be inferred that the lexical items bear the meanings of the text. Abbasian and Afrazi (2018, p. 6) are right in calling LD as “information packaging” because the entire pack of information is concentrated in its lexical items. Children know this salient language feature when they start to speak and write in their mother language. They often leave the grammatical items and construe the meaning through lexical items only (Mackey et al., as cited in Halliday, 1989). Halliday (1989) expounds that written text is found to be denser than spoken discourse. Doubtless, the high density and low sparsity of texts are directly linked to the number of lexical items chosen to pack important information. Halliday (2003)

refers to LD “as a measure of the density of information in any passage of text, according to how tightly the lexical items have been packed into a grammatical structure” (p. 76). In other words, lexical items contain information of the whole text. Without lexical items, it is impossible to convey the meaning of the text, and grammatical structure refers to the clause structure in which these lexical items have been arranged. Halliday (1989) states that conventionally words are not bundled into phrases; rather, they are packed in higher morphological structures, i.e., clauses and sentences. The density of information in a text can be determined by analysing how lexical items are arranged to generate grammatical structures. Halliday adopts the term ‘clause complex’ instead of ‘sentence’ used by traditional grammarians. In SFL, lexical density can be measured by counting the number of lexical items and the number of total clauses. When we divide the former with the total number of ranking clauses, we get LD. Ranking clauses are defined by Halliday (2004) as those clauses which “have their full status as a clause in the discourse” (p. 195). Ranking clauses are paratactic and hypotactic (Halliday, 1989; Thompson, 2013). According to Halliday (1989), written language contains a significantly higher degree of lexical items than spoken language. Christie and Derewianka (2010) clarify that in our daily conversations, we do not need to generally use more lexical items because it is not necessary to utter the name of the thing we see around us while we have to construe the whole structure of information through lexical items in our written language. Therefore, written language is lexically denser.

Ure (1971) was the first to investigate LD. She measured LD by dividing the total number of lexical items by the total number of words used in the whole text. She presented a paper at the conference at Cambridge in 1971 and discussed what LD was. She also compared the density of lexical items used in written and spoken language. She established that informal conversation has an LD index of less than 40%. In comparison, the LD of written language is more than 40%. In fact, she proposed a new formula in her study for the calculation of the LD of any text. Besides her, Halliday also proposed a method to calculate LD which can be considered more sophisticated. The formula suggested by Halliday (1989) equates LD with the number of lexical items per ranking clause. Halliday’s investigations show that spoken language has a sparsity of LD while written language has density. Moreover, written

language is complex in respect of LD. The present study analyses LD with two other aspects, i.e., nominalization and GI. Nominalization plays its role in making the language of English textbooks compact and condensed. Furthermore, the study uses Halliday's formula as its primary tool to assess the LD of English textbooks. Ure's method and the formula are applied only to sort out and verify the difference between the LD of the spoken and written languages.

Pratiwi (2014) explores the LD and supporting nominal groups of English textbooks in the second year of senior high school. By selecting 15 English texts, the researcher analyses the data by applying Gerot and Wignall's (1994) theory of LD and nominal groups. The calculated data is explained using the Hallidayan yardstick of high, medium, and low LD in the texts. The three strata, high, medium, and low LD levels are scattered across the textbooks. Moreover, it is also concluded that nominal groups support the extent of LD. Still, if the text has a high number of clauses but a low number of lexical items, its LD remains low.

Sari (2018) investigates the LD of K13 English textbooks taught in Indonesia using Ure's method. The researcher aimed to find the LD of the three textbooks and to compare the LD of the textbooks of the said three grades to explore the gradual progression of LD as it was the main feature of LC. Taking 12 units from the textbook of grade X, 09 from the English textbook of grade XI, and 17 from the textbook of grade XII the researcher calculates LD and finds the simple means of the LD of all the three books. The study concludes that LD in the textbooks shows "fluctuated pattern of changes" (Sari, 2018, p. 38).

2.6.2 Lexical density and readability

The LD is considered to be a type of complicatedness that is the outcome of the deployment of words (Kwapien, 2010), and this deployment of words comes up with the result of LD. LD and readability are in inversely proportional relation with each other. To et. al, (2013) examine the relationship between LD and readability in English textbooks. Applying Hallidayan Systemic Functional Linguistics theory and formula to calculate the LD, the researchers found that LD and readability showed a consistent rise when the results from textbooks of different levels were compared. The LD increased through two levels of the textbooks while it dropped gradually across

the following two study levels. The results of the intermediate and upper-intermediate levels do not conform with the gradual progression of the LD. Corresponding with the Flesch Reading, Ease Scale, the Elementary level books are highly lexically dense and not easily read; pre-intermediate level books contain the highest LD and are most demanding on the readability scale, while the intermediate and upper-intermediate are of high and low LD level respectively and both are rather difficult to read. This study mirrors the direct relationship between readability and LD. The higher the LD, the lower the readability, and vice versa. In the current study, the correlation between LD and readability was not part of the major objectives. Rather, it was confined to study LD in English textbooks and the major objective was to explore other dimensions and analyse the LC of the English textbooks of elementary and secondary levels to show whether the LC increases within the same study level or not.

Abbasian and Afrazi (2018) investigated the LD and readability in the Iranian English Prospect Series taught in grades VII, VIII, and IX. The study applied Ure's method to measure the LD and Flesch Reading Ease Score to interpret the readability of the selected textbooks. The study found that the LD of the conversation section of the books was also higher than that of 40%, which does not conform with Ure's defined percentage of spoken LD. The study concludes that the books are left unnoticed from the perspective of LD and are full of shortcomings. My study explores three contributory aspects of LC, i.e., LD, nominalization, and GI. Furthermore, the present study uses Halliday's concept and formula to calculate LD. Ure's method only reflects whether the written text has a proper LD level.

2.6.3 Factors affecting lexical density

Several factors contribute to the increase or decrease in the LD of text (Halliday, 1989) in which grammatical metaphor, in the form of nominalization, is directly connected with LD. The term 'grammatical metaphor' was introduced by Halliday (2014) and refers to any substitution of a grammatical class or a grammatical structure with another. Within the academic genre, writers are encouraged to rely more on it for the construction of technical, sophisticated, and specialized discourse. The salient features of this specialized academic written discourse entail that it is lexically dense compared to the spoken language, highly abstract, intricate with the use of nominal groups, relational processes are ubiquitous, impersonal, and evaluative (Biber, 1991,

2006; Christie & Deverwianka, 2010). To enhance the use of the above-said features of academic language, SFL pinpoints a convincing language resource that “simultaneously builds cohesion, foreground meanings in static nominal groups and background personal and subjective voice” (Liardet, 2013, p. 163). Thus, grammatical metaphor (GM) is a powerful, compelling, and dominant linguistic resource to construct and construe formal meaning in academic language. Since nominalization is “the single powerful resource for creating grammatical metaphor” (Halliday & Matthiessen, 2014, p. 656), it forms a major construct in raising the density of a text with high number of nominals (Eggins, 2004).

2.7 Nominalization

Nominalization is a feature that directly contributes to the LC of written language. Nominalization is a peculiar feature to make academic and scientific language complex (Banks, 2005; Halliday & Martin 2003; Halliday & Martin, 1994). Nominalization is defined in a variety of different ways by functionalists. According to Martin (2008), nominalization is a process in which nouns are developed from other word categories. In the same way, Thomson and Droga (2012) state that the names of certain processes are formed with the change in other word classes and are called nominalizations. Similarly, Eggins (2004.) refers nominalization to the “process of turning things that are not normally nouns into nouns” (p. 94) For instance: the message ‘A village destroyed’ can be alternatively conveyed through ‘a village destruction.’ To be more exact, the action ‘destroyed’ is turned into the name of the action ‘destruction’. Similarly, in the case of adjectives, ‘I am feeling happy.’ can also be conveyed by ‘My feeling of happiness.’

Mackenzie (1996, p. 2) classifies nominalization as “nouniness squish” because it renders compactness to a sentence by changing it from entirely verbal to fully nominal expression. Regarding the role of nominalization in the academic text, Halliday believes that LC rises with the increase in the abstraction of academic discourse which prefers to hide the participants (Halliday & Martin, 2003).

2.7.1 Noun, nominalization and nominal group

Concerning the various definitions of nominalization, it has been clearly understood that nouns realise nominalization. Thus, it is essential to distinguish between nouns

and nominalization. Thomas and Droga (2012) differentiate abstract nouns from concrete nouns. The specific abstract noun *transportation* does not mention any tangible thing in the world. Instead, it relates to a process or quality of the word, so it is nominalization. The noun *transportation* mainly indicates the process in which things are moved from one place to another (Thomas & Droga, 2012). Such words are called nominalizations.

2.7.2 Functions of nominalization

Nominalization is a resource in which various word categories are transformed into nouns. It is used frequently in academic and literary writing. Used in a formal speech in large number, it is sparsely found in non-standard varieties. It is the imposing construction of words in English concerning morphological description and salient functions. With the help of nominalization, the whole text becomes condensed, stores meaning in concise form, and the information is imparted in a compact style. To be more exact, the text is more opaque as its information becomes more compressed and laborious to decipher (Wenyan, 2012). Eggins (2004) is of the view that although excessive use of nominalization in a text seems ostentatious and pompous and it brings obscurity to the meaning of a text, the desire to obtain certain functions in grammatical structures is the genuine motive behind its use, as certain textual effects are achieved through nominalization which cannot be achieved with unnominalized text. According to her, two textual leverages can be obtained through nominalization: first, it helps the writers regulate their text rhetorically; second, it is used to pack more lexical content in a single clause.

2.7.2.1 Syntactic functions

As far as the syntax is concerned, greater versatility is achieved through nominalization (Mackenzie, 1996). Nominalization is a significant resource for the organisation of information. Verbs and adjectives are transformed into nouns, and the written text does not have verbs and adjectives each time. The nominalization imparts a newness and versatility to the text. We can conclude that the use of nominalization in written language is neither mere stylistic decoration nor an attempt to create ambiguity.

2.7.2.2 Semantic functions

From the semantics point of view, the frequent deployment of nominalization lends more “abstraction” to the sentences (Mackenzie, 1996, p. 331). It is seen in generic statements like “Seeing is believing” (Mackenzie, 1996, p. 331). Abstraction in the form of nominalization makes the text complex. According to Lehmann (1982, p. 1), nominalization achieves “a transition from proposition to the concept,” and this transition of words poses difficulty to comprehend. Comprehension is directly proportional to the extension of the structure in which the words are spread over the large syntactic structure.

2.7.2.3 Pragmatic functions

Koptjevskaja-Tamm (1993) has given another name to the phenomenon and called it text compressing. Condensation and compressing make the text opaque and hence difficult to understand. In this way, this feature directly contributes to the LC of the text.

2.7.3 Classification of nominalization

Literature has discussed different forms of nominalization, but from the functional grammar perspective, nominalization can be divided into two primary forms: verbal nominalization in which nouns are made from verbs, for instance, *decision* from *decide*, and adjectival nominalization in which nouns are constructed from adjectives, for example, *distinction* from *distinct*.

2.7.4 Nominalization in various written texts

Wenyan (2012) investigated nominalization in medical papers. Language for medical purposes is standardized and full of highly technical terms. The terms for medical writing are said to have taken words from almost ten languages to broaden its range of vocabulary. The terminology for medical jargon is constructed through polymorphemic, having the root morpheme and prefixes, suffixes, and infixes. Ortony (as cited in Wenyan, 2012) found that scientific language, being the literal one, is characteristically assumed to be precise and unambiguous. For the comparative analysis, the study takes ten medical papers from native writers and ten from Chinese academic writers taken from very prominent medical journals. The study employs the

Hallidayan Function Grammar lens to probe the nominalization and LD to show that nominalization is the most powerful device in English. The writer believes that through the use of nominalization, the whole body of the text becomes a condensed whole of information making the text capable of transferring a transparent message and leaving no grain of doubt or argument in imparting a clear message. The paper's findings show that Chinese writers use nominalization less frequently than native writers. Moreover, the native writers' language is characterized by the abundant use of metaphorical expressions which are missing in non-native writers' prose. The finding indicates that nominalization imparts figurative expression to the written language. Furthermore, the result implies that natives are more fluent in the technical terms of medical terminology.

Jalilifar et al., (2017) conducted an exploratory corpus-assisted study investigating the boundaries of potential differences in assigning the functions to nominalization in specific disciplines. The study explored these differences realized in scientific textbooks and Applied Linguistics and their variation in hard and soft sciences. They applied SFL as a theoretical lens, took clause complex as the unit of analysis, and selected eight textbooks from two variants of hard and soft sciences, Physics and Applied Linguistics, as their sample. The study explored not only the identification, quantification, and classification of nominalization and patterns of nominal groups but also the functions performed by the preeminent arrangements of nominal groups. The study showed that considering the classification of nominalization suggested by Halliday and Matthiessen (2006), the first three are most frequent in the sample textbooks. There are close similarities in both the sample textbooks. However, an apparent disciplinary distinction is observed in the samples regarding their distribution in the textbooks. In Physics textbooks, academic writers use more complex, lexically dense, and compound nominal phrases to pack more information into them. There is frequent use of post-modifiers realized by a string of prepositional phrases. On the contrary, Applied Linguistics depends mostly on nominal groups preceded by classifiers. Another difference is that Linguistics writers are more fluent in conveying the generality of a message with the help of patterns in which nominals are realized with few pre/postmodifiers.

2.7.5 Nominalization in textbooks

Kaya and Apaydin (2019) investigated the number, intensity, and kinds of nominalizations in 3rd grade science textbooks. By applying Functional Grammar as its theoretical framework, the researchers counted the total nominalized words and the total words of the text. Then he calculated the ratio of nominalization in each unit to the total number of words in the text and found the density of nominalization. The findings show that the selected textbook has a 7.37% nominalization density. The findings of the study conform with the Hallidayan (2003) proposition that primary school children's developing cognition cannot handle naming constructions created with nominalization.

Jalilifar et al., (2014) conducted an exploratory study to compare the ratio of nominalization instances between two distinct disciplines, i.e., applied linguistics and biology books. Grounded in the SFL theoretical framework, the study investigated the proportions of nominalization in the selected textbooks of applied linguistics and biology taught in Iranian Universities at the undergraduate level. They were the most suitable form for objectification and abstraction, and significantly high-marked differences were found in the use of nominalization in the texts of the two disciplines.

Mueller (2015) analysed nominalization in elementary and middle school science textbooks. Putting the SFL lens as its main theoretical and analytical framework, the researcher examined the types, total number of instances, frequency of nominalization, and its contribution to the text's LD. Regarding the frequency of nominalization in successive grade levels, starting from grade three, the percentage showed a clear rise with the increase in grade levels.

To and Mahboob (2018) explored the LD and nominalization to see the tendency of complexity variation arising from the two features in science and non-science texts across four levels. Employing an SFL lens, the researchers examined the variation of LD and nominalization in two distinctly different disciplines. To answer the question of the degree of variation of two features of the complexity of language across the different levels in a book series, the study probed twenty-four texts from each discipline and the findings showed that nominalization instances increased with the increase of grade in science textbooks levels. In contrast to the science books, in

non-science textbooks, the ratio of nominalization did not conform with the proposition of a gradual increase with the grade level. After completing a detailed discussion on nominalization as a significant factor of LD, its types, classification, and functions, I want to go ahead towards the third feature which contributes to LC and is named as GI.

2.8 Grammatical Intricacy

It is essential to consider the written text's GI because the texts with higher GI pose little challenge to learners when they interact with it for its comprehension. The texts are easy or hard for learners to understand depending on the level of their GI. The GI of a text can be determined by the number of ranking clauses found in a clause complex (Halliday as cited in To, 2015). Considering the score of GI, we can say that the text is highly intricate grammatically. If the text has a higher number of ranking clauses in a clause complex, we say that the text is more intricate. On the other hand, a text having a clause complex containing fewer ranking clauses will have lower GI. Another important point is that it is easier to measure the written text's GI than that of the spoken text because, in speech, it seems impossible to discern the pauses. Halliday (2004) maintains that the level of difficulty in the cognitive processing of the texts increases when clause complexes are smoothly conjoined. A clause complex is a grammatical or semantic unit formed when two or more than two clauses are linked systematically and meaningfully (Eggins, 2004). As far as the measurement of the GI of the spoken language is concerned, Halliday is of the view that it seems problematic partly due to the criteria required for the identification of clause boundaries, and partly because it is difficult to make a clear sense to calculate the exact number of clauses. This is because spoken language construes experience by way of interpersonal meaning and has nothing to do with the ideational meaning. The nature of spoken language is dialogic and has short turns guiding the interaction, whereas the monologic discourse is structured by a complex clause that makes it intricate.

Taxis construes the relationship of clauses in clause complex. Taxis indicates two degrees of interdependency: parataxis and hypotaxis. Parataxis refers to equal status, and hypotaxis refers to unequal status (Halliday and Matthiessen, 2014). In traditional terms, they are called independent and dependent clauses, respectively.

Parataxis is “the relationship of two like elements of equal status, one initiating and the other continuing” (Halliday & Matthiessen, 2014, pp. 374-375). Hypotaxis is “the relationship between a dependent element and its dominant, the element on which it is dependent” (Halliday & Matthiessen, 2014, p. 374).

2.8.1. Grammatical intricacy vs. lexical density

LD is the main characteristic of written text, while the grammatical intricacy is of the spoken language (Halliday, 1989). Thus, it seems complicated to prefer one mode of communication to the other in terms of complexity; both are complicated in their own ways. Written language is characteristically lexically dense and fixed on the pages. On the contrary, spoken language is actively changing and sophisticated in grammatical intricacy (Halliday, 2014). It is explored through many pieces of research that written texts are closely knitted lexically while they have a low GI value than the spoken language. On the contrary, the spoken language is grammatically more intricate while lexically less dense than the written text (Eggins, 2004).

Ma'mun (2017) studied GI in students' writing. According to the researcher, writing is cognitive as well as physical activity. Alice Ochima (as cited in Ma'mun, 2017, p. 1) states that “writing is a progressive activity.” The process of writing is started with cognitive ignition. The writer thinks before he can compose the thought in linguistic form. Even after the completion of the idea in the form of written form, the written material is reviewed and revisited for rectification. Therefore, instead of being one step action, writing is something that has multi-steps. After a detailed discussion on the mode of GI and probing every nook and corner of the feature, the researcher suggests that teachers must improve teaching methodology to teach the students how to construct the clause complex to make their writing impressive and intricate.

Hanafiah and Yousuf (2016) investigated the LD and GI in the abstracts of the linguistics thesis. The study applied the SFL lens to probe the extent of LD and GI to reflect whether the LD and GI had the level to be called the written text or not. By applying the purposive sampling technique and analysing seven thesis abstracts, the study concluded that the numbers of both the aspects under analysis reach the extent that they can be called written text.

2.8.2. Grammatical intricacy: spoken vs. written language

Spontaneous and interactive in its nature, spoken language is done face to face and is created on the spot. The spoken language is done along with body gestures and actions. It is oral and is done without any rehearsal in everyday life. On the contrary, written language is planned, and it is monologic. In written language, writers can revisit, reorganize and reconstruct their thoughts. Moreover, formal written text can be edited many times. Moreover, “spoken language has silences, (unfilled paused) and all other types of hesitation __ false starts, repetitions and filled paused” (Sari, 2021, p. 15). These aspects of spoken language make it appear formless. Regardless of that it is spontaneous and has many errors, but it is still not formless. Halliday (as cited in Sari, 2021, p. 15) thinks that “speech is tentative, spur of the moment and highly organized but not formless.” Since both the written and spoken languages are produced by the same system, none of them is less organized or structured. The two modes of language are meant for different purposes. While spoken language is meant for direct communication, written language is used for writing a book. Both modes have their own beauty of structuring information. However, both modes are distinguishable from each other in their level of LD and GI. Written language tends to be lexically dense, while spoken needs to be grammatically intricate.

Amelia (2020) investigated the two aspects of LC in debaters’ speeches. Discussing the significance of GI, the researcher believes that GI is essential to unfold messages because the text is said to be hard to understand if it stores more information in fewer lexical items. Unarguably, it is effortless to understand a simple clause as it contains small information in comparison with a complex clause which encompasses more than one piece of information in one sentence. In the argumentative mode, the debater’s objective is to persuade his/her audience to the stance s/he is advocating. The study employed the qualitative way of analysis and used Ure’s method to calculate the LD and the Hallidayan form to calculate GI. The researcher transcribed YouTube videos into text, calculated the lexical and grammatical items, and separated the clauses and clause complexes to figure out GI. Four speeches of the NUDC (National University Debating Championship) 2018 University of Nigeria Malang were selected. The researcher found that almost all the four core leaders’ lectures had high LD, i.e., more than 40% which indicated that all

the speeches were of written text. The four core speeches had high GI by which the speeches could be categorised as spoken language. The present study is different in that it explores the written text through Hallidayan SFL theoretical framework through three aspects of LC.

2.8.3 Grammatical intricacy in textbooks

As far as GI in textbooks is concerned, data from many studies manifests that with the increase in grade level, more clause complexes are added, and the structure becomes more intricate. By adding more ranking clauses, the writers create clause complexes in higher grade levels. Opposite to this, with fewer ranking clauses, the text in lower grade levels is less intricate grammatically. To be more exact, with the increase in grade level, more clause complexes are found as compared to clause simplexes. Clauses are coupled to form a clause complex when the writer aims at “tighter integration in meaning” (Halliday & Matthiessen, 2014, p. 365). Therefore, the textbooks composed for older children pack more information into each written text to express more ideas in a compact and condensed manner by using fewer words.

To (2017) investigated the GI in EFL textbooks. Explaining the fact that GI is an essential feature that characterizes the complexity of language while it is less explored in TEFL, especially in English EFL textbooks, the researcher employed the SFL theoretical framework and Hallidayan method to investigate the GI in four consecutive levels of textbooks, i.e., elementary, pre-intermediate, intermediate and upper-intermediate. The research findings show that the GI shows rise with the increase in study level. Hence gradual progression is found in the level of GI in four consecutive levels of textbooks. The study explored only one feature of LC leaving the other aspects untouched. My study is different from the research in that it analyses LC through three salient features, i.e., LD, GI, and nominalization. Recognizing LD, nominalization, and GI as salient features for measuring LC anticipates exploration by various scholars’ views on the position of interlinkage of gradual progression in LC and the level of textbooks.

2.9 Gradual Progression in Linguistic Complexity in Textbooks

Learning a language is a sequential process. Several scholars have stressed the sequence of learning a language because language learning is a continuous and

connected process. Moreover, the words are morphologically connected with the words' family. Furthermore, they are weaved in a string to make sense. Language is practised to describe feelings, emotions, opinions, and situations objectively and subjectively. "Learning involves linguistic challenges that increase as students move from primary to secondary schooling and on to higher education" (Schleppegrell, 2004, p. 1). Chall and Squire (1991, p. 126) remark that the tradition of sequencing of textbooks has been in practice for centuries "with each book designed to be suitable in content, appeal, and difficulty for children within each grade".

The suitability and difficulty according to learners' level are advantageous to learners in achieving proficiency and mastery of language. Francis et al., (2006) state that expertise in literary language is a significant indicator in determining the educational success of the learners as language plays a vital role in understanding, comprehension, and translation of ideas, opinions, feelings, and thoughts. This enables the learners to get command over a language which establishes a social position in general and academic success in particular. Scarcella (2003, p. i) goes further and argues that "learning academic English is probably one of the surest, most reliable ways of attaining socio-economic success" because it is an effective tool that improves learners' ability to communicate in society. Since a language socializes people and helps them to search for new ways for economic prosperity, language proficiency leads to upward social mobility. The native language is acquired through living in a community and interacting with parents first and then with other members of society. It incorporates new vocabulary and new phrases when the need arises. At the same time, the second language is learnt through teachers and textbooks, and new sentence structures are mastered to express new ideas in novel ways. For learning and understanding an academic language, the teachers are a significant duct and passage; learners get the meanings of texts as to how they are shaped by syntax (Delpit, 2006). As far as books are concerned, Nagy and Townsend (2012) point out that work in this area suggests that textbooks become more academic—that is, increasingly complex academic language—as grade level increases. Anstrom et al. (2010, p. v) clarify that academic English "is developmental with trajectories of increased sophistication in the language used from grade to grade." Since the major objective of my study is to explore LC, it is necessary to determine whether LC within a grade and across

different grades increases in a systematic pattern so that it can enable learners to maintain and enhance their language comprehension ability.

Zein et al., (2020) probed linguistic complicatedness through its two features i.e. LD and GI in the introduction parts of bachelors' theses by applying the Systemic Functional Linguistic framework. Such theses are appropriate samples of students' academic writing. Subtlety, the characteristic feature of academic writing, is measured through packaging ideas, which increases the LD of ...academic writing. It was hypothesised that the theses at this level would show higher LD and low GI. To answer the percentage of LD and index of GI, the researchers manually analysed twenty (20) introductory parts of the linguistic theses. Having written on various aspects of linguistics and literature, these theses covered sociolinguistics, psycholinguistics, pragmatics, translation studies, semantics, semiotics, discourse analysis, and multiple dimensions of literature. They explored various linguistic aspects, and there was steady differentiation of related vocabulary. The research concluded that the theses written in both the disciplines had substantially high LD which made them academically acceptable because the rules demand that the academic language at advanced level is required to be condensed and opaque.

Working in the Systemic Functional Linguistics framework, Putra and Lukmana (2017) examined the nature and rate of English textbooks' language complexity. The study verified that the gradual increase in lexical complexity occurs with the rise in the level. However, the results revealed that within the study level, there was no evidence of gradual progression of LD. In other words, the LD of the book's final chapter of the specific level was not consistently higher than in the previous chapters.

To (2015) examined the LC through the SFL lens. The dissertation dealt with the complete nature of LC, bonding LD, and GI. The researcher has taken nominalization and grammatical metaphor to address the issue of LD, while thematic structure and hierarchy of periodicity have been taken to comprehend the GI. The statistics were driven by using Ure's method as well as by the Hallidayan method. The core results were brought through the statistics gathered by the Hallidayan methodology. The data was collected from four level textbooks equally divided into science and non-science textbooks. The study probed into the shift of LC across the

level and within science and non-science book series. The study showed that the linguistic density became more complex at a higher level through a more significant number of nominalization and grammatical metaphors. In contrast, the curve of LC showed a slight downfall at the topmost level. No significant differences in LC were found between science and non-science textbooks. The researcher of the study believes that SFL has been widely used in Australia on a broader scale in recent years. The researcher recommended the use of a higher level of linguistics complexity in the textbooks designed for the students of secondary and post-secondary classes. Moreover, it was predicted that the higher LC at the intermediate and advanced levels was helpful to learners in their smooth shift to higher education.

To and Mahboob (2018) probed the LC through three dimensions: LD, grammatical metaphor, and nominalization across science and non-science textbooks. Mahboob mapped a three-dimensional language variation model. The researcher believes that language varies according to the mode of use. They mean that oral language has its dimensions while written language has its own. Assessing the language variation based on genre and field and over the various levels in book series of elementary, pre-intermediate, intermediate, and upper intermediate levels through the SFL lens found that science and non-science books have not differed statistically in the case of LD and nominalization. The study concludes that as the study level grows, the LD of the science and non-science textbooks do not differ significantly.

Presnyakova (2011) examined the gradual progression of LC within and across the levels regarding LD, lexical variation, and GI. By applying Ure's method and systemic functional grammar lens, the researcher probed sequential Arts textbooks from grades 2 to 5 taught in Ohio, United States. The results showed that LD and diversity varied slightly across levels while the lexico-grammatical variation was significantly prominent across the grades. This indicates that the learners are exposed to more sophisticated language at a higher level.

Mulyanti and Soeharto (2020) analysed the textual complexity by exploring its three features: LD, GI, and lexical variation. By applying a systemic functional lens and qualitative approach, the researcher probed the textual complexity of textbooks of three consecutive grades which were taught in Indonesia: VII, VIII, and IX. The researcher selected two texts from the textbook of each grade level. The study

concludes that LD score fluctuates within and across the classes while the level of GI increases with the increase in the study level.

Issa et al., (2022) examined the linguistic complexities in the English textbooks of grades IX and XII. The textbooks are being taught in colleges in Islamabad. Putting the SFL lens as the major framework, the study probed the LC of the textbooks in respect of LD and GI quantitatively. The researchers also applied Ure's method to calculate the lexical densities of the textbooks to verify whether the LDs conform with Ure's defined standards of written language. The major objective behind analysing the LC of two consecutive grades is to determine whether the LC of the textbooks conforms to the grade levels. The study concludes that grade XII English textbooks are more complex than the English textbooks of grade XI. My study is different from the above-mentioned study as I have incorporated another salient feature of LC, namely nominalization. My study also adds qualitative analysis and quantitative investigation to probe the gradual progression of textbooks within and across the levels. Furthermore, my study deals with elementary and secondary English textbooks.

Since the above discussion predominantly clarifies that sequence and gradual progression in LC according to grade levels in textbooks is an essential component that many researchers have explored. In the Pakistani context, it seems pertinent and suitable to investigate LC in English textbooks and to examine whether it conforms with the proposed criterion for different school grades.

CHAPTER 3

RESEARCH METHODOLOGY

This chapter starts with a discussion on the research approach and after concluding the discussion on the approach, I introduce the research method chosen for the study. The description of the research method is followed by the introduction to the population of the study where I outline my sample population. Afterwards, the chapter describes the data collection method and presents a rough picture of the data analysis procedure. There is not only provided an elaborate view of the theoretical framework of the study in which the study is situated but also paints a comprehensive view of the conceptual and functional framework. In the end, the conclusion part has a short analysis of the main points of the above discussion, which are covered as the major topics of the chapter.

3.1 Research Approach

Burn (as cited in To, 2015) states that research is an organised practice of analysis to discover possible solutions to certain issues. Almost all the areas are developing through research and to explore the hidden areas of education research is conducted. Keeping in view the definition of qualitative research given by Krathwohl (1998), we can conceive it as the description of facts and events in words rather than in numbers and numerics. Contrarily, quantitative research deals with facts through the numeric description. In educational research, quantitative studies see “teaching as a science,” whereas qualitative studies consider teaching to be an art (Suter, 2011, p. 55). To create a blend of science and art, my study employs a mixed method approach in which quantitative analysis is conducted to answer the first question, and to answer the second question, qualitative analysis is used. My study aims to uncover the trajectory of the gradual progression of LC in the English textbooks of elementary and secondary classes because assessment of LC can prove impactful in students’ more meaningful interaction with the text and achieve proficiency in English as a second language.

3.2 Research Method

To (2015)'s adapted methodology is used to carry out this research. The current study employs both quantitative and qualitative approaches because it deploys content analysis using the theoretical framework of SFL. The study deals with elementary and secondary school English textbooks. The textbooks are analysed to examine the LD, nominalization, and GI within a grade and across different grades. The findings are shown in bar graphs and pie charts. These textbooks exemplify how learners in Pakistan are introduced to academic writing while studying in Elementary and Secondary schools. Though they cannot be claimed to represent the entire educational reading materials used across academia, they offer a sizable data specimen that can be used for a focused design.

3.3 Research Sample

English textbooks of grades 6 to 10 which are taught at the elementary and secondary level in the institutions run by the Federal Government in ICT form the study's population. These textbooks are published by National Book Foundation and Punjab Textbook Board, Lahore, and are disseminated by the Ministry of Educational and Professional Training. Excluding poems and dialogues, I have used the first five lessons from each selected book as my sample. Every lesson was analysed with tools proposed in SFL theoretical framework. In short, the sample size is thirty (30) lessons from five study levels.

3.4 Data Collection

Data is collected from the English textbooks of five consecutive levels: grade 6 to grade 10. The study is an evaluative in its nature in which the researcher opted to examine the curve of progression of LC within and across the levels of textbooks. The required data was collected from the textbooks teachers were using at consecutive levels so that the results obtained from the analysis could be interpreted meaningfully and some insightful clues could be drawn.

3.5 Data Analysis

Manual reading of textual data from the English textbooks provided me with the data set on which I conducted subsequent quantitative and qualitative data analysis. The

quantitative analysis produced the results in the form of numbers and frequencies. After obtaining the numeric values for the proposed constructs, I calculated the mean of the values obtained earlier so that I could interpret the extent of the features that were affecting the LC.

3.5.1 Analysis of lexical density

The data relating to LD was analysed quantitatively as well as qualitatively. The instances of lexical items found in each textbook chapter were counted by manual reading. I have completed quantitative analysis to measure LD for which I have used two different methods. First, the extent of LD was found using Ure's method. According to Ure (1971), LD refers to the simple arithmetic percentage of the lexical items to the total number of words. At the second stage, the Hallidayan method was used to compute the extent of LD. According to Halliday (1989), the division of the total number of lexical items by the total number of ranking clauses gives the measure of LD. According to Halliday and Matthiessen (2014, p. 374), the "degree of interdependency is known technically as taxis", and there are two levels of dependency, i.e., parataxis and hypotaxis. The study followed Halliday and Matthiessen's (2014) method to show a definite distinction and count the number of clauses and clause complexes. To differentiate lexical items from grammatical items, lexical items of the units of the sample textbooks are underlined. At the beginning and the end of a clause complex, I have used marks denoted as // , while parataxis and hypotaxis clauses are marked by /.

3.5.2 Analysis of nominalization

Using Halliday's method and following Quirks' description, instances of nominalization were counted manually, and the total number was divided by total ranking clauses to get their proportion. The data obtained is followed by a discussion. For the second research question, the data was analysed qualitatively. Nominalized words are encircled to make them prominent for the sake of their counting.

3.5.3 Analysis of grammatical intricacy

By applying Halliday's method, GI was determined by dividing the total number of ranking clauses by the total number of clause complexes. For the qualitative analysis, I have given subjective discussion.

3.6 Theoretical Framework

Principally, the study applies Hallidayan (1989) framework to examine LC in English textbooks of grades 6 to 10. It was assessed first at the same level and later across different study levels. Since a comprehensive view of the framework is required, I detail here the formulae for determining the three features that have a direct impact on LC.

3.6.1 Lexical density

Halliday and Martin (2003) describe LD as the measure of the density of informational data in any written paragraph. The information density is directly linked with the packaging of lexical items in a syntactic structure. Precise categorisation of lexical and grammatical items and ranking and embedded clauses are compulsory. However, some items fall on the borderline, which is sometimes problematic (Halliday, 1989). To avoid any fluctuation and deviation, a precise categorization of lexical and grammatical items is provided to make data consistent and the study's results reliable.

Ure (1971) and Halliday (1989) have devised different procedures to compute LD. To Ure, for the calculation of LD, the total number of lexical items is divided by the total number of running words, and the result is multiplied by 100. This approach has been applied in several works. In Ure's approach, the typical LD of a written text usually falls at 40% and above. On the other hand, the LD of spoken language is normally less than 40% (Ure, 1971). In this study, this method was used only to check whether the LD of the selected textbooks was up to the mark of the suggested value of the English written language.

$$\text{Ure's lexical density} = \frac{\text{Total number of lexical items} * 100}{\text{Total number of words.}}$$

The second method used to measure LD was of Halliday's (1989). In this formula, LD is calculated by finding the ratio between lexical items to the total number of ranking clauses. According to Hallidayan formality level, the written text

has a LD usually between three to six. The higher LD indicates that the text is becoming more complex.

$$\text{Halliday's lexical density} = \frac{\text{Total number of lexical items}}{\text{Total number of ranking clauses}}$$

3.6.2 Lexical items

Different researchers and scholars categorize lexical and grammatical items in different ways. This study draws a specific line between lexical and grammatical items for clear differentiation. Lexical items consist of the word classes described below.

- All nouns, including common and proper nouns. A hyphenated compound noun is treated as a single lexical item, while a non-hyphenated compound noun will be considered as two lexical items.
- All verbs. The verb *be* is also included when it is used as a main verb.
- In phrasal verbs, only verbs are taken as lexical items.
- Adjectives are taken lexical items.
- Some adverbs. Adverbs of manner (e.g., briskly, slowly) and sentence adverbs (e.g., fortunately, hopefully, conclusively, eventually, gradually)

3.6.3 Grammatical items

The following categories in word classes will be taken as grammatical items for this research.

- All pronouns (e.g., I, you, us, yours, myself, anyone, this, etc)
- Determiners consisting of articles, quantifiers, and numbers

- All finite verbs consisting of do, have, and modals. If ‘do’ is used as the main verb, it will be treated as a lexical item, but when it is used as an auxiliary, it will be treated as a grammatical item.
- Some kinds of adverbs: adverbs of settings, adverbs of degree, negative particles, and interrogative adverbs
- All conjunctions
- All prepositions (e.g., on, in, under, beneath, over)
- Contractions like don’t, can’t, etc are taken as a single grammatical item.
- Exclamation words (e.g., Wow! Hurrah!, Alas!, Please!)

3.6.4 Ranking clauses

Ranking clauses attain full status of a clause in the text, while embedded clauses are embedded in something else and hence are not given the status of a ranking clause (Lukin, as cited in To, 2015). Paratactic and hypotactic clauses are included in ranking clauses (Halliday & Matthiessen, 2014, Halliday, 1989).

(i) Paratactic clauses

Explaining the paratactic relation, Halliday and Matthiessen (2014, pp. 374-375) state that parataxis “is the relation between two like elements of equal status, one initiating and the other continuing.”

(ii) Hypotactic clauses

According to Halliday and Matthiessen (2014, p. 374) “hypotaxis is the relation between a dependent element and its dominant, the element on which it is dependent.” Hypotactic clauses also include non-defining relative clauses.”

(iii) Reported clauses

“Reported clauses can be analysed in terms of parataxis and hypotaxis” (Thompson, 2013, p. 190). In some cases, reporting clause and the quote are in an equal relation, as shown in the example (3.8). On the hand, in other cases reported clause may depend on reporting clause, as shown in the example (3.9).

(3.8). They said, “/Oh yes, we sell refills.”

(3.9). I asked, / “How much two aquamarines would be?”

In the above examples, the sign / marks the boundary of the ranking clause.

(iv) Embedded Clause

An embedded clause or phrase is a “rank shift” and serves the functions of a post-modifier of a nominal group, a post-modifier of an adverbial phrase, or a head/ thing of a nominal group (Halliday & Matthiessen, 2014, p. 426).

(3.3) The man [who came to dinner]

The above example [] shows that it encompasses an embedded clause.

According to Thompson (2013, p. 24), embedded clauses are a type of another unit that “allows a unit to be expanded by the inclusion of another unit”. For example,

(3.6) Tumours [of the cervical spine] are rare.

(3.7) Experiments [in the dehydration and evaporation of milk] were also taking place at this time. (Thompson, 2013, p.24). The nominal groups include to expand the unit may occur as a premodifier or a postmodifier.

3.6.5 Nominalization

Nominalization is a unique aspect of academic and scientific writing (Banks, 2005; Halliday & Martin, 2003; Halliday & Matthiessen, 2014). Since nominalization is a device that directly contributes to increase the LD of language by creating more compact and condensed prose, I have included it in my study and attempted to link it with the measure of LD obtained with the Hallidayan formula. Ultimately, nominalization enhances LC. Among several definitions, Martin (2008, p. 82) defines nominalization as “a grammatical resource for deriving nouns from other word

classes”. The derivative names of processes are called nominalizations (Thomson & Droga, 2012). According to Eggins (2004, p. 58) nominalization is a process of “turning things that are not normally nouns into nouns”. Functionalists divide nominalization into two common types: verbal and adjectival. Both are included in my study. For studying nominalizations, I have adopted the endings of nominals as listed below. These endings were suggested by Quirk et al., as cited in To (2015).

-suffix	Quirk’s description	Examples
-ment	Verb	punishment, measurement,
-ion	Verb	conception, complication
-ation	Verb	Attestation, Exploration
-ing	Verb	Reading, warning
-ity/-ty	Adjective	Superiority, Priority
-ance/- ence	Adjective	Assurance, importance
-al/-ial	Dynamic verbs	Removal
-ship	Nouns	relationship, friendship
-ness	Adjectives	Madness, darkness
-ism	Nouns/ adjectives	Criticism, racism

After identifying instances of nominalization, I have divided the total number of nominalized words in a unit by the total number of ranking clauses in it.

3.6.6 Grammatical intricacy

GI or the intricacy of grammatical structure is obtained when the total number of ranking clauses is divided by the total number of clause complexes (Halliday as cited in To, 2015). It is evident that if there are more ranking clauses in a clause complex, the GI will be higher.

$$\text{Grammatical intricacy} = \frac{\text{Total number of ranking clauses}}{\text{Total clause complexes}}$$

Castello (2008) is right in claiming that the intricacy of grammatical structure refers to how many clauses a clause complex has. A high index of GI shows that the language is constructed intricately.

During the calculation of GI, only ranking clauses that are either hypotactic or paratactic are included. Embedded clauses remain excluded. Parataxis includes the clauses that are joined by coordinating conjunctions like ‘for, and, but, or, nor, yet, so’ and direct speech complexes. On the other hand, hypotaxis includes conjunctions like ‘if, besides, when, because, instead of’ and indirect complexes (Halliday, 1989).

3.7 Data Analysis Procedure

At the first stage of data analysis, the total running words of each of the first five units, excluding poems and dialogues, of all the five English textbooks from grades VI to X were counted through a manual reading of the texts. With the manual reading of the text, I marked lexical and grammatical items according to the list provided in sections 3.6.2 and 3.6.3. After this, the lexical items were counted to find the LD. The percentage of the LD of each level calculated by Ure’s method is reflected in separate tables. Furthermore, in tabular form, LD calculated by Halliday’s method is shown.

For the calculation of LD in the Hallidayan method, ranking clauses and clause complexes are counted as per their description in section 3.6.4. To calculate the ratio of nominalization, instances of nominalization are counted manually. In the end, GI is calculated by applying Halliday's SFL formula.

3.8 Conclusion

In this chapter, the significant elements of the research methodology and research framework have been discussed. The discussion on the research approach is immediately followed by the outline of the research method. The detail on the research sample follows the research method. After explaining how I collected the data, I sketched my data analysis procedure. The data analysis portion has a brief sketch providing an avenue of investigation of three aspects of LC: LD, nominalization, and GI. In the end, I have elaborated how my study situates in the research framework of SFL and specified the meanings and applications of key terms of my conceptual framework along with a brief sketch of the data analysis procedure. In the next chapter, I conducted the data analysis and interpreted the results to reach the findings of the study.

CHAPTER 4

DATA ANALYSIS

4.1 Data Analysis

This chapter contains the quantitative and qualitative analysis of the collected data. The analysis chapter includes the analysis of LD first in Ure's method. Then a quantitative portrayal of LD is done by the Hallidayan method. The ratio of the use of nominalization follows LD analysis. In the end, GI indices are calculated, and then the numerical data is discussed qualitatively to answer the second research question.

4.2 Linguistic complexity features analysis within and across five levels of English textbooks

The first research question states: What is the extent of lexica density, nominalization, and grammatical intricacy within and across elementary and secondary-level textbooks? The three aspects of LC named as LD, nominalization, and GI are measured arithmetically.

4.2.1 Lexical density calculated by using Ure's method

English textbook grade VI

Table 4.1 Percentage of lexical density of the selected units of English textbook of grade VI

S.No.	Name of Unit	Total No. of words.	Total No. of lexical items.	Percentage of the lexical density.
01	Healthy Living	649	333	51.31
02	Little Frog in the Well	905	410	45.3
03	The People of the Cave	463	180	38.88
04	Ideas, Designs & Architecture	622	318	51.13
05	The Sweating Earth	871	436	50.10

Table 4.1 shows the percentage of LD by using Ure's (1971) method. The table shows the total number of words in a lesson, the total lexical items in it, and the percentage of the LD of the first five units of the English textbook of grade VI. The very first unit of the book with the title "*Clean and Green Pakistan A Campaign*", is excluded from the analysis due to its dialogic nature. According to Ure (1971), the LD of the written language should be more than 40% when it is counted by the total number of words of the written text, so the dialogue is excluded because the conversation is different from the written prose. Instead, it is a written form of the spoken language. Regarding the standards of LD of written language set by Ure (1971), it was found that the third unit of the sample population with the title "The people of the cave" does not conform to the proposed standard.

English textbook grade VII

Table 4.2 Percentage of lexical density of the selected units of English textbook of grade VII

S. No.	Name of Unit	Total No. of words.	Total No. of lexical items.	Percentage of the lexical density.
01	A Glimpse from Life of the Rasool of Allah (S.A.W.W)	856	401	46.85
02	Fire	780	321	41.15
03	Robotics	603	326	54.10
04	Lincoln's Letter to His Son's Teacher	426	178	41.78
05	Dr. Ruth Pfau - A Humanitarian	606	284	46.86

Table 4.2 shows the sketch of the percentage of the LD of the first five units of the English textbook of grade VII. Before calculating LD, the units were read carefully, and those having a dialogue as their part were excluded from the data. In this way, chapter 1 of the textbook with the title "Blessing of Almighty Allah" was excluded because it was partially dialogic. Unit No. 3 was a poem, unit No. 4 with the title "Stories of Mullah Nasruddin" also had a dialogic expression, and unit No. 7 was a poem, so these units were not included in the data to keep consistency in the data set. Concerning the LD level as per Ure's (1971) mentioned standards, it was found that nearly all the sample units of this textbook conform to this level because the LD of all the units is more than 40%.

English textbook grade VIII

Table 4.3 Percentage of lexical density of the selected units of English textbook of grade VIII

S. No.	Name of Unit	Total No. of words.	Total No. of lexical items.	Percentage of the lexical density.
01	The Madina Charter	611	302	49.43
02	The Caliph and the Gardener	1050	422	40.20
03	A Visit to Swat Valley	746	352	47.18
04	The Hospital Window	900	401	44.55
05	Major Shabir Sharif (Shaheed), NH and SJ	1040	577	55.48

Table 4.3 displays a quantitative illustration of the LD of five units of the English textbook for grade VIII. The percentage of LD is calculated by applying Ure's (1971) formula for measuring LD. The percentage of lexical items is calculated with respect to the total number of words of each unit. According to Ure (1971), the LD of the written language is more than 40%. Regarding Ure's criterion, it was found that the LD of nearly all the five units of the textbook is convergent with the proposed level.

English textbook grade IX

Table 4.4 Percentage of lexical density of the selected units of English textbook of grade IX

S. No.	Name of Unit	Total No. of words.	Total No. of lexical items.	Percentage of the lexical density.
01	The Saviour of Mankind	856	427	49.88
02	Patriotism	332	163	49.09
03	Hazrat Asma (R.A)	603	296	49.08
04	The Quaid's Vision and Pakistan	371	190	51.21
05	Sultan Ahmed Masjid	581	268	46.13

Table 4.4 presents a tabular form of the percentage of the LD of the first five units of the English textbook of grade IX. The tabular data contains a lesson's total number of words, lexical items, and the LD in percentage terms. The percentage is found by applying Ure's (1971) formula of LD. Unit No. 3, with the title "Media and its Impact" was excluded because it was in the dialogic conversation of a class that did not reflect the LD of written text. Unit No. 5, "Daffodils," was omitted from the analysis due to its poetic genre. Ure's (1971) set criterion for the LD of the written language is more than 40%. Assessing the LDs of the selected five units of the textbook on this criterion, it is seen that almost all the chapters follow the standard.

English textbook grade X

Table 4.5 Percentage of lexical density of the selected units of English textbook of grade X

S. No.	Name of Unit	Total No. of words.	Total No. of lexical items.	Percentage of the lexical density.
01	Hazrat Muhammad (S.A.W.W), an Embodiment of Justice	710	313	44.08
02	Chinese New Year	500	249	49.80
03	First Aid	713	411	57.64
04	Television vs. Newspaper	492	213	43.29
05	Little by Little One Walks Far!	513	242	47.17

Table 4.5 depicts a blueprint of the percentage of the LD of five units of English textbook of grade X. The table contains a summary of total words, lexical items, and then the percentage of the LD as calculated by Ure's (1971) formula. Unit No. 3 with the title "Try Again" and unit No. 5 with the title "The Rain" were not included in the data due to their poetic nature. Ure (1971) mentioned that when percentage of LD is found to the total running words of the written text, it should be more than 40%. Keeping Ure's (1971) set standard in view, it is observed that the sample five units of the textbook have the proposed level of LD.

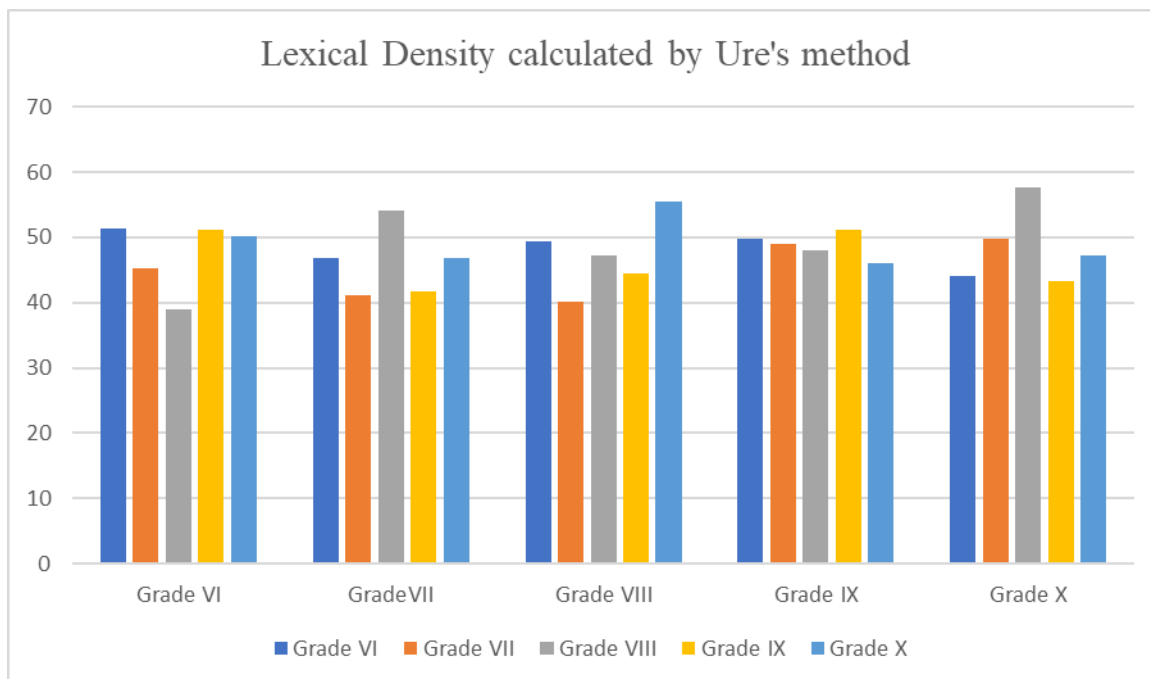


Fig 4.1

Lexical density of the first five units of the five selected study levels calculated by applying Ure's method

Figure 4.1 depicts the results in bar graph. It shows that almost all the units of the sample textbooks of five levels, except a unit in grade VI, have LD higher than 40%. The percentage is considered as the normal LD of written texts (Ure, 1971). Only one unit of the textbook of grade VI with the title “The people of the Cave” has a LD score of only 38.88%, which is lower than the mean number score of density as determined by Ure (1971). The range of LD scores within the sample units of elementary and secondary English textbooks starts from 38.88 and reaches 57.64. However, the data does not show any gradual increase in the percentage of lexical items within or across the level.

4.2.1.1 Discussion on lexical density found by using Ure's method.

The LD analysis in the tables is calculated by Ure's (1971) method. For each of the five units of selected grades from VI to X, its graphical representation depicts that all except one unit have equal or more than 40% LD. According to Ure (1971), LD of

written text is required to be higher than 40%. The unit with the title “The People of the Cave” is the English textbook of grade VI that has LD lower than 40%. Its score of LD reaches only 38.88%. As far as the percentage of LD is concerned, the data shows that the selected textbooks conform with Ure’s (1971) view of the LD of written text. However, contrary to the proposed scheme that the LD should grow gradually, the percentage does not conform with the gradual increase in the LD with the increase in grade level. The findings are consistent with the results recorded in Sari D. (2018).

4.2.2 Lexical density within the study levels calculated by Halliday’s method

As stated earlier, the first question of the research is: What is the extent of lexical density, nominalization, and grammatical intricacy within and across the textbooks of elementary and secondary levels? LD is computed by the formula proposed by Halliday (1989), which is based on the ratio of lexical items per ranking clause. Since some lexical items fall on the borderline of lexical and grammatical words, consistency is the key factor in separating and calculating lexical items and grammatical items. As explained in section 3.6.4, in SFL paratactic and hypotactic clauses form ranking clauses, whereas the embedded clauses are excluded from this notion of taxis. According to Halliday’s method, distinguishing between ranking clauses and lexical and grammatical items is crucial. The divisions are made through manual reading. The results of calculations for LD, nominalization, and GI within and across the levels are displayed in tables, bar graphs, and pie charts separately. The detail for each feature of LC is in the coming sections.

English textbook grade VI

Table 4.6 Lexical density of the selected units of English textbook of grade VI

S. No.	Name of Unit	Total No. of lexical items.	Total No. of ranking clauses.	Lexical density.
01	Healthy Living	333	79	4.21
02	Little Frog in the Well	410	137	2.99
03	The People of the Cave	180	50	3.60
04	Ideas, Designs & Architecture	318	61	5.21
05	The Sweating Earth	436	86	5.06

Table 4.6 mirrors the LD of the first five units of the English textbook of grade VI. The table has the data of the total number of lexical items, the total number of ranking clauses of each unit, and then LD is counted using Halliday's (1989) method, which is the ratio of lexical items to ranking clauses. The "Little Frog in the Well" unit has the least LD of 2.99. In contrast, the unit titled "Designs & Architecture" has the maximum LD of 5.21, the highest in the entire data set of the lessons within the same textbook. The LD of the five lessons ranges from 2.99 to 5.21, and it fluctuates haphazardly from low to high or high to low within the level.

According to Berendes et al., (2018), the reading and comprehension complexity of the textbooks should differ gradually within the tracks in line within a study level. From table 4.6, it is observed that the LD indices of the first five units do not show a regular pattern of rise among the five sample units of the textbook; rather, there is a significant gap between the lowest and the highest LD level. This irregular variation does not conform with the notion of systematic progression in LC. Hence, this irregular variation may be problematic for the learners to learn the language as the linguistically dense texts pose greater processing demands because of the limits of human working memory (Miller, 1969).

The raw data required for calculating LD by applying Halliday's (1989) method consists of the total number of ranking clauses in every unit and total number of lexical items are marked and underlined respectively. Their description is given in Appendix A.

English textbook grade VII

Table 4.7 Lexical density of the selected units of English textbook of grade VII

S. No.	Name of Unit	Total No. of lexical items.	Total No. of ranking clauses.	Lexical density.
01	A Glimpse from Life of the Rasool of Allah (S.A.W.W)	401	118	3.39
02	Fire	321	147	2.18
03	Robotics	326	68	4.79
04	Lincoln's Letter to His Son's Teacher	178	80	2.22
05	Dr. Ruth Pfau - A Humanitarian	284	65	4.36

Table 4.7 depicts the LD of the first five units of the English textbook of grade VII. The tabular data contains the total number of lexical items of each lesson, the total number of ranking clauses, and the LD measured by dividing the first by the second. The LD of the five lessons ranges from 2.18 to 4.79. The unit with the title "Fire" has the lowest LD range of 2.18, while the unit with the title "Robotics" has the highest LD of 4.79 within the level. The LD spreads randomly within the five units of the textbook.

According to Halliday (1989), the LD of the written text is 3 to 6, but table 4.7 shows that the LD of the two sample units of the textbook does not conform to this criterion. Moreover, it is observed that the ratios of LD do not rise regularly; rather, it varies randomly within the first five units of the textbook. The LD index of the five

units of the study level does not conform to Berendes et al., (2018), view of systematic complexification assumption. Moreover, the intermittent rise and fall may hamper the smooth progress of learners due to the limits of human working memory (Miller, 1969).

Raw data required for the calculation of LD by applying Halliday's (1989) method comprises the total number of ranking clauses in every unit and lexical items. The former is marked with /, and the latter is underlined. They are described in Appendix B.

English textbook grade VIII

Table 4.8 Lexical density of the selected units of English textbook of grade VIII

S. No.	Name of Unit	Total No. of lexical items.	Total No. of ranking clauses.	Lexical density.
01	The Madina Charter	302	66	4.57
02	The Caliph and the Gardener	422	148	2.85
03	A Visit to Swat Valley	352	58	6.06
04	The Hospital Window	401	115	3.48
05	Major Shabir Sharif (Shaheed), NH and SJ	577	92	6.27

Table 4.8 is a tabular picture of LD of the first five units of the English textbook of grade VIII. The table shows the total number of lexical items of a unit that are mentioned against the box of each unit and also includes the total number of ranking clauses. The last box against each unit has LD, calculated using Halliday's (1989) method. The unit with the title "The Caliph and the Gardener" is at the bottom line in respect of its LD when it is compared with the other four units of this textbook. It has an LD of 2.85, whereas the unit with the title "Major Shabir Sharif (Shaheed), NH

and SJ” is at the top order when we compare the LD of five units in the book. Its LD is 6.27.

The random rise and fall of the LD index within a vast range negates the Halliday’s proposition of LD of the written text at both the lowest and the highest level. At the lowest level, a unit has 2.85 LD index, and it is less than 3, whereas at the highest level, the lesson with an LD of 6.27 goes beyond the described LD limit. Furthermore, this vast range and sporadic LD indices which in one way do not conform to the idea of gradual progression and in another way, are problematic due to the cognitive limitations for the learners to proceed smoothly within the study level (Miller, 1969). This intermittent rise and fall do not have agreement with the notion of regular progression in LD.

The raw data required for calculating LD by applying Halliday’s (1989) method consists of total number of ranking clauses in every unit and the lexical items in it. The ranking clauses are marked, and the lexical items are underlined. They are described in Appendix C.

English textbook grade IX

Table 4.9 Lexical density of the selected units of English textbook of grade IX

S. No.	Name of Unit	Total No. of lexical items.	Total No. of ranking clauses.	Lexical density.
01	The Saviour of Mankind	427	81	5.27
02	Patriotism	163	27	6.03
03	Hazrat Asma (R.A)	296	68	4.35
04	The Quaid’s Vision and Pakistan	190	40	4.75
05	Sultan Ahmed Masjid	268	53	5.05

Table 4.9 has the tabular representation of the LD of the first five units of English textbook of grade IX. The picture has the total number of lexical items of each of the

five units, the total number of ranking clauses, and then, in the last box of the table, LD has been measured, which is the ratio of the total number of lexical items of a unit and the total number of ranking clauses. The unit having the title “Hazrat Asma (R.A)” has the minimum LD score of 4.35 in the five units. In contrast, the unit with the title “Patriotism” has a maximum LD score of 6.03. The LD of the five units shows random increase or decrease within the level.

Table 4.9 suggests that although the sample units are in line with a textbook, but the LD index does not increase gradually. This does not qualify Berendes et al., (2018)’s notion of systematic progression. Moreover, this uncertain and haphazard LD within a study level hampers the cognitive processing to comprehend the hard lexical strings.

The raw data required for the calculation of LD by applying Halliday’s (1989) method includes total number of ranking clauses in every unit and the lexical items in it; they are marked and underlined respectively. Appendix D contains the data of book IX.

English textbook grade X

Table 4.10 Lexical density of the selected units of English textbook of grade X

S. No.	Name of Unit	Total No. of lexical items.	Total No. of ranking clauses.	Lexical density.
01	Hazrat Muhammad (S.A.W.W), an Embodiment of Justice	313	78	4.01
02	Chinese New Year	249	43	5.79
03	First Aid	411	88	4.67
04	Television vs. Newspaper	213	59	3.61
05	Little by Little One Walks Far!	242	58	4.17

Table 4.10 has the tabular portrayal of the LD of the first five units of the English textbook of grade X. The table has an arithmetic description of the total number of lexical items, the total number of ranking clauses, and then LD calculated by applying Halliday's (1989) method. According to Halliday, LD is the ratio of the total number of lexical items to the total number of ranking clauses. Within the level of grade X, the unit with the title "Television vs. Newspaper" has a minimum score of 3.61 LD, the lowest among the five units. In contrast, the unit with the label "Chinese New Year" has the maximum score of 5.79 LD, the highest in the first five units of the grade level. Here also, the increase in LD score does not follow any regular pattern.

Table 4.10 depicts the same random LD index which does not conform to Berendes et al., (2018)'s notion of gradual progression of the LD level within a textbook of a study level. Thus, this inadequacy in the systematic progression of LD within the level is uncertain and hinders the working human memory to read and comprehend the text.

The raw data required for the calculation of LD by applying Halliday's (1989) method includes total number of ranking clauses in every unit and the lexical items in it; they are marked and underlined, respectively. Appendix E contains the data of book X.

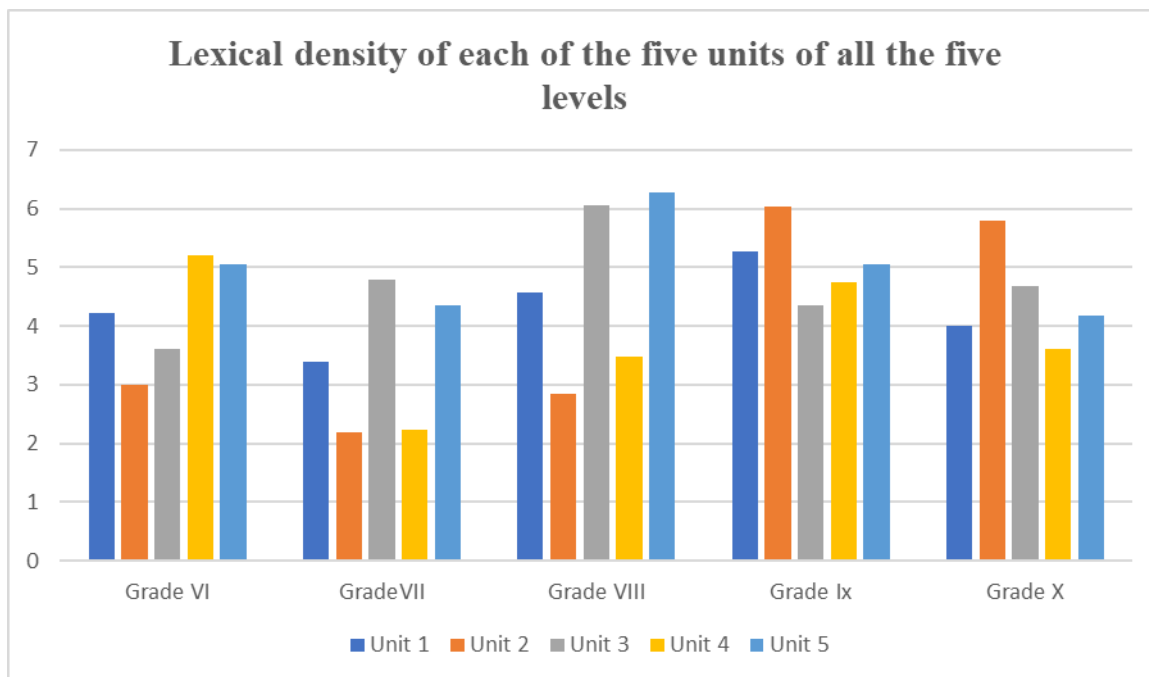


Fig 4.2

Lexical density of all the five units of the selected five study levels of English textbook; calculated by Hallidayan method

4.2.2.1 Lexical density by Halliday's method across the five study levels

Table 4.11 Mean lexical density of the first five units of each textbook

S. No	Textbook level	Sum of Lexical density of first five units	Mean
01	Grade VI	$4.21 + 2.99 + 3.60 + 5.21 + 5.06 = 21.07$	$21.07/5 = 4.21$
02	Grade VII	$3.39 + 2.18 + 4.79 + 2.22 + 4.36 = 16.94$	$16.94/5 = 3.39$
03	Grade VIII	$4.57 + 2.85 + 6.06 + 3.48 + 6.27 = 23.23$	$23.23/5 = 4.64$
04	Grade IX	$5.27 + 6.03 + 4.35 + 4.75 + 5.05 = 25.45$	$25.45/5 = 5.09$
05	Grade X	$4.01 + 5.79 + 4.67 + 3.61 + 4.17 = 22.25$	$22.25/5 = 4.45$

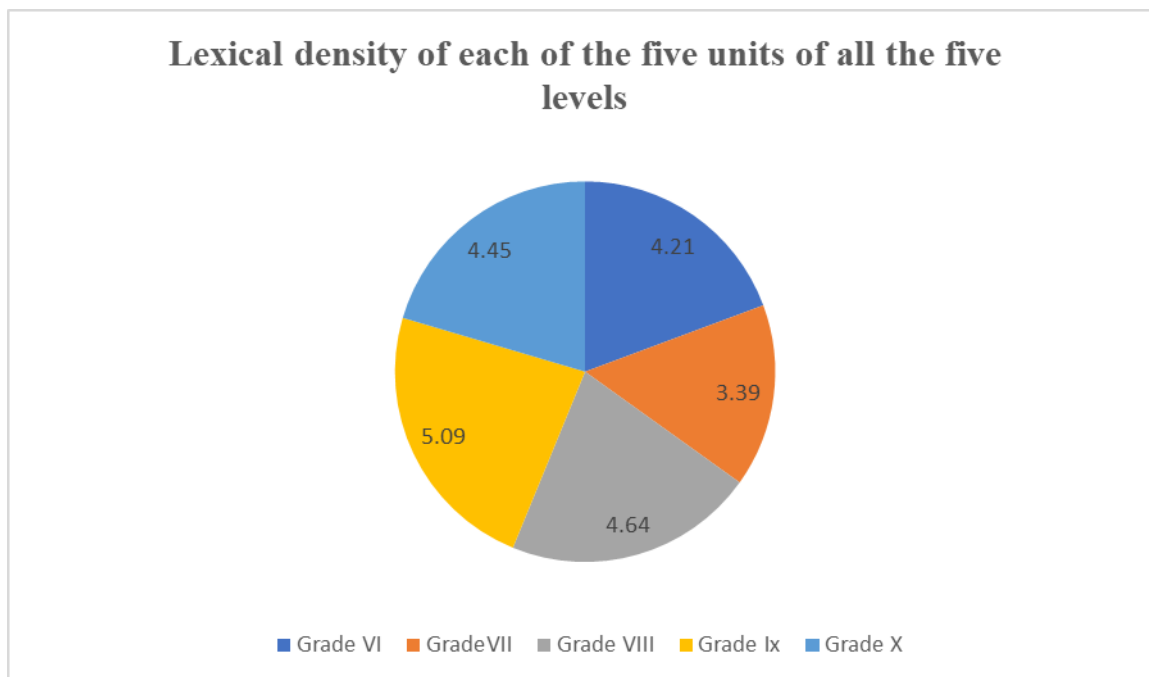


Fig 4.3

Mean lexical density of the selected five study levels

Table 4.11 is an illustration of the arithmetic means of the LD of the first five units of each of the five English textbook levels. The table contains the LD of the first five units calculated by the method suggested in Halliday (1989) and described in section 3.6.1. The mean of LD of five grades is calculated by first adding their individual LD, and later dividing the sum by 5.

The mean LD index of the five selected study levels suggests that nearly all the LDs of all the five selected study levels correspond to Halliday's (1989) proposition of the LD level of the written language. Despite this concordant picture, the LD score across the study levels does not conform to Berendes et al., (2018)'s view of the gradual progression of complexity across the levels, and the LD across the study levels shows this aspect in the least. To Miller (1969), lexically dense texts pose greater processing demands than lexically sparse texts, so the complexity of the textbooks may be according to the age and grade of the learners but the sample textbooks of the selected study grades are least concerned with this feature.

4.2.2.2 Discussion on lexical density calculated by Halliday's method

LD is one of the significant factors that have a direct impact on the LC of written language. The quantified data shows an irregularly varying pattern of LD within and across the five selected study grades. The first unit of each study level does not contain the least number of lexical items. Similarly, the fifth unit does not reach the highest level of LD value. The same sporadic pattern is seen across the five study levels. In other words, the LD increase or decrease does not follow any consistent pattern within the level and across different levels. The study results are convergent with the findings of not only Putra and Lukmana (2017) but also of Mulyanti and Soeharto (2020).

4.3 Nominalization within the study levels

English textbook grade VI

Table 4.12 Nominalization in the selected units of English textbook of grade VI

S. No	Name of Unit	Total No. of ranking clauses	Total No. of instances of nominalization	Nominalization per ranking clause
01	Healthy Living	79	14	0.17
02	Little Frog in the Well	137	0	00
03	The People of the Cave	50	5	0.1
04	Ideas, Designs & Architecture	61	12	0.19
05	The Sweating Earth	86	8	0.09

Table 4.12 mirrors a sketch of tokens of nominalization per ranking clause in each unit of the English textbook of grade VI. Instances of nominalization are distinguished and counted on the criterion described by Quirk et al and cited in To, 2015. The description of nominalization is given in the section 3.6.5. The division of ranking clauses is made on Hallidayan criterion of ranking clauses. The ratio of

nominalization instances per ranking clause ranges from 00 to 0.19 withing the sample units of study level. The unit with the title “Little Frog in the Well” contains no token of nominalization. In contrast, the unit at serial No. 04 with the title “Ideas, Designs & Architecture” has the highest token of 0.19. The number of tokens of nominalization scatters across the five units of the level randomly without following any specific pattern.

Nominalization is a device that enhances LD by rendering compactness, and it makes the language condensed. The complexity arising out of the use of nominalization may also concord with the notion of gradual progression, but this is not seen throughout the level. Apart from this, learners are expected to learn the use of nominalization at the age of nine and ten (Halliday and Matthiessen, 2013). In grade VI the average age of the students is expected to be ten to eleven years, but a unit with the title “Little Frog in the Well” does not incorporate even a single instance of nominalization. Hence, this aspect of lexical knowledge is missing in this unit.

English textbook grade VII

Table 4.13 Nominalization in the selected units of English textbook of grade VII

S. No	Name of Unit	Total No. of ranking clauses	Total No. of instances of nominalization	Nominalization per ranking clause
01	A Glimpse from Life of the Rasool of Allah (S.A.W.W)	118	21	0.17
02	Fire	147	02	0.01
03	Robotics	68	15	0.22
04	Lincoln’s Letter to His Son’s Teacher	80	03	0.03
05	Dr. Ruth Pfau - A Humanitarian	65	17	0.26

Table 4.13 reflects the total number of ranking clauses and the number of instances of nominalization used in the written text of each unit of the English textbook of grade VII. Nominalized words are separated from each unit following the criterion set by Quirk and described in the section 3.6.5. The total number of ranking clauses is counted by following Halliday's division of paratactic and hypotactic clauses, as mentioned in section 3.6.4. Then the ratio of nominalization per ranking clause is calculated. It is ranging from 0.01 to 0.26 within the study level. Unit at serial No. 2 with the title "Fire" has the minimum ratio of 0.01 nominalization instances per ranking clause. In comparison, the unit at serial No. 5 with the title "Dr. Ruth Pfau - A Humanitarian" has the highest score of nominalization ratio, which is 0.26 instances of nominalization per ranking clause. The ratio of nominalization per ranking clause score is scattered haphazardly across the five units of grade VII.

To Wenyan (2012), with nominalization, the text becomes heavily sophisticated which needs more cognitive effort to decode and understand. Since this bulkiness is difficult to comprehend, so this device is suggested to be used gradually within the study level but the sample textbook does not confirm this view. The textbook's last units incorporate the maximum number of nominalization cases while the second and the fourth units include the minimum instances of nominalization. This shows the inadequate concordance with the scheme of gradual progression of the LC level.

English textbook grade VIII

Table 4.14 Nominalization in the selected units of English textbook of grade VIII

S. No	Name of Unit	Total No. of ranking clauses	Total No. of instances of nominalization	Nominalization per ranking clause
01	The Madina Charter	66	17	0.25
02	The Caliph and the Gardener	148	05	0.03
03	A Visit to Swat Valley	58	03	0.05
04	The Hospital Window	115	01	0.01
05	Major Shabir Sharif (Shaheed), NH and SJ	92	19	0.20

Table 4.14 is an arithmetic representation of the nominalized words per ranking clause. To calculate the ratio, the total number of ranking clauses of each unit of the English textbook of grade VIII is counted, after which the total number of instances of nominalization used in the written text of each unit is calculated. The measurement of the ratio of nominalization in numerical form shows that it ranges from 0.01 to 0.25 per clause. The unit with the title “The Hospital Window” has a minimum ratio of nominalization of 0.01. In contrast, the textbook unit with the title “The Madina Charter” has a maximum score of the ratio of nominalization of 0.25. The results reveal that the range of the ratio of nominalization from 0.01 to 0.25 is scattered within the five units of the selected textbook for grade VIII.

Nominalization is a lexical device that, by wrapping the text into fewer words, makes it heavy to comprehend. Since nominalization increases the LD index of a text, so its use is advised to progress gradually within a study level, but the sample textbook shows an inadequate concordance with the view of systematic progression. Besides this, the use of very fewer instances of nominalization in the second, third and

fourth units deprives the learners of grade VIII to be familiar with this useful lexical device.

English textbook grade IX

Table 4.15 Nominalization in the selected units of English textbook of grade IX

S. No	Name of Unit	Total No. of ranking clauses	Total No. of instances of nominalization	Nominalization per ranking clause
01	The Saviour of Mankind	81	26	0.32
02	Patriotism	27	12	0.44
03	Hazrat Asma (R.A)	68	07	0.10
04	The Quaid's Vision and Pakistan	40	04	0.10
05	Sultan Ahmed Masjid	53	06	0.11

Table 4.15 presents the quantitative data of the ratio of nominalization instances in the selected five units of the grade level. For measurement of the ratio of the cases of nominalization, the total number of ranking clauses is counted in accordance with Halliday's description of ranking clauses mentioned in the section 3.6.4, after which the total number of instances of nominalization is counted. Then the ratio is calculated, and the results are portrayed in the table. The ratio ranges from 0.10 to 0.44, randomly scattered within the five units. Two units of the grade level with the titles "Hazrat Asma (R.A)" and "The Quaid's Vision and Pakistan" have the same score of the ratio of 0.10, reflecting that each of the two units employs 0.10 instances of nominalization per clause. The unit entitled "Patriotism" has the greatest extent of ratio of nominalization with a score of 0.44.

Nominalization is a technical device that compacts and condenses the written text. When the text is condensed, it is difficult to decode and comprehend; hence, the LC level of the text increases. To conform to the gradual progression of LC within the

study level, the use of nominalization is suggested to be increased slowly, but the same is not observed within this study level. In this way, the learners may face difficulty in comprehending the uneven LC level due to the limits of human working memory (Miller, 1969).

English textbook grade X

Table 4.16 Nominalization in the selected units of English textbook of grade X

S. No	Name of Unit	Total No. of ranking clauses	Total No. of instances of nominalization	Nominalization per ranking clause
01	Hazrat Muhammad (S.A.W.W), an Embodiment of Justice	78	14	0.17
02	Chinese New Year	43	09	0.20
03	First Aid	88	17	0.19
04	Television vs. Newspaper	59	07	0.11
05	Little by Little One Walks Far!	58	07	0.12

Table 4.16 shows the tabular data of the ratio of five units of the grade X English textbook. To calculate the data, each of the five units' total number of ranking clauses is counted based on Halliday's description of ranking clauses. Then the total number of instances of nominalization used in each unit's text is counted, and the numbers are written in the boxes against each unit. The ratio of nominalization is calculated for each unit, and the data shows that the ratio range among the five units is 0.11 to 0.20. The "Television vs. Newspaper" unit lies at the bottom of the score and has only a 0.11 ratio. In comparison, the unit with the label "Chinese New Year" lies at the highest position of the grade level and has a 0.20 ratio of nominalization. The range of the ratio score is scattered within the five units haphazardly.

Nominalization is a useful device of academic language that learners start learning at the nine or ten (Halliday & Matthiessen, 2013), but in the highest study level of secondary school education, the students are taught this inadequately. The very small number of instances of nominalization in the last two sample units shows the least concordance with the assumption of systematic gradual progression of LC within the level. To Harmer (2008), textbooks need to be in proper order and appropriate for the level of grades, but the textbook does not confirm this viewpoint.

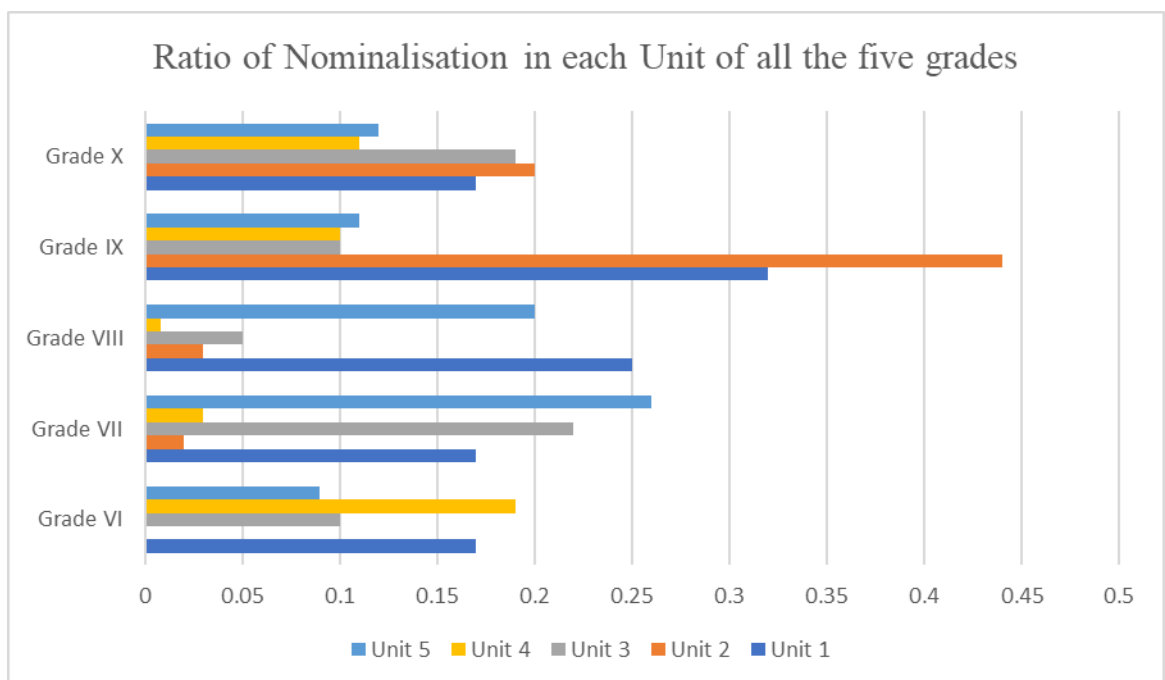


Fig 4.4

Ratio of nominalization of each of the five units of all the five study levels

4.3.1 Nominalization across the five study levels

Table 4.17 Means of nominalization of the first five units of each selected textbook

S. No	Textbook level	Sum of the ratio of nominalization of the first five units	Mean
01	Grade VI	$0.17+0.00+0.10+0.19+0.09$	$0.55/5 = 0.11$
02	Grade VII	$0.17+0.01+0.22+0.03+0.26$	$0.69/5 = 0.14$
03	Grade VIII	$0.25+0.03+0.05+0.01+0.20$	$0.538/5 = 0.11$
04	Grade IX	$0.32+0.44+0.10+0.10+0.11$	$1.07/5 = 0.21$
05	Grade X	$0.17+0.20+0.19+0.11+0.12$	$0.79/5 = 0.16$

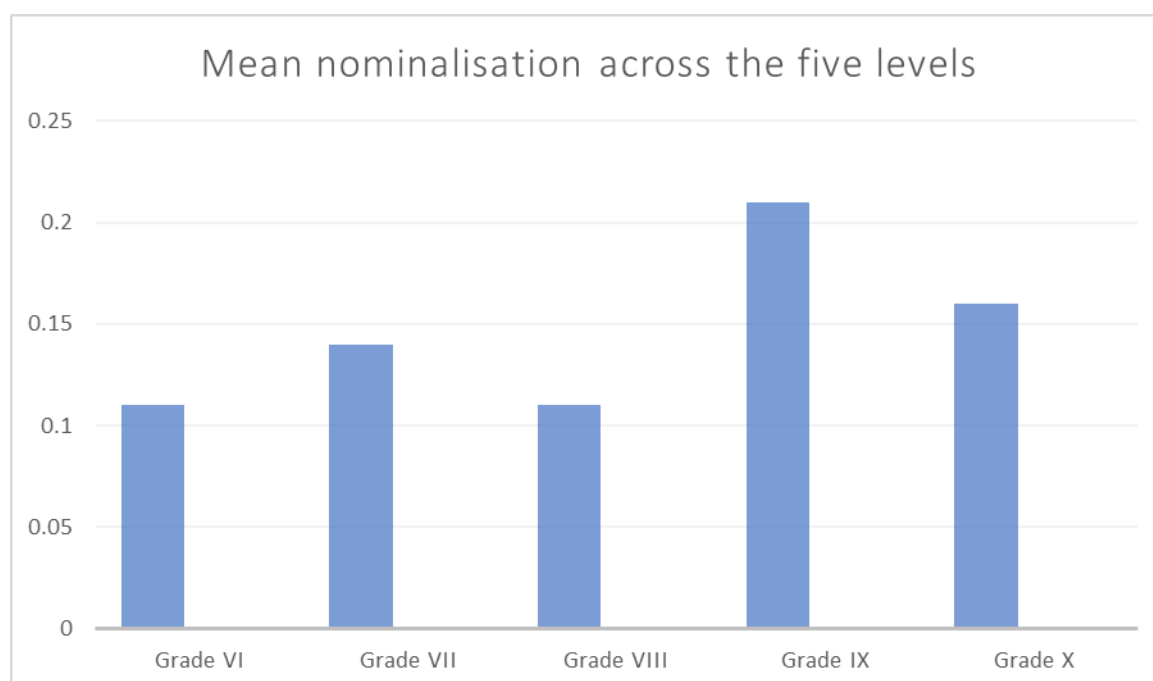


Fig 4.5

Means of nominalization of the selected five study levels

Table 4.17 shows a comprehensive arithmetic portrayal of the average ratios of nominalization across the five study levels. To calculate the mean values, the ratio found in each of the five units of an English textbook of a grade is added, and then the obtained sum is divided by 5. The results reflect that the ratio across the levels ranges from 0.11 to 0.21. English textbook of grade VI and VIII contain the minimum value with the number 0.11, while the English textbook of grade IX lies at the highest position with the mean ratio of 0.21. In the same way, 0.14, and 0.16 are the mean ratios of nominalization of grades VII, and X, respectively. The extent of ratios spreads randomly across elementary and secondary-level textbooks.

4.3.2 Discussion on nominalization

A scanty ratio of nominalization is employed in almost all the five study levels. Furthermore, the number of tokens and the ratio of nominalization used in the sample textbooks are not harmonised with the study levels. The first unit of almost all the study levels does not contain the lowest ratio of nominalization; the same irregular rise and fall are seen throughout the study level. Although the very first study level of the sample population, i.e. Grade VI, contains the lowest ratio, but Grade X does not contain the highest ratio. The results of this study are not consistent with the findings reported in the studies of Mueller (2015), Kaya and Apaydin (2019), and Jalilifar et al., (2014), while the results of this study are convergent with the outcomes of To and Mehaboob's (2018) study.

4.4 Grammatical intricacy within the selected study levels

English textbook grade VI

Table 4.18 Grammatical Intricacy of the selected units of English textbook of Grade VI

S. No	Name of Unit	Total No. of ranking clauses	Total No. of clause complexes	Grammatical intricacy
01	Healthy Living	79	40	1.97
02	Little Frog in the Well	137	73	1.88
03	The People of the Cave	50	23	2.17
04	Ideas, Designs & Architecture	61	37	1.65
05	The Sweating Earth	86	43	2

Table 4.18 depicts the arithmetic calculations of GI of the first five units of the English textbook of grade VI. GI is determined by Halliday's method (Halliday as cited in To, 2015), as mentioned in the section 3.6.6. To calculate the GI of each unit of the textbook, the total number of ranking clauses is counted by following Halliday's description of paratactic and hypotactic clauses as ranking clauses described in the section 3.6.4. Secondly, the entire unit's total number of clause complexes is counted. Finally, GI is measured by applying the formula stated by Halliday (as cited in To, 2015) and is described in the section 3.6.6. GI ranges from a score of 1.65 to 2.17. The textbook unit with the title "Ideas, Designs & Architecture" has the minimum score of 1.65, while the unit with the title "The People of the Cave" has the maximum score of 2.17. The score of GI scatters on the five units haphazardly. This haphazard rise and fall of GI index indicate that it contributes randomly to the LC of the sample units within the study level. Hence, this random contribution of GI index within the study level causes random spread of the LC index within the study level.

English textbook grade VII

Table 4.19 Grammatical Intricacy of the selected units of English textbook of Grade VII

S. No	Name of Unit	Total No. of ranking clauses	Total No. of clause complexes	Grammatical intricacy
01	A Glimpse from Life of the Rasool of Allah (S.A.W.W).	118	41	2.88
02	Fire	147	75	1.96
03	Robotics	68	38	1.79
04	Lincoln's Letter to His Son's Teacher	80	28	2.86
05	Dr Ruth Pfau - A Humanitarian	65	29	2.24

Table 4.19 is a mathematical expression of the GI of the first five units of the English textbook of grade VII. The mathematical data represents the measurement of the GI of each of the five units. According to Halliday (as cited in To, 2015), GI refers to the ratio of a total number of ranking clauses to a total number of clause complexes of a text, so a total number of ranking clauses and a total number of clause complexes are counted in accordance with Hallidayan description of ranking clauses and clause complexes and the ratios are calculated by simple division method. The range of ratio GI of the five units of the English textbook of grade VII is between 1.79 to 2.88. The unit with the title "Robotics" lies at the lowest ratio scoring rate of 1.79, while the unit titled "A Glimpse from Life of the Rasool of Allah (S.A.W.W)" is at the highest position with a ratio of 2.88. The range of the ratio of GI is scattered randomly across the limit of the five units. The researchers show that GI contributes inversely to the

LC of written text. Therefore, for the gradual progression of the LC level, GI index is required to decrease gradually, but this is not observed within this study level.

English textbook grade VIII

Table 4.20 Grammatical Intricacy of the selected units of English textbook of Grade VIII

S. No	Name of Unit	Total No. of ranking clauses	Total No. of clause complexes	Grammatical intricacy
01	The Madina Charter	66	41	1.61
02	The Caliph and the Gardener	148	75	1.97
03	A Visit to Swat Valley	58	41	1.41
04	The Hospital Window	115	71	1.62
05	Major Shabir Sharif (Shaheed), NH and SJ	92	74	1.24

The table 4.20 contains tabular data of the arithmetic calculations of GI of the first five units of the English textbook of grade VIII. To calculate the ratio of GI, the total number of ranking clauses and the total number of clause complexes are computed on Hallidayan principle of ranking clauses, including paratactic and hypotactic clauses, as mentioned in the section 3.6.4. The measurements of GI reveal that the ratios limit themselves within the range of 1.24 to 1.97. The unit 5 with the title “Major Shabir Sharif (Shaheed), NH and SJ” has the lowest ratio limit with a score of 1.24. In contrast, the unit at S. No. 2 with the title “The Caliph and the Gardener” with a score of 1.97 fills the highest position. The score of the ratio of GI scatters haphazardly over the five units. This random rise and fall lead to random increase or decrease in the LC index of the units, which will in turn disturb the notion of gradual progression.

English textbook grade IX

Table 4.21 Grammatical Intricacy of the selected units of English textbook of Grade IX

S. No	Name of Unit	Total No. of ranking clauses	Total No. of clause complexes	Grammatical intricacy
01	The Saviour of Mankind	81	44	1.84
02	Patriotism	27	17	1.58
03	Hazrat Asma (R.A)	68	42	1.61
04	The Quaid's Vision and Pakistan	40	21	1.90
05	Sultan Ahmed Masjid	53	37	1.43

Table 4.21 shows the arithmetic data of ratios of GI of the first five units of the English textbook of grade IX. To calculate the ratios of GI, we are required to count the total number of ranking clauses and the total number of clause complexes. The study uses SFL as its main theoretical framework, so the counting of the ranking clauses and clause complexes follows the Hallidayan principle of SFL as mentioned in the section 3.6.4. The total number of ranking clauses is divided by the total number of clause complexes by simple arithmetic division to find the ratio in each of the five units of the textbook. The calculated ratios start from 1.43 and reach 1.90. The unit with the title "Sultan Ahmed Masjid" has the minimum GI score of 1.43, while the lesson with the title "The Quaid's Vision and Pakistan" has the maximum GI score of 1.90. The score of GI in the five units of the textbook shows random transitions from high to low and low to high. Hence, the randomly dispersed GI index causes a scattered LC index of the units within the study level.

English textbook grade X

Table 4.22 Grammatical Intricacy of the selected units of English textbook of Grade X

S. No	Name of Unit	Total No. of ranking clauses	Total No. of clause complexes	Grammatical intricacy
01	Hazrat Muhammad (S.A.W.W), an Embodiment of Justice	78	36	2.17
02	Chinese New Year	43	22	1.95
03	First Aid	88	53	1.66
04	Television vs Newspaper	59	31	1.90
05	Little by Little One Walks Far!	58	31	1.87

Table 4.22 contains the arithmetic representation of GI of the first five units of the English textbook of grade X. For the measurement of GI, the SFL perspective is applied to obtain the requisite data of the total number of ranking clauses and the total number of clause complexes. After gathering the primary data, the GI is calculated, which is the ratio of the total number of ranking clauses to the total number of clause complexes. The measurements are found within the range of 1.66 and 2.17. The unit with the title “First Aid” has the least score of GI, while the unit with the title “Hazrat Muhammad (S.A.W.W), an Embodiment of Justice” has the highest score among the selected five units. The score shows random rise and fall over the five units. Therefore, the haphazard GI index contributes randomly in the decrease or increase of the LC index of the units within the study level. In this way, the LC level does not conform to the idea of gradual progression.

4.4.1 Grammatical intricacy across the five selected study levels

Table 4.23 Mean of Grammatical Intricacy Across the Selected Study Levels

S. No	Textbook level	Sum of grammatical intricacy of first five units	Mean
01	Grade VI	1.97+1.88+2.17+1.65+2	$9.67/5 = 1.93$
02	Grade VII	2.88+1.96+1.79+2.86+2.24	$11.73/5 = 2.35$
03	Grade VIII	1.61+1.97+1.41+1.62+1.24	$7.85/5 = 1.57$
04	Grade IX	1.84+1.58+1.61+1.90+1.43	$8.36/5 = 1.67$
05	Grade X	2.17+1.95+1.66+1.90+1.87	$9.55/5 = 1.91$

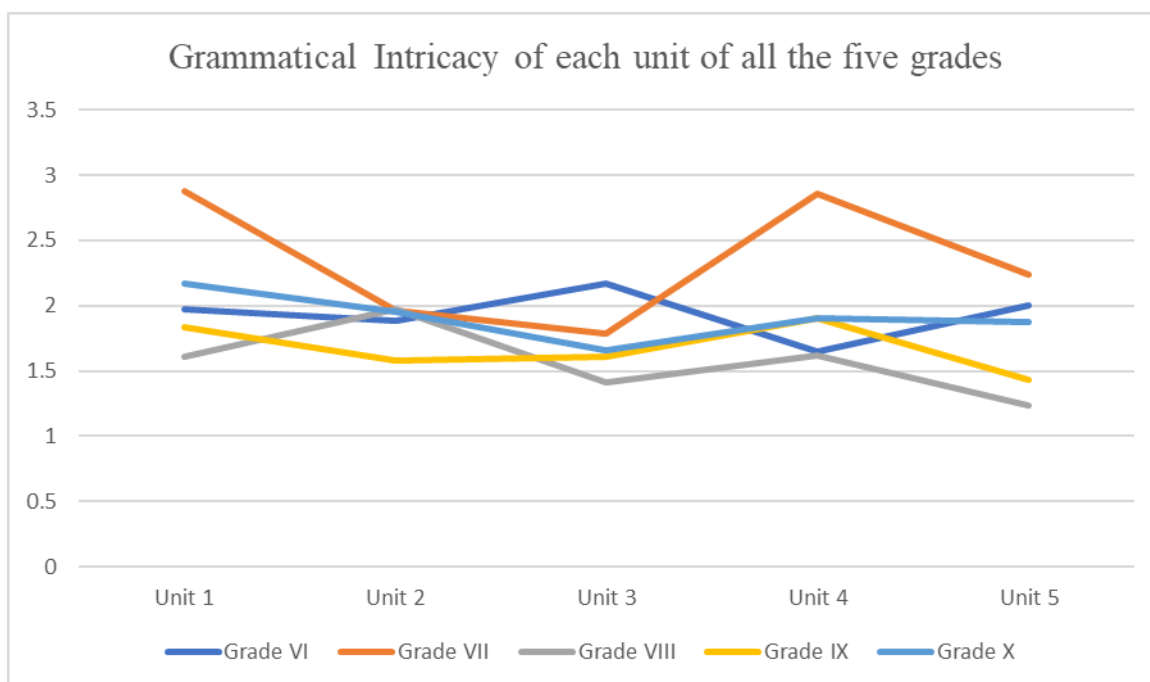


Fig. 4.6

Grammatical intricacy of each selected unit of all the five English textbooks from grade VI to X

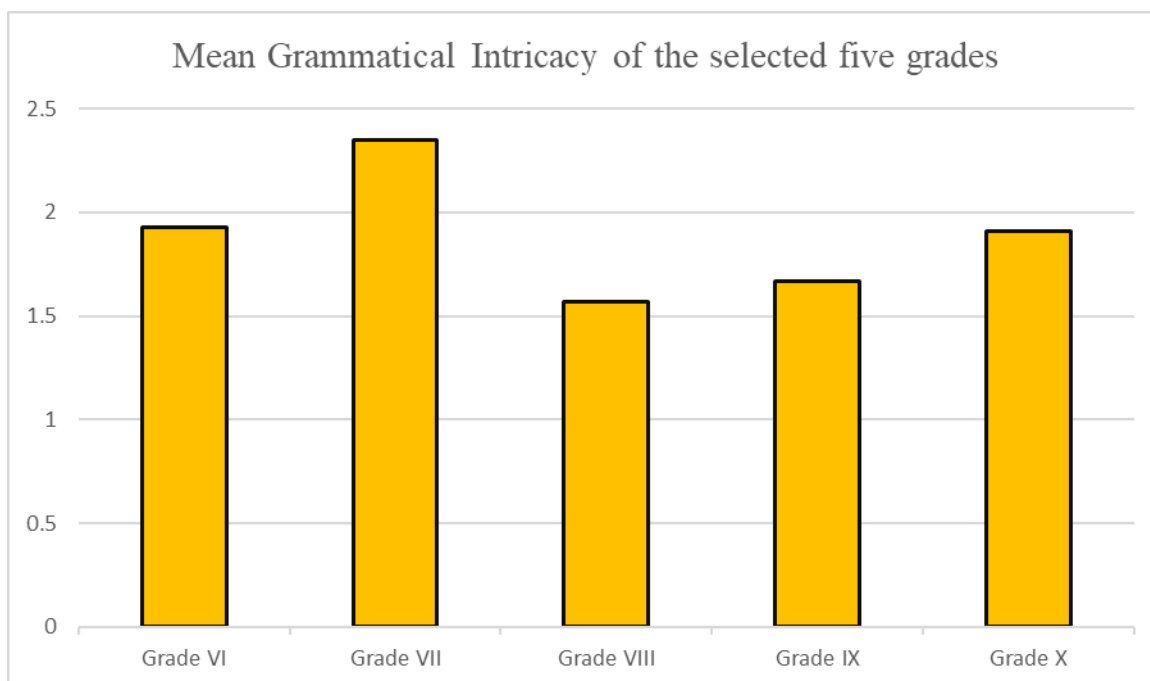


Fig 4.7

Mean Grammatical Intricacy of the selected five study grades

The table 4.23 shows a comprehensive arithmetic picture of the means of GI of all the five English textbooks: Grades VI to X. The mean is calculated by adding GI scores of all the five grade units and dividing the sum by 5. The means of the five levels portray a complete picture of GI across the grade levels. The score of the GI represents the ratio of ranking clauses to clause complexes as defined and determined by the SFL perspective. The mean results depict that the English textbook of grade VIII has the minimum GI value, while the maximum score of 2.35 is found in the textbook used in Grade VII. The other three scores, i.e. 1.93, 1.67, and 1.91, demonstrate the mean GI of grades VI, IX, and X, respectively. Researchers in the SFL paradigm show that GI index contributes inversely to the LC index of the written text. Keeping this in view, the GI score is suggested to decrease gradually across the level, so that the LC level could increase gradually. To Harmer (2008) the difficulty level increases with the increase in grade level, and LC suggests the hardness of the textbook so it may increase slowly across the study level.

4.4.2 Discussion on grammatical intricacy

GI is a peculiar characteristic of the complexity of language (Halliday as cited in To, 2015). GI indices do not follow any regular pattern of increase from the lowest to the highest study level or otherwise. Regarding the study levels, GI spreads sporadically within the five levels. The study's results are divergent from the results shown in the research of To (2017).

4.5 Summary of Key Findings of the First Research Question

- A unit of English textbook of grade VII has the lowest LD score of 2.18 among elementary and secondary levels. This LD score is minimal in the entire data set.
- A unit of English textbook of grade VIII contains the maximum LD score of 6.27 among all the five selected grades. The score reaches the highest LD index among all the five grades.
- English textbook of grade VII has the least mean value of LD of 3.39.
- English textbook of grade IX lies at the highest border line of mean LD value with a score of 5.09.
- Since a unit of English textbook of grade VI does not employ even a single instance of nominalization, it lies at the bottom line in the employment of nominalization.
- A unit of English textbook of grade IX employs a maximum ratio of instances of nominalization, and the textbook also has the leading mean of ratios of nominalization.
- Means of the ratio of nominalization of English textbooks of grades VI and VIII are equal.
- A unit of English textbook of grade VIII has a 1.41GI index making it the least intricate among all the units of selected textbooks.
- A unit of textbook of grade VII with the GI score of 2.88 rests at the highest border of GI among all the five selected grades.

- English textbook of grade VIII has a minimum GI value of 1.57, while English textbook of grade VII has a maximum GI score of 2.35.

4.6 Linguistic Complexity within and across the levels: Analysis and Discussion

The second research question states: How does LC vary in the selected textbooks? To answer the question, first, the data was quantified, and in the discussion on the quantified data, I showed the variance in LC of the sample. LC was explored through three measures: LD, nominalization, and GI. There were two steps in the analysis of the quantitative data. In the first step, I analysed LC of every unit of the textbook used at a certain level. By comparing the results obtained from the measure of different units, LC within the level was assessed. Similarly, a textbook-wise analysis was made to probe the shift in LC across the levels.

LD a salient feature of LC is the measure of LC in terms of the use of lexical items. Contrary to the proposed scheme of gradual progression from the lower to higher, the LD of the first unit of grade VI is equal to the mean of the five sample units, and the mean of the LD of the five units is always higher than the least value. Even though it is the first unit, the LD index, as per the concept of steady increase, does not concord with the unit number. The sentences, like the first sentence of the second paragraph of the unit, make the language of the unit lexically dense. The sentence “Our body is kept healthy when we feed it with right kind of food from all the nutrients groups in the required proportion at the right time”. This sentence has thirteen lexical items and only two ranking clauses. This shows that a lot of information has been packed into only two ranking clauses which makes the language dense and difficult to comprehend. In the third paragraph of the lesson, the sentence “Hence the importance of a well-balanced diet is evident as it aims to provide nutrients essential for proper growth and functioning of the human body in adequate proportions” contains sixteen lexical items packed in two ranking clauses. In this way, the sentence has been made challenging for sixth-grade learners. In the same way, the last sentence of the unit, “One should remember that desired change in lifestyle does not happen overnight and it takes a lot of dedication and hard work to start living

healthy,” contains thirteen lexical items grouped in three ranking clauses. It is obvious that so many content words in only three ranking clauses are hard to comprehend for the learners as they contain so much information. This kind of packaging of lexical items makes the language lexically dense. Opposing the idea of a steady increase in the LD index, with a steep decline in the LD index, the next unit contains the minimum lexical items per ranking clause that make its language the least dense. The sentences like the sentence of the second paragraph, “When the Little Frog was thirsty, he drank a little bit of the well water and when he was hungry, he ate some insects,” is of lengthy syntactic structure and comprise more clauses. This sentence has eleven lexical items packed in four ranking clauses. Because of the fewer lexical items and more ranking clauses, the sentence becomes lexically less dense, and hence it is easy to comprehend. The third unit attains a rise in the LD index and includes 3.6 lexical items per ranking clause, but still, its language is less dense than the first unit which has 4.21lexical items per ranking clause. Similarly, the fourth unit of the textbook lags behind its following unit in the LD index and reaches the highest LD value of 5.21lexical items per ranking clause. The sentences like the opening sentence of the second paragraph of the fourth sample unit, “All inventions in the world are linked to thoughtful minds of brilliant people,” make the language dense. This sentence contains seven lexical items in a single ranking clause. With so many lexical items in a single clause, the message of the sentence seems quite difficult to understand. In this way, the fourth unit’s language is the densest, while the last sample unit of the study level contains less dense language. This way, random rise and fall were observed throughout the grade level. The gap between the smallest and the greatest LD indices of the sample units shows a range within which the LD of the units varies. The minimum LD index among the five units is 1.22 which is lower than the mean score of the LD of the five units, and the maximum LD index is 1.00 greater than the mean LD value. Thus, we can observe a massive gap of 2.22 between the lowest and the highest values. The LD variance of grade VI shows a wide gap. The results demonstrate that the LD score within the level does not follow the proposed pattern in which every next lesson in the textbook has higher LD than the previous unit. Instead, there was found an irregular variation trend. Thus, the absence of a regular pattern led to rather high fluctuation in the LD of five units.

Nominalization is another device through which the LD of a written text is increased as it compresses the text into fewer items, thus making it more difficult for the reader to decode (Wenyan, 2012). About the employment of nominalization, it was found that there are 14 instances of nominalization in the first unit. With a ratio of 0.17 nominalization per ranking clause, the unit contains the second highest score among the five units. The sentence of the unit, "Positive thoughts like praise, acceptance and tolerance towards others lead to contentment and peace," incorporates three nominalized words in a single ranking clause and causes much abstraction and opacity, and makes the text challenging. The instances of nominalization like living, existence, presence, importance, feelings, differences, creation, gossiping, meditation, and dedication make the sentences compressed and difficult to decode as it poses greater cognitive load on the learners. Since the second unit of the textbook does not employ even a single instance of nominalization, the language of the unit lacks lexical condensation, which arises out of the use of nominalization. In other words, the total absence of nominalization checks any increase in the LC of the text. The third unit of the textbook contains only five instances of nominalizations, and the ratio of nominalization in the unit is 0.1. The sentence in the opening paragraph, "The people of their country was unaware of their presence in the cave and therefore they remained without interruption," contains two instances of nominalization and makes the opening paragraph rather difficult to comprehend for the learners. Contrary to our expectation that there would be more instances of nominalizations, I found that the number showed a decrease that resulted in a decrease in the abstraction and compactness of the text. In the next unit, lesson 4 of the textbook, the assessment has revealed that it incorporates 12 instances of nominalization, and the ratio with the score of 0.19 touches its highest. The sentence of the last paragraph, "It does not have a typical green dome of a mosque for which it was criticized in the beginning but after its completion everybody appreciated its glory and greatness," has included three instances of nominalization which makes its language compressed and difficult to comprehend. Consequently, the LC level reached the highest level within the book. Again, a fall is seen, and the fifth unit of the textbook contains eight instances of nominalization, and the ratio is calculated at 0.09. The gap between the highest and the lowest use of nominalization indicates the range within which the nominalized words are used and makes the language of the text abstract. The gap between the

highest and the lowest ratio of instances of nominalization is 0.19. The highest value is 0.08 more than the mean index, while the lowest is 0.11 lower than the mean value. This gap has a noticeable effect on the opacity of the written text, which significantly increases the text's LC. The use of nominalization condenses the LD of the written text. Still, contrary to the notion of systematic complexification assumption, no specific pattern is observed in the increase of employment of instances of nominalizations.

GI is another feature of the text that contributes negatively to the LC of written language. It is quite pertinent that a simple clause is less intricate than joined clauses, irrespective of whether they are joined paratactically or hypotactically. But due to the dispersal of lexical items over long sentences, the GI score affects the LC of the text inversely. Hence with the increase in GI score, the LC index decreases. The higher the GI index, the more intricate the written text will be and the less the LC of the text. The GI score varies from 1.65 to 2.17 within the five sample units of this grade level. Although a tiny gap of 0.52 between the minimum and maximum GI scores is found, it still affects the LC of written text. GI scores are scattered randomly within the level.

The LC level increases with the rise in both the LD index and the ratio of nominalization. In contrast to this, the increase in the GI score leads to a decrease in the LC because LD and GI have inverse relation with each other. Regarding the three features of LC within grade VI, the data shows that the unit with the highest LD contains the highest ratio of nominalization and the lowest level of GI. On the other hand, the unit with the lowest LD index has the lowest ratio of nominalization. At the same time, it does not contain the highest GI ratio, which shows inconsistency in all three aspects of LC. In terms of gradual progression, all the three features of LC align neither with each other nor with the advancement of units within the study level. Concerning the steady increase in the LC within the level, the first unit does not lie at the lowest borderline of the LC features. Similarly, the fifth unit does not contain the highest indices of the LC features. Thus, the LC of the five units does not follow any well-defined pattern.

Regarding the aspects of LC in the English textbook of grade VII, the LD index of the first unit is equal to the mean LD index of the five units. This shows that the LC of the textbook does not begin from the lowest level, as the mean of the five

sample units is always higher than the least value. From the very outset of the grade level, such LD poses a challenge for the learners. The unit contains heavily dense sentences. For example, the opening sentence of the fourth paragraph of the unit is, “Having completed his first duty in the cave of Hira on Mount Nur, Hazrat Jibrael disappeared immediately”. The sentence has ten lexical items packed in only two ranking clauses. This shows that the sentence contains dense language which is difficult to comprehend for the learners. Contrary to the gradual progression belief, the LD value of the second unit plunges to the lowest level. Its LD index is only 2.18 lexical items per ranking clause. In other words, its language is the least complex. The sentences like “We have to save the kids” and “We have to save the children,” and many more have two or three lexical items in a single ranking clause which cause the LD to drop to the lowest level. This sudden rise and fall in the LD index do not conform to the proposed pattern of a systematic increase in the LC. With a sharp rise in the LD score, the language of the third unit is the most complex of all the five units as its LD index gains the highest value of 4.79 lexical items per ranking clause. The sentences like “This creative activity kept you busy for hours”, “ Robots can be made from a variety of material including metals and plastics,” and “Agricultural robots speed up the slow, repetitive and dull tasks of farmers” contain lexically dense language as the sentences comprise of only one ranking clause which is densely grouped with the lexical items. In this way, the language of the whole unit is the most dense of all. Again, a steep fall is found in the following unit, and the LD score of the fourth unit decreases to the second-lowest LD value of 2.22. This makes its language less complex than its preceding unit. The text of the unit contains very short sentences with fewer lexical items which are fixed at their proper places with the help of grammatical items. The sentences like “Teach him to learn to lose and also to enjoy winning”, “In school teach him, it is far more honourable to fail than to cheat,” and the unit ends with the sentence “This is a big order, but see, what you can do. He is such a fine fellow, my son”. The sentences show that almost all ranking clauses in the sentences have two to three lexical items in them. In the fifth unit, the score rises again and reaches the second highest value, but still, its language is less dense than that of the third unit. The sentences like “Her home was damaged, her baby brother became ill and died and she herself barely survived the bombing attacks” the second sentence of the second paragraph of the unit contains four ranking clauses, and all the

four ranking clauses have eleven lexical items. In this way, the text's LD remains lower than the highest value. The gap between the lowest and the highest LD score determines the range of spread of the LD index. The minimum LD value is 1.21, less than the mean value, while the highest index is 1.40, higher than the mean value. There is a gap of 2.61 in the LD index among the five units, which shows a considerable difference, and this gap signals the wide dispersal of the LD index within the five units of the study level. The unexpected rise and fall inform about the irregular spread of the density of language over the five units.

Regarding the employment of nominalization, it is found that the first unit employs 21 instances of nominalization, and the ratio reaches 0.17 which makes the text rather complex. The unit contains instances of nominalization like education, revelation, reading and seeking, beginning, significance, reading, revelation, responsibility, excitement, revelation, suspension, pollution, clothing, existence, judgment, responsibility, perfection, and guidance. These nominalized words are obviously difficult to decode and comprehend as they demand more cognitive processes to understand the compressed text than un-nominalized words. It is obvious that nominalization makes the language compact and raises the level of LC of the text. As nominalization contributes positively to the LC of the text, it is suggested to increase within the level slowly to conform with the notion of steady increase. Contrary to the suggested gradual progression, it is found that the very first unit does not contain the minimum ratio among the five sample units. In other words, the language of the first unit is not the least condensed. Instead of the first unit, the second unit of the grade level contains the minimum score of 0.01 nominalization per ranking clause, and the second unit includes only two instances of nominalization. The whole unit includes only two instances of nominalization which are confusion and crackling. These two instances of nominalization lend the least abstraction to the whole text of the chapter. In this way, the contribution of nominalization to the complexity of language in the second unit is very minute. In the textbook's third unit, 15 instances of nominalization are used. The ratio reaches the second highest index of 0.22 nominalization per ranking clause. It makes the text more condensed than the two preceding units. The instances of nominalization used in this unit are imagination, entertainment, simulation, decision, information, action, operation, relations,

exploration, construction, packaging, production, precision, boredom, and advancement. All these words make the text heavily compressed and abstract as they pack lots of meaning in a single word. In this way, the text of the unit becomes opaque and difficult to understand. Again, a steep fall is observed in the following unit, and only three instances of nominalization are used in unit number 4. In this unit, the second minimum ratio of nominalization is used. In this unit, the nominalized words which are used are winning, sweetness, and patience which lend the least abstraction to the text. In the last unit, 17 instances of nominalization are used, and the ratio touches the highest index of 0.26. The instances of nominalization which are used in this unit are calling, choice, decision, infancy, disabilities, isolation, posting, organisation, directorship, intention, limitation, working, devotion, and selflessness. All the nominalized words make the text heavily dense and compact as they compress the text into fewer words rather than delivering the same message in a lengthy whole. Resultantly the language of the unit is the most compressed and opaque. The employment of nominalization within the level displays a random rise and fall.

GI is another aspect that contributes to the LC of the written text. GI is the ratio of a unit's ranking clauses to clause complexes. To conform to the idea of LC steady increase within the level, the GI index is suggested to decrease steadily, whereas this is not seen within the study level. Within the level, the lowest GI index is 1.79, while the highest GI score is 2.88. The third unit among the sample five units contains the lowest GI score, while the first unit contains the highest score of intricacy. The GI index does not follow a systematic pattern of rising and falling within the level.

To correspond to the approach of gradual progression, the LD index and ratio of nominalization would increase while the GI score would decrease slowly. As far as the alignment of the three features of LC is concerned, the third unit of the study level has the highest LD index, the second highest ratio of nominalization and the lowest ratio of GI. On the bottom line, the second unit contains the lowest LD index, and the lowest ratio of nominalization, while it does not contain the highest ratio of GI index. Evidently, all three aspects are neither harmonised with the highest nor with the lowest LC level. Apart from the adjustment of the three features at the highest and the lowest LC level, the data of the three features of the LC shows little consistency with

the progression of units within the level. The study level's first sample unit of the English textbook does not have the least LC value. The same is seen in the last unit of the grade level, which does not fall on the highest LC index within the study level.

Regarding the three LC aspects of grade VIII, the LD index of the first unit lies very close to the mean LD value, and a fractional difference of 0.07 is found between the mean LD of the sample five units and the LD of the first unit. Obviously, the mean LD index of the five units is always higher than the minimum LD value. This shows that contrary to the notion of gradual progression, the LD of the study level's first unit does not start from the lowest index in the textbook. The opening sentence of the first unit is, "When Hazrat Muhammad Rasulullah (S.A.W.W) migrated to Madina, this city was inhabited by different sections of people". This sentence contains two ranking clauses while the message of the clauses is conveyed through ten lexical items. In the same way, the offset of the third paragraph of the unit is "All communities signing the charter would form a common nationality. If any signatory of the charter was attacked by an enemy, others would defend him collectively". This passage contains three clauses while the information in these clauses has been conveyed through twelve lexical items. In this way, with the use of so many lexical words in a clause, the lexical density of the text becomes higher, and the text becomes difficult to understand. Again, the second unit's LD plunges to the bottom line and touches the least density level among the five units. The sentences like "The merchant shouted and jumped out of the water", "The officer did as they were bidden," and "Well then", said the caliph, "Why did you not return it to us at once" make the language of the lesson least dense as the message has been expressed with the use of fewer lexical items. The LD of the third unit goes upward steeply and gains the second highest value of 6.06 lexical items per ranking clause. The lesson opens with the sentence, "Springtime is the most beautiful time of the year around the world". This sentence contains only one clause, and seven lexical items are used to express the message. In the same way, the second sentence of the last paragraph of the lesson is "The village on the hillside built with stone from their own rocks melted into the colour of the hills". In this sentence, only one ranking clause contains nine lexical items grouped to convey the message. In this way, the text of the lesson is lexically dense. Opting the same irregular fashion, the LD of the fourth unit goes down steeply

and lies at the second lowest LD index among the five units. The second sentence of the lesson is, “He was moved into a separate room and put on a bed next to the only window”. The sentence contains two ranking clauses, and seven lexical items have been grouped to convey the message. Following the same pattern, the opening sentence of the fourth paragraph, “The two roommates quickly bonded and started talking for hours on bed,” imparts the information through six lexical items grouped in two ranking clauses. Using the least lexical items makes the chapter's linguistic density low. The fifth unit, in terms of LD indices, rests at the highest extreme of 6.27. The sentences like the opening sentence of the chapter of the textbook, “The gallant and heroic acts of military personals are acknowledged world wide for protecting their country,” make the text of the unit highly dense because only one clause contains nine lexical items. This tight grouping of lexical items in a single clause renders the text the highest difficulty level. The density level of the fifth unit is at the highest level, while the third unit contains the second highest density. The gap between the lowest and the highest LD indices determines the range for LD within which it spreads over the five units. There is a gap of 1.79 between the mean and the lowest value, while the gap between the highest and the mean is 1.63. A huge gap of 3.42 between the lowest and the highest LD score is calculated. This considerable gap indicates the widest dispersal of the LD index over the range of five units of the grade level. Moreover, the gap also indicates accelerated progression of the LD within the five units of the grade level.

About the employment of nominalization, it is found that the first unit contains 17 instances, and the score reaches its highest ratio of 0.25 per ranking clause within the five units. This shows that the unit's language is the most condensed of all. The nominalized words like cooperation, creation, distinction, nationality, liability, decision, importance, freedom, equality, tolerance, incorporation, and safety make the text compact and condensed. Since these words pack more meanings therefore, they are a source of thickness of the information in a clause. Moreover, “as compared to the use of verbs, nominalization can be more ambiguous due to valency reduction” (Bello, 2016. p, 19). With a steep fall, the second unit comprises only five instances of nominalization, and its score touches the second lowest ratio of 0.03. This way, the language compactness is low. The nominalization instances used in this unit are

kindness, management, honesty, and lacking. With the use of fewer instances of nominalization, the text is loosely structured in terms of complexity which arises out of the use of nominalization and is hence easy to comprehend. With a slight rise in the ratio, the third unit incorporates three nominalization cases with a ratio of 0.05 instances per ranking clause. In this way, the language of the unit is slightly more condensed than its previous unit. Another sharp fall is seen in the following unit, and with only one nominalized word, the language of the fourth unit is characteristically least compact. With an abrupt rise in the use of nominalization, the fifth unit reaches the second highest level with the use of 19 instances of nominalization. The ratio reaches 0.20 per ranking clause, and it makes the unit's language the second most condensed of all the five units. The prose text of the unit contains nominalizations like martyrdom, education, completion, performance, achievement, bravery, dauntlessness, appreciation, leadership, patriotism, and safety. These words make the text opaque as the subjective voice in the text is hidden, and the meaning of these words is difficult to understand.

GI is another feature that contributes to the LC index of a written text inversely. In other words, with the increase in the LD index of a written text, the GI value would increase to enhance its LC level. However, this is not seen within the English textbook of grade eighth. About the GI index, it was noticed that the fifth unit has the lowest GI index while the second has the highest GI value. The GI index shows that the score does not start from the lowest to the highest.

To correspond to the notion of the steady increase in LC, the three aspects of LC should have conformity with each other. Regarding the conformity of the three aspects of LC, at the lowest LC line, the second unit of grade VIII contains the lowest LD index, the second lowest ratio of nominalization, and the highest score of GI. On the other hand, the fifth unit has the highest LD score, the second highest ratio of nominalization, and the lowest GI index. On the lowest and the highest extremes, the three aspects of LC are harmonised to some extent, while they show little consistency in the increasing pattern with the advancement of units within the level as the very first unit does not harmoniously contain the least LC score.

Over the three grades of elementary level, an identical irregular pattern in the increase of LD score is found. In contrast to the assumption of gradual progression,

the first unit of all three grades of the elementary level contains an LD value equal to the mean LD index of the sample five units. In the same way, the second unit in all three grades indicates a steep downfall and reaches the minimum LD score. Regarding a unit's lowest and the highest LD indices, another contrasting pattern is seen among the English textbooks of three grades of elementary level. Despite being the second unit of grade VII, it has the smallest LD index of 2.18 lexical items per ranking clause among the three study levels. This shows that the language of the sixth-grade English textbook is not the least complex among the elementary level. On the other hand, the fifth unit of grade VIII touches the highest LD index of 6.27 lexical items per ranking clause. This demonstrates that LC in Grade VIII English textbook reaches maximum level and makes it rather challenging for the learners.

About the LC aspects in grade IX, it was found that the LD of the very first unit contains the second highest score which makes the unit's language denser than the lesson with the lowest LD. This indicates that the first unit does not have the minimum dense language. From the very outset of the lesson, sentences like "Arabia is the land of unparalleled charm and beauty, with its trackless deserts and sand dunes in the dazzling rays of the tropical sun" make the text difficult as the message is formed through tightly grouped much lexical items in a single ranking clause. In the second unit of the English textbook of the study level, the LD score instantly attains the highest extreme of 6.03 lexical items per ranking clause. The sentence of the lesson, like "Patriotism gives people the strength and courage to safeguard the interest of the country and nation," packs the information into tightly woven lexical items in one or two clauses. In this way, the language of the second unit is highly dense which resultantly raises the unit's score of the LC. With a steep fall in the LD score, the third unit's language density suddenly jumps to the bottom line among the five sample units of the study level. The lesson contains sentences like "She prepared food for his journey. She tied the food on the camel back with her own belt as nothing else could be found". The message of the sentences is expressed in one or two clauses while the clauses contain the small number of lexical items. After the third unit, a gradual increase in LD scores is found in the fourth and fifth units. Despite this gradual increase in the LD index in the following two units, the density of the last unit is still less than those of the first and second units. In the last sample unit of the textbook,

sentence like “It is also known as the Blue Masjid because of the blue tiles that embellish its interior” makes the text somewhat lexically dense. Still, the density level does not touch the density of the highest score among the five units of the textbook. The gap between the lowest and the highest LD indices mentions the range within which the LD score spreads over the five units of the study level. The lowest LD value is 0.74 less than the mean LD index, and the highest score is 0.94 higher than the mean value. The gap between the lowest and the highest LD indices is 1.68, which is comparatively low. In this way, the gap shows a relatively lower dispersal of LD within the level.

Nominalization is another salient feature that contributes indirectly towards increase in the LC index of the written text by raising its LD. About the deployment of nominalization, it is found that the first unit contains 26 instances of nominalization, and their ratio with ranking clauses reaches the second highest level with a score of 0.32 cases per ranking clause. Such a large number of nominalizations increases rather highly the opacity of the text. Consequently, there is seen a sudden increase in the complexity of language in this unit. The use of nominalization in the sentences like “Their eloquence and memory found expression in their poetry” and “It is no small wonder that Allah Almighty chose the Arabic language for His dispensation and preservation of His words” make the sentences heavily compressed and the meanings of the sentences are difficult to unpack due to ambiguity which arises out of valency reduction of the use of words (Bello, 2016). With a sharp rise in the ratio of nominalization in the second unit the ratio reaches the highest level. It depicts that the complexity of language about the employment of nominalization of this unit touches the highest level as the unit contains 0.44 instances of nominalization per ranking clause. The use of nominalization in sentences like “Patriots render sacrifice for the preservation and protection of these values” makes the text heavily nominalised hence the meanings becomes difficult to unpack. In contrast to the accepted pattern of progressive increase, a sudden decline is observed in the following three units that follow the second unit. They have 0.10, 0.10, and 0.11 ratios of nominalization respectively. The use of a fewer number of nominalizations makes the language of the subsequent units less condensed as compared to the first two units.

GI is another feature that affects the LC index of a written text inversely. About the GI index within the level, it is found that the very first unit lies at the second-highest GI index, the fourth unit contains the highest GI index, and the fifth unit has the lowest GI index. The haphazard spreading of GI within the level reveals that the intricacy level of the language does not follow any systematic pattern within the five units.

The LC level of a written text increases with the increase in the LD score and index of nominalization, whereas its level decreases with the increase in the GI value. Keeping the concordance of the three features of the LC in view, the sample five units of the textbook show the least harmony. At the highest borderline, the second unit contains the highest LD index and the highest ratio of nominalization. Still, disregarding the preceding two features of LC, it has the second lowest GI score. At the lowest extreme of the LC, the third unit contains the lowest LD and the lowest ratio of nominalization but not the highest range of GI index. As is seen, all three aspects of the LC neither concord with one another nor the progression of the units within the sample five units. Resultantly the first and the last units do not contain the lowest and the highest LC value, respectively. The three features also show the least harmony with their two extreme lines and within the five units.

Regarding the LD index as a salient feature of LC, it was found that the first unit of grade X contains an LD index higher than the mean LD score. This indicates that instead of falling on the least LD level within the study level, the first unit is lexically a bit denser than the unit with the average LD value. Obviously, the mean LD of the sample five units is greater than the minimum LD value, so the LD of the first unit is not the least among the five units. In the first unit of the last sample textbook, the sentence like “People can seek light from the message and guidance from his life to achieve perfection in the moral, spiritual and social areas of life” conveys the information through the thickly arranged lexical items. The LD score of the second unit has a steep rise, and it touches the highest value of 5.79 lexical items per ranking clause within the level. In this way, it makes the unit’s language the densest of all. The opening sentence of the unit is, “Chinese New Year is a holiday that celebrates the beginning of a new year according to the Chinese lunar calendar”. The information is given through thirteen lexical items packed in only two ranking

clauses. After which, contrary to the notion of steady progression in the LD index, a gradual fall is seen, and the third unit contains the second highest value. The sentence of the unit like “We all need help at times in our lives”, “Minor cuts and scrapes usually stop bleeding at their own,” and “To clean the area around the wound, use soap and washcloth” consist of clauses that contain not fewer number of lexical items. The next unit maintains this decline and reaches the lowest bottom line—the language of the fourth unit is the least dense in the sample five units of the study level. The sentences like “Newspapers were primarily established to cover the news and later on they added entertainment” and “One way could be to record it and watch it later. But the point here is that it is not that convenient” consist of the least number of lexical items in each clause which make the text linguistically least dense. In the fifth unit, the LD score rises again, contributing a bit higher to the complexity of language. The sentences like “The last couple of years have been a long bumpy ride for me”, “As a student, I am an active participant in academic and co-curricular activities,” and “I am glad that I have got the taste of what the real world has to offer” express the message in rather a complex manner. As far as the LD score within the five units is concerned, the first unit does not contain the least density. In the same way, the fifth unit is also deprived of the most elevated dense language. The gap between the lowest and the highest LD indices mentions the range within which the LD score spreads over the five units of the study level. The lowest LD value is 0.84 less than the mean LD index, while the highest score is 1.34 higher than the mean LD value. There is a gap of 2.18 between the lowest and the highest LD values. The gap indicates the high range of dispersal of the LD index within the level.

When we consider the distribution of the nominalization, we notice that the very first unit contains 14 instances of nominalization, and the ratio reaches rather a high level of 0.17. The sentences of the unit, like “Once a Quraish woman was found guilty of stealing. Some people wanted to save her from punishment,” contain instances of nominalization, and the ratio of the use of nominalization is high but not the highest of all the units. Its rather high number indirectly increases the complexity of language. A rise in the use of nominalization is also seen in the second unit. With this rise, the unit achieves the highest index of the ratio of nominalization which makes its language the most condensed. The instances of nominalization used in the

unit are decorations, celebrations, cleaning, association, happiness, beginning, prosperity, and long-lasting. These nominalized words pack more meanings and make the sentences ambiguous due to the valency reduction of the use of words (Bello, 2016), and hence the text becomes difficult to decode. However, in the third lesson, there is found a visible decrease in the LC score. Again, an abrupt fall in the use of nominalized words is also observed in the next unit. Resultantly, it lowers the compactness of the text. The fifth unit has almost the same number of nominalizations as the fourth unit. Hence, both lessons share a similar opacity level of the text. In other words, the last two units show no difference in the compactness of language because they have incorporated equal number of nominalization instances.

Since the dispersal of lexical items over multiple-clauses and longer sentences results in a low LD value and raises the GI of the text, we can conclude that LD is inversely related to the index of the LC. About the GI indices, the first unit has the highest score, and it gives it the highest intricacy level and the lowest LC score. The third unit has the lowest GI index. It is found that there is a haphazard rise and fall within the five units. The gap between the lowest and the highest GI index is 0.51. This insignificant gap does not allow GI to spread the LC score within a vast range.

To conform to the LC score within the level, the LD index and the ratio of nominalization should rise, whereas the score of GI should decrease. As far as the harmony of the three aspects of LC is concerned, at the highest extreme of the LC, the second unit of the English textbook of grade X has the highest LD score, and the highest ratio of nominalization, while the ratio of GI is observed as second highest. At the lowest border line of the LC, the fourth unit contains the lowest LD index, and the lowest ratio of nominalization, though it does not have the highest intricacy index.

As far as the LC features within the levels are concerned, the features do not follow the systematic gradual increase with the advancement of units at a certain level. Moreover, all three components of LC do not correspond with each other within the levels. With the increase in LD score, the LC index of written text rises. Similarly, in the employment of nominalization, there is also found appreciable increase in LC level. Consequently, more instances of nominalization make the written text more condense and rather challenging for the reader to decode. In contrast, with the increase in GI, the written text becomes sparse due to the spread of lexical items over

a large number of ranking clauses. Hence, a rise in the GI score leads to a lowering of the LC index as LD, and GI are inversely related to each other. As an accepted pattern, the unit with the highest LD index may contain the lowest GI value. Still, the same is not found within the levels. Apart from this, within the levels, the LC of the first units is not always at the lowest value. Similarly, the last unit does not contain the highest LC index as all the three features of the LC are dispersed randomly within the five units of the study levels. According to Berendes et al., (2018), a suitable level of LC in learning materials is believed to be of decisive significance for learning. The suggestion for school textbooks is that reading complexity should differ systematically between grade levels and between higher and lower tracks in line with what can be called the systematic complexification assumption.

Table. 4.24 The three features of LC across the five study levels

S.No	Grade	LD	Nominalization	GI
01	VI	4.21	0.11	1.93
02	VII	3.39	0.14	2.35
03	VIII	4.64	0.11	1.57
04	IX	5.09	0.21	1.67
05	X	4.45	0.16	1.91

Table 4.24 shows a complete picture of all the three features of LC across the five successive study levels. Grade VI is the lowest study level in elementary schooling, and the initial study level of the sample population but it does not contain the lowest LD index. Hence the LD's contribution to the LC level of this textbook is not the least. Therefore, it is evident that learners do not start from the lowest LD level and face a challenging text in the first year of elementary schooling. Contrary to the assumption of gradual rise in LC features, in the next grade, the level of LD plunges to the lowest score among the five successive study levels. This shows that in the higher study level, the students are not being exposed to more complex information packaging; contrarily they meet lower LD levels in the higher study

grades. There is found a rise in the LD index in the subsequent level, and the English textbook of grade VIII reaches the second highest density level among the sample population with a score of 4.64 lexical items per ranking clause. Since this density is notably higher than that of grade VII, and the learners face such a high combination of lexical items after they have experienced the lowest complexity level in the previous class, this high LD poses a serious challenge to the learners. Within the three grades of elementary level, the language of the third level is the densest while the very first grade does not stand at the lowest density level. The LD of English textbook of grade VIII is higher than its preceding two levels, but the same is not seen in LD of its successive grades. Therefore, the students feel at ease in learning and comprehending the language when they are promoted from grade VI to VII as they meet with the lower complexity level but face a challenging linguistic density when they pass from VII to VIII.

Across the five consecutive study levels, the LD index of grade IX touches the maximum value of 5.09 lexical items per ranking clause. This indicates that the textbook is lexically the densest of all but a reversal in the LD index in the following study level is found. The LD of the English textbook of grade X is less than that of its two preceding study levels. It mirrors that the language of the English textbook for grade X is less complex than that of the English textbook for grades VIII and IX. In their highest study grade of secondary level, the students are expected to have mastery in the comprehension of lexically dense language for which the textbooks are the main source, but at the highest study level of secondary school, learners are not exposed to a text of desirable LC. In this way, the highest-level English textbook deprives the students of opportunities to develop the necessary skills of comprehension they were expected to acquire. Resultantly, it does not conform with the idea of systematic and gradual progression of LD indices not only within a level but also across the different level.

Furthermore, the gaps between the highest and the lowest LD indices determine the range within which the LD varies and make the language of the text complex. From the comparative perspective of the gaps between the highest and the lowest LD indexes, a vast and significant contrasting picture is noted. The mean LD value of the five successive grades is 4.35, and the gap between the lowest and the

highest LD indices across the five study levels is 1.70. While the gap of LD within grade VI is 2.22, in VII, VIII, IX and X LD indices are 2.61, 3.42, 1.68, respectively. This comparison shows that the gap of the LD across the five successive study levels is smaller as compared to any gap within the levels except for grade IX, which is fractionally smaller than this. This suggests that the LD of each of the five units is dispersed within a comparatively vast gap. Obviously, it poses a prominent difficulty to the learners. Due to this, in the sample textbooks, the learners who study at the same level need to deal with the significant irregular varying density levels, which eventually hampers their advancement in understanding the lexically dense syntactic structures within the class. Since the gap in the LD index is the space that allows LD to increase; therefore, this low LD gap across the five successive study levels provides an insignificant space for LD to show a noticeable increase across the five study levels. Hence, with the increase in study levels, there is a trivial rise and fall in LD. Considering this triviality, the students' expectations and demands to acquire new linguistic knowledge and interact meaningfully with lexically dense construction of ESL across the levels remain unfulfilled. Considering the LD gap between the elementary and the secondary levels, an inadequate gap of 0.69 between the LDs of the elementary and secondary textbooks is seen. This unpredictable gap does not allow LD to show an apparent increase across the elementary and secondary levels. It is pertinent to note that the increase in the LD of English textbooks from elementary to secondary levels shows a slight shift while the study levels are prominently different. This figure contrasts with the assumption of steady progression in the LD indices across the groups in elementary and secondary English textbooks.

As far as nominalization is concerned, the very first study level of the sample population employs the least ratio of nominalization. Since "nominalization has a prominent stylistic function of formality" (Li, 2017, p. 61), it adds the minimum value in organising the compactness and formality by employing the least ratio of nominalization in the very first study level of the sample population. With the progress in the grade levels, a fractional increase is seen, but it reverses back in grade VIII and reaches the index of the first study level of the sample population. With a sharp rise in the use of nominalization, the language of English textbook of grade IX becomes considerably higher in sophistication and more challenging for the readers to

decode. In contrast to the accepted pattern of a steady increase in the complexity of language, which arises out of the employment of nominalization across the study levels, the ratio of nominalization drops again, and it reaches the second highest level in the last study level. As per the results shown in the quantitative data, with the fractional use of instances of nominalization, the language of the textbooks lacks versatility and abstraction throughout the five grades of elementary and secondary English textbooks. Nominalization is a technical device that causes a high level of LD by wrapping the text into fewer words makes the text's language condense, compact and opaque and hence increase the LC value. The employment of significantly fewer instances of this device originates a lack of metaphorical mode of language which the students are expected to start learning at the age of nine or ten (Halliday & Matthiessen, 2013). When the learners are studying in the sample textbooks of grades VI to X, the expected age of the learners is eleven to sixteen years. Still, there is a challenging deficit in using this unique characteristic of LD, which enhances LC by making the language condenser and lends it greater compactness by transferring a lengthy whole of a language into a “nouniness squish” (Mackenzie, 1996, p. 2). Considering the gap between the highest and the lowest ratio of nominalization across the five study levels, a fractional gap of 0.10 is found. On the other hand, the gaps within the five levels are 0.19, 0.25, 0.24, 0.34, and 0.09 in grades VI, VII, VIII, IX, and X, respectively. Comparing the gaps in the use of nominalization within the five successive study levels and the gap across the five consecutive study levels, I have observed that the latter is the lowest of all the five grades except grade X which is 0.01 higher than this. The data informs that the students face highly complex language within the study levels while the demand for learning linguistic knowledge matching with the study levels remains ungratified. Moreover, this insignificant gap across the five levels binds the nominalization complexity to a very narrow field depriving the textbooks of the LC they may have according to the grade levels.

About the GI index across the five successive study levels, contrary to the assumption of systematic progression in LC English textbook of grade VII has the highest intricacy index while textbook of grade VI has the second highest. GI value of grade VIII indicates that it has the lowest intricacy value among all the five grades. Resultantly, no gradual pattern of rising or fall is seen across the five study levels.

The observation confirms that this feature of LC in the English textbooks does not follow any well-defined design.

Table No. 4.25 Means of LD and nominalization and value of GI

S.No.	Grades	Means of LD and Nominalization	GI
01	VI	$4.21+0.11/2 = 2.16$	1.93
02	VII	$3.39+0.14/2 = 1.76$	2.35
03	VIII	$4.64+0.11/2 = 2.37$	1.57
04	IX	$5.09+0.21 /2= 2.65$	1.67
05	X	$4.45+0.16/2 = 2.30$	1.91

Since LD and the use of nominalization make written language denser and more compact that resultantly raises the LC index of textbooks, by taking the means of LDs and ratio of nominalizations of the five grades, it is seen that the means of the above two indices of English textbook of grade VII is the least with the highest GI index across the five grade levels. On the other hand, the English textbook for grade IX has the highest mean but not the lowest GI index. Since multiple clauses string together each long sentence, it allows lexical items to scatter over more ranking clauses. An increase in GI index is likely to result in lower abstraction and compactness because the ideas become episodic and the chunks are spread over an extensive syntactic structure (Putra and Lukmana, 2017). Therefore, LD and GI are inversely related (Halliday as cited in To, 2015), and with the increase in the GI index, the LC of the text becomes low. Mulyanit and Soeharto (2019, p. 220) maintain the same view that “the bigger the score in grammatical intricacy, the lesser the complexity of the text is”. The above table clearly shows that so far as the three features of LC are concerned, the English textbook of grade VII occupies the lowest LC index because it has the minimum mean of LD and nominalization and the highest GI index. At the highest borderline of LC, the English textbook of grade IX has the highest mean of LD and nominalization, but GI index is the second lowest. English textbook of grade VIII has the second highest mean but the lowest GI index. The

results endorse Halliday's (1989) propositions that high LD results in low GI as high LD is often found in simple clause complexes. In simple clause complexes, fewer ranking clauses are strung up to make clause complexes, and it requires that more lexical items are found in short strings of words.

In *How to teach English*, Harmer states that one important consideration while choosing a book for any level is its appropriateness for the age learners. Unless the syllabus designers follow a well-organized order in the difficulty level of reading and listening of the text with learners' movement to higher grades (Harmer, 2008) the smooth advancement in comprehension of the text seems improbable. In the sample textbooks of the study, as per quantitative data and the in-depth qualitative analysis, the written text of almost all the sample books shows little alignment with their grade levels. With such sporadic and intermittently dispersed features of LC within and across the five selected levels, it can be concluded that textbook writers, syllabus designers, and publishers are least concerned with what they produce for the learners.

4.7 Summary of Key Findings of the Second Research Question

Apart from the significant disharmony in the three features of LC within the textbooks of the five grade levels, the LC of the textbooks of the sample population is inconsistent with the accepted approach of gradual progression. The five successive grade levels do not follow the idea of systematic complexification assumption. The results of the study are consistent with the findings of Putra and Lukmana (2017), To (2015), and Mulyanti and Soeharto (2020).

4.8 Discussion on Overall Findings

The quantified data analysis shows the extents of LD, nominalization, and GI as three distinct features of LC within the sample population. The LD indices show that in the beginning unit, the density level is higher than the least LD value within all the five study levels. Furthermore, in all the five grade levels, none of the English textbooks involves the LD index from the lower to a higher score. Although the inclusion of nominalization is introduced in the first units of all the study levels yet its ratio does not adapt the design of regular progression. The quantitative analysis represents the same disharmonised random rise and fall in GI indices within the study levels. Therefore, the language of the very first unit of all the selected textbooks is more

complex than that of the unit with the lowest complex language. Besides this, significant disharmony among the three features of LC is also found within every study level.

Apart from the measurements of the three features of LC within the sample population, the calculations across the levels demonstrate that the three features of LC have concurrence at the lowest bottom line of LC, but the lowest LC does not begin from the first grade of the sample population. Instead, the second study level occupies the minimum LC index. Disregarding the gradual increase in LC across the levels, the second last study level of the sample population rises to the highest extreme. The penultimate study level of the sample textbooks lags behind its following study level in the LC index. Like the results of the studies revealed by Putra and Lukmana (2017), To (2015), and Mulyanti and Soeharto (2020), English textbooks of elementary and secondary classes which are taught in the schools run by FDE in Islamabad Capital Territory have the same inconsistency in a gradual increase in LC within every level and across different levels.

Keeping in view both the quantitative and qualitative analysis of LC within and across the levels of elementary and secondary English textbooks, it is concluded that there is the least conformity of the three features of LC. LD, the most prominent feature of LC, does not follow any specific pattern of increase. About LD indices within the elementary level, contrary to the accepted notion of gradual increase, it was found that the value does not start from the lowest level. Instead, the first unit has an LD value equal to the mean of the five units. Instead of starting from grade VI, a unit of grade VII contains the lowest LD value while the LD index touches the highest value in grade VIII, leaving no space for further increase in LD in the following grades. The same irregular increase in LD indices in secondary English textbooks is found. As the units of almost all the five grade levels do not conform to the pattern of gradual increase, the same is the case across the levels. The LD index of grade VII is the minimum value among the five grade levels, while grade IX touches the highest line of LD. Moreover, nominalization, the second salient feature of LC, does not follow any explicit arrangements within and across the levels. The results show that the GI aspect of the elementary and secondary English textbooks has the same least concordance within every level and across the five successive study levels.

Combining the three features of LC, I have noticed that LC indices do not start from the lowest grade of the sample textbooks. A contrary glaring picture is seen that grade VI does not have the lowest LC value. Rather, the English textbook of grade VII lies at the down border line of LC. The same is the case with grade X which is not at the highest borderline of the five English textbooks. Instead, the preceding grade level rises to the highest LC value. Simply, English textbooks of elementary and secondary levels do not conform to the notion of systematic complexification assumption.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

Following the SFL thread relating to LC, I have administered a broad description of the LC of English textbooks of the elementary and secondary levels. The study has detailed quantitative and thorough qualitative analysis in the previous chapters. Detailed data analysis mirrors that questions set for the study are highly purposeful for the learner, the teachers, textbook content writers, and the syllabus designers. The first research question was about lexical items' frequency, nominalization tokens, and GI. The question states: What is the extent of lexical density, nominalization, and grammatical intricacy within and across elementary and secondary-level textbooks? Quantitative data portrays a comprehensive picture of the extent of all three features of LC within and across the five levels. Quantified data informs the density of lexical items used in each sample unit of all the five study levels. It shows that in nearly all the five sample study levels, the least LD does not always start from the first unit. This irregularity continues until the last unit of the sample units and culminates in the sporadic spread of the LD within and across the five successive levels. As far as the employment of nominalization is concerned, the first unit contains some ratio of nominalization. Still, a sudden drop is found in the employment of this device in the following units. In this way, intermittent use of nominalization causes a jerky change in the LC of the sample textbook. Concerning the GI indices within and across the five study levels, the sample textbooks do not follow any specific pattern of rise and fall that deprive the textbooks of achieving a steady increase in the LC within a level and across the levels.

The second research question was on the qualitative description of the pattern of increase in LC at elementary and secondary levels. The question states: How does linguistic complexity vary in the selected textbooks? To achieve the accepted design of gradual increase in the LC within and across the levels, the three aspects of LC may have consistency that lacks in the sample textbooks. Discussions on the quantitative data reveal that all the three elements of LC do not conform to each other or the

textbook levels. In this way, LC varies haphazardly and follows irregular patterns. Inconsistency and irregularity in the LC within a level and across the study levels hinder the learners' smooth development in the language.

5.2 Recommendations

As is evident in the study results that the elementary and secondary English textbooks do not have any consistency in nearly all the three features of LC level within a level and across the five study levels. As books are the leading pedagogical resource for learning a language, their role is pivotal in knowledge development and linguistic skills. Their importance is acknowledged, and the gradual increase in LC within a level and across the study levels makes the students' learning flow smooth. However, regarding the sample population, it seems to be the most neglected aspect of syllabus design. Therefore, it is recommended that the textbooks be compiled keeping in view their density of language, as the density of lexical items is the feature that determines the LC of the text and directly impacts learners' reading and comprehension skills. A lesson at a study level is like a small step in learners' academic journey; therefore, the gradual increase in the density can prove conducive in learners' smooth shift from one level to the other. This aspect cannot be neglected even in the arrangement and sequencing of the units within the study levels. LD is the salient feature that affects learning abilities of students as lexically dense texts pose greater processing demands than lexically sparse texts because of the limits of human working memory (Miller, 1969) so it is suggested that great attention be given to this aspect while selecting or compiling the text for the textbooks.

Nominalization is a device that enhances LD by compacting the information and rendering an opaqueness to the text. It gives the language a metaphorical mode which the students are expected to start learning at the age of nine or ten (Halliday & Matthiessen, 2013). While reading the sample textbooks, the average age of the students is eleven to fifteen years, but the textbook employs this metaphorical device in a very slight ratio. This is a beneficial device that packs more significant meanings in concise words. After coding and decoding the meanings in various forms of nominalization, the students can be proficient in English, but the textbooks lack this meaning packing device. It is pertinent to recommend that this device be incorporated

proportionally in accordance with the progression of grade levels. Apart from the use of this device, it seems advisable that its various forms are introduced in the text according to different grade levels so the students are exposed to a wide variety of nominalization. The exposure to greater number of forms of nominalizations helps learners to develop their linguistic repertoire.

Moreover, the students' heightened awareness of the GI is also required. This can be learnt by using joining words, i.e., conjunctions. Besides the LD and nominalization, GI should be considered when designing the curriculum for students.

5.3 Implications of the Study

This section incorporates my reflections on the significance of the study. I have outlined the vital contribution this study can make in furthering research for improving English textbooks for elementary and secondary study levels, especially in Pakistan. This study is significant in calculating LC levels in English textbooks for their improvements. The coming sections incorporate the contribution of this study.

5.3.1 Pedagogical Pathways

This thesis provides an essential insight into Pakistani English textbooks taught at elementary and secondary levels. It reveals that English textbooks taught at elementary and secondary levels do not conform to the accepted pattern of gradual progression of LC. These understandings provide cues to the content writers, textbook designers, and publishers to design the syllabus keeping the learners' age and grades in view. These pedagogical interventions will directly be helpful for the syllabus designers, while they indirectly affect the learners by exposing them to smooth flow in learning ESL. The LC factor will, in turn, benefit the teacher in teaching the content that gradually becomes complex. As Nagy and Townsend (2012) point out, studies in this field suggest that textbooks contain more academic language—that is, textbooks use increasingly complex academic language—with the increase in grade level.

5.4 Limitations of the Study and Future Research

Even though I have earnestly ventured to verify the validity of this study, tried hard to ensure its reliability, and struggled to expand its generalizability, I cannot claim that

this single thesis provides a comprehensive account of Pakistani English textbooks. In its scope and size of the population, the study represents significant limitations as only the first five units of the five grades have been selected which cannot be representative of the whole textbooks. The LC of the complete textbooks can be assessed to enhance its generalizability.

Future researchers can opt for the adopted methodology of this study for their studies on academic written text. This study is beneficial for those whose interest lies in textbook analysis. Since I have worked only on the elementary and secondary English textbooks, future researchers can go for the English textbooks from grades I to X to probe and see a gradual upward curve of the LC. Moreover, grades XI and XII English textbooks can also be assessed to seek this significant learning factor. In addition, the coming researchers are advised to examine LC indices in science and non-science textbooks of the same grade levels to probe the LC differences of the same grade textbooks. Furthermore, comparative research studies on the index of three features of LC of various grade levels can help enhance the understanding of LC level.

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