CHAPTER II
LITERATURE REVIEW

2.1 Lexical Complexity in Second Language Acquisition and Writing

Lexical complexity is an important part of learning a second language and improving writing skills. It refers to how varied and sophisticated a person's vocabulary is, including aspects like lexical diversity, lexical density, and lexical sophistication. Studying lexical complexity helps researchers and teachers understand a learner's language ability and progress.

In second language learning, lexical complexity plays a big role in developing strong communication skills. Learners who use a wider range of words can express their thoughts more clearly and effectively, which improves both their speaking and writing. Studies suggest that lexical complexity is connected to other important language features, such as sentence structure and fluency, all of which contribute to overall language skills (Bulté & Housen, 2012)

One key part of lexical complexity is lexical variation, which refers to how many different words a person uses in their writing. If someone uses a wide range of words, it usually means they have a strong vocabulary. Researchers measure lexical diversity using tools like the Type-Token Ratio (TTR) and moving-average TTR (MATTR) to see how varied a learner's vocabulary is.

Another important aspect is lexical density, which looks at how many content words (such as nouns, verbs, adjectives, and adverbs) appear in a text compared to function words (such as prepositions and conjunctions). Texts with high lexical density are usually more informative and are commonly found in academic writing (Ure, 1971). However, second-language learners sometimes struggle with lexical density because they rely on simpler words and sentence structures.

Lexical sophistication refers to the use of advanced or less common words. More proficient learners tend to use vocabulary that is not frequently found in everyday conversations but is common in academic or professional settings (Laufer & Nation, 1995). Using sophisticated vocabulary is a sign of language growth and development.

In second-language writing, lexical complexity is often linked to writing quality. Research shows that skilled writers tend to use a broader vocabulary, include more content words, and use advanced vocabulary to express complex ideas (Crossley & Kyle, n.d.) However, using too many difficult words without understanding their proper use can make writing confusing and harder to read.

Because lexical complexity is so important in second-language learning and writing, many researchers and teachers use digital tools to analyze vocabulary use in students' writing. For example, the *Lexical Complexity Analyzer (LCA)* helps assess different aspects of vocabulary and provides insights into a learner's

14

progress. This information can help teachers guide students in improving their vocabulary and writing skills.

By understanding lexical complexity and its role in second-language learning, educators can create better teaching methods to help students expand their vocabulary and improve their writing. Encouraging learners to use a variety of words effectively can lead to stronger academic writing and better overall communication skills in a second language.

2.2   Theoretical Framework of Lexical Complexity

Laufer & Nation (1995), introduced an important way to analyze vocabulary use in second language learning. Their approach focuses on lexical richness, which includes three main aspects: *lexical variation, lexical density, and lexical sophistication*. These aspects help researchers and teachers evaluate how well language learners use vocabulary in speaking and writing.

2.2.1   Lexical Sophistication

One key part of their framework is lexical sophistication, which refers to the use of less common and more advanced words. Laufer & Nation (1995) suggest that learners with higher proficiency use vocabulary that is not frequently found in daily conversations but is more common in academic and professional settings. To measure this, they developed the Lexical Frequency Profile (LFP), which analyzes how often learners use high-frequency versus low-frequency words. The LFP is still widely used in vocabulary research today.

2.2.2 Lexical Variation

Another important aspect is lexical diversity, which looks at how many different words a learner uses in a text. A higher lexical diversity score means a learner has a richer vocabulary and greater flexibility in expressing ideas. A common way to measure this is the Type-Token Ratio (TTR) and its variations, such as the Moving-Average Type-Token Ratio (MATTR) (Laufer & Nation, n.d.).

2.2.3 Lexical Density

Laufer & Nation (1995) also discuss lexical density, which measures the proportion of content words compared to function words (such as prepositions, conjunctions, and articles). Texts with higher lexical density tend to be more complex and informative, making this an important factor in evaluating academic writing.

2.3 Lexical Richness as a Sign of Language Proficiency

According to Laufer & Nation (1995), the variety and quality of vocabulary a learner uses can show their level of language proficiency. More advanced learners tend to use a wider range of words, include more content words (such as nouns, verbs, adjectives, and adverbs), and choose more advanced, less common vocabulary. Their research highlights how important vocabulary is for fluency and accuracy in a second language.

2.4 Why This Framework Matters for Language Learning

Laufer & Nation (1995) ideas have had a big impact on second language learning and teaching. Their framework helps teachers and researchers assess vocabulary development, track students' progress, and identify areas that need improvement. Their

16

research has also influenced the way vocabulary is taught, encouraging learners to expand their word choices and use more advanced vocabulary.

Additionally, their work has contributed to the creation of tools like the *Lexical Complexity Analyzer (LCA)*, which automatically measures vocabulary use in writing. By applying these ideas, teachers can better support students in developing their vocabulary, improving their writing, and reaching higher levels of language proficiency.

2.5 Factors Affecting Lexical Complexity

Lexical complexity, or the use of more advanced and varied vocabulary, is not something that appears suddenly in student writing. It grows step by step, influenced by what students read, how they feel about English, and the strategies they use to learn.

One important factor is reading. When students read English texts, especially ones that are a little more difficult than usual, they see many new words and sentence structures. This helps them learn and remember vocabulary that they can later use in their writing.

Through regular reading, students can write with more word variety (**lexical diversity**) and use more academic or less common words (**lexical sophistication**).

Another important factor is the student's attitude. According to the Tripartite Model of Attitude (Garrett et al., 2003; Wenden, 1991), attitude has three parts:

a.   What students believe about reading and writing (cognitive),

b.   How they feel when doing those tasks (affective), and

17

c.   What they do to improve (behavioral).

For example, if a student believes that reading helps improve their writing, enjoys learning English, and often practices outside class, they are more likely to show better vocabulary in their essays. Positive attitudes can lead to better motivation and more effort in using advanced words.

Awareness also plays a role. Some students notice the words they use and try to improve them. They may write down useful vocabulary, use online tools like thesauruses or dictionaries, and check their writing to replace simple words with better ones. These small habits help build stronger, more academic writing over time.

One external factor that can affect students' lexical complexity is the quality of lexical input from their learning materials. According to Ro'ifah (2022), lexical units presented in high school ELT textbooks are often insufficient and unevenly distributed, which may limit students' vocabulary acquisition and restrict their lexical diversity in writing.

In simple terms, lexical complexity grows from good reading habits, a positive attitude toward learning, and the small, smart choices students make when they write.

2.6 Impact of Lexical Complexity on Writing Ability

Lexical complexity has a big impact on writing ability, especially for second language (L2) learners. Having a more varied and advanced vocabulary helps writers express their ideas more clearly, accurately, and persuasively, Writing competence is not only influenced by grammatical knowledge, but also by lexical

mastery and text organization skills (Hafifah & Yunianti, 2019). Studies show that writers who use more complex language tend to perform better because they use a wider range of words, include more content-rich words, and can use more sophisticated vocabulary (Laufer & Nation, 1995).

One important aspect of lexical complexity is lexical diversity, which refers to the variety of words a writer uses in their text. Using a wide range of words helps avoid redundancy and makes writing more interesting. Laufer & Nation (1995) found that students with more lexical diversity tend to write more fluently and show better language skills.

Another key idea is lexical density, which looks at the proportion of content words (like nouns, verbs, and adjectives) compared to function words (like prepositions or articles). A text with higher lexical density is often more information-rich, which is typical in academic or professional writing. However, as Laufer & Nation (1995) point out, L2 learners often struggle with achieving high lexical density because they have a smaller vocabulary and tend to use simpler sentence structures.

Lexical sophistication, using advanced or less common words, is also crucial for writing quality. More advanced writers can incorporate sophisticated vocabulary, which makes their writing deeper and more detailed. However, Laufer & Nation (1995) warn that using too many complex words can make the writing harder to read, so it's important to balance complexity with clarity.

In academic and professional writing, lexical complexity is especially important because clear and accurate vocabulary is

necessary. Laufer & Nation (1995) showed that learners who use more complex vocabulary tend to write better-organized and clearer texts, which leads to better writing results. This is why teachers focus on helping students grow their vocabulary while keeping their writing easy to understand.

However, increasing lexical complexity can be challenging for L2 learners. Many students struggle to balance the variety, richness, and sophistication of their vocabulary while ensuring their writing remains clear. Laufer & Nation (1995) also note that students with smaller vocabularies may find it difficult to use more complex language in their writing.

2.7 Threshold Criteria for Lexical Complexity

In this study, lexical complexity is analyzed based on three main aspects commonly discussed in Second Language Acquisition (SLA) research: **lexical density**, **lexical variation**, and **lexical sophistication** (Laufer & Nation, 1995; Ure, 1971; Ai & Lu, n.d.) Each of these aspects is measured using specific quantitative indicators available in the Lexical Complexity Analyzer (LCA), a web-based tool designed to automatically assess the lexical features of student writing.

- **Lexical Density (LD)** measures the proportion of content words (such as nouns, verbs, adjectives, and adverbs) to the total number of words in a text. A higher LD score indicates that a text is more informative and content-rich. According to Ure (1971), an LD score above **0.55** is considered high and reflects a greater level of lexical complexity.

- **Lexical Variation (LV)** is measured through **Type-Token Ratio (TTR)** and **Number of Different Words (NDW)**. While TTR is sensitive to text length, it remains a widely used measure in L2 writing research. A TTR value above 0.50 is interpreted as high lexical variation, especially in controlled writing tasks (Ai & Lu, n.d.; Kyle & Crossley, 2015; Laufer & Nation, 1995). An NDW score above 150 in texts of 200–300 words is also considered high for high school EFL learners.

- **Lexical Sophistication (LS)** refers to the use of advanced or less frequent words. This is measured using **LS1**, which calculates the proportion of words outside the most frequent 2,000 words in English. According to (Laufer & Nation, 1995) a score above **0.35** indicates high lexical sophistication and suggests that the writer is able to use more academic or uncommon vocabulary.

To interpret the results, this study uses benchmark thresholds to categorize each student's lexical complexity level as **low**, **medium**, or **high** based on previous studies and standards in L2 writing research. The following table presents the threshold values used:

Table 1 Threshold of Lexical Complexity

INDICATOR	ASPECT	LOW	MEDIUM	HIGH	SOURCE
LD	Lexical Density	<0.45	0.45 – 0.55	> 0.55	Ure (1971)
TTR	Lexical Variation	< 0.40	0.40 – 0.50	> 0.50	(Laufer & Nation, 1995)
NDW	Lexical Variation	< 100	100 – 150	> 150	Adjusted from (Ai & Lu, n.d.)
LS1	Lexical Sophistication	< 0.2 5	0.25 – 0.35	> 0.35	(Laufer & Nation, 1995)

By applying these indicators and benchmark values, the study can objectively assess the lexical complexity level of each student's writing and classify their performance accordingly.

2.8 Aspect and Measuring of Lexical Complexity

Based on Lexical Complexity, it can measured using several quantitative formulas:

2.8.1 Lexical Density

The proportion of content words (nouns, verbs, adjectives, adverbs) compared to total words, indicating the informativeness of a text. According to Ure (1971), a higher lexical density suggests a more complex and information-rich text. This aspect is particularly important in academic writing, where conveying precise information efficiently is necessary. A text with high lexical density typically avoids redundant function words and focuses on meaningful content words, enhancing clarity and conciseness.

Formula:

$$Lexical\ Density = \frac{Number\ content\ words}{Total\ number\ of\ words} \times 100$$

2.8.2 Lexical Variation

The range of unique words used in a text, often measured by Type-Token Ratio (TTR) or other indices (Laufer & Nation, 1995) Greater lexical diversity indicates an ability to use a wide variety of vocabulary, reflecting a writer's linguistic resourcefulness. A high lexical diversity score suggests that a writer avoids excessive repetition, making the text more engaging and demonstrating a

22

broader vocabulary knowledge. This is particularly relevant in argumentative and descriptive writing, where variation in word choice enhances expressiveness.

Formula:

$$TTR : \frac{Number\ of\ unique\ words}{Total\ number\ of\ words}$$

2.8.3 Lexical Sophistication

The range of unique words used in a text, often measured by Type-Token Ratio (TTR) or other indices (Laufer & Nation, 1995). Greater lexical diversity indicates an ability to use a wide variety of vocabulary, reflecting a writer's linguistic resourcefulness. A high lexical diversity score suggests that a writer avoids excessive repetition, making the text more engaging and demonstrating a broader vocabulary knowledge. This is particularly relevant in argumentative and descriptive writing, where variation in word choice enhances expressiveness.

Formula:

$$Lexical\ Sophistication = \frac{Number\ of\ los\ frequency - Words}{Total\ Words}\ x\ 100$$

2.8.4 Using LCA by Haiyang Ai

The Lexical Complexity Analyzer (LCA) is a web tool created by *Haiyang Ai* which can accessed in https://aihaiyang.com/software/lca/batch/ to measure lexical complexity in second language (L2) writing. It automatically analyzes different vocabulary-related metrics based on three main factors :

Table 2 Indicator in LCA

Aspect	Definition	Indicator in LCA
Lexical Density (LD)	Measures the density of content words in a text (LU, 2012)	LD
Lexical Variation (LV)	Measures the diversity of vocabulary in a text (Laufer & Nation, 1995; LU, 2012).	NDW, NDW-50, NDW-ER, NDW-ES, TTR, MSTTR, CTTR, RTTR, AdjV, AdvV, ModV
Lexical Sophistication (LS)	Measures the proportion of advanced or low-frequency words in a text (Laufer & Nation, 1995)	LS1, LS2, VS1, VS2, CVS1

In this study, LCA is used to assess the lexical complexity in the writing of 12th-grade students at SMA Muhammadiyah X Surabaya. The collected data were analysed with LCA to get *LD, LV, and LS scores*. These scores will then be compared to describe how lexical complexity appears in relation to students' writing skills.

In LCA, lexical density is analyzed using the Lexical Density Measure (LD), while lexical sophistication is measured through *LS1, LS2, VS1, VS2,* and *CVS1*. Lexical variation is assessed using various metrics, including *NDW, NDW-50, NDW-ER, NDW-ES, TTR, MSTTR, CTTR, RTTR, AdjV, AdvV, and ModV*. These values help determine the complexity of vocabulary in a text.

According to Ai & Lu, n.d.), LCA provides a more accurate and efficient way to analyze text compared to manual methods. Using Natural Language Processing (NLP) algorithms, LCA can quickly detect lexical patterns. The results can also be compared with previous studies to better understand how lexical complexity develops in second-language learners' writing.

2.9   Previous Research on Lexical Complexity in L2 Writing

Several previous studies have addressed lexical complexity in various educational contexts. Putra & Lukmana, (2017) analyzed the reading texts in senior high school English textbooks published by the Indonesian Ministry of Education using a systemic functional linguistics framework. Their study focused on lexical density, lexical variation, and grammatical intricacy as indicators of text complexity and found that these elements increased progressively across grade levels. However, their study focused solely on the language of textbooks (input) and did not investigate students' actual writing (output).

Similarly, Karman (2016), investigated the lexical features of senior high school students' writing in recount texts. While the study provided insights into students' lexical use, it is limited to a descriptive genre and did not explore more cognitively demanding genres such as argumentative writing.

More recently, Istihari (2024), examined lexical richness in primary-level EFL students' opinion writing in a bilingual classroom, focusing on lexical density, variation, and sophistication. The study revealed gender differences in lexical use and emphasized the importance of exposing learners to rich vocabulary at an early age. However, the research limited to elementary students and basic persuasive writing.

Given these gaps, in contrast to previous research that focused on textbook content, elementary students, or basic genres such as recount and persuasive writing, the present study investigates actual student-produced **descriptive texts** written by

senior high school learners. Descriptive writing requires higher lexical precision and detail, making it a more demanding genre in terms of vocabulary use. Moreover, this study integrates both textual analysis and attitudinal data from questionnaires, offering a broader perspective on the factors influencing students' lexical complexity. This dual approach distinguishes the present study from earlier works and contributes new insights into the relationship between vocabulary use and writing development in secondary EFL contexts.