

Readability of Reading Texts as Authentic Materials Issued by ChatGPT: A Systemic Functional Perspective

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ARTICLE INFO	ABSTRACT
Keywords: readability, lexical density, grammatical intricacy, lexical variation, ChatGPT DOI: http://dx.doi.org/10.21093/ijeltal.v8i2.1546 How to cite: Ramadhani, R., Aulawi, H., & Ulfa, R.L. (2023). Readability of Reading Texts as Authentic Materials Issued by ChatGPT: A Systemic Functional Perspective. <i>Indonesian Journal of English Language Teaching and Applied Linguistics</i>, 8(2), 149-168	Selecting the appropriate texts as the authentic material for English teaching, particularly at the university level, matched with students' mastery level is still challenging. This study attempts to investigate the readability level of reading texts through the framework of Systemic Functional Linguistics (SFL) issued by ChatGPT, focused on whether the complexity level of the texts matches the standard level of the Common European Framework of Reference (CEFR) by proposed British Council. Through the qualitative design with content analysis, this study examines eighteen texts classified following CEFR levels issued by ChatGPT. It analyzes their lexical density, grammatical intricacy, and lexical variation to know the complexity of the texts. The analysis revealed that the complexity level of the texts issued by ChatGPT has not thoroughly followed the standard level of the texts used by the British Council on the CEFR level, indicating that several texts are inappropriate with their complexity levels. It is found that the complexity level of the texts issued by ChatGPT is determined by the length of the texts that increase from the basic level to the proficient level seen from the number of words in each text, not by their lexical density, grammatical intricacy, and lexical variation indexes. The study provides implications for the lecturer to carefully select the text used as teaching material issued by ChatGPT by relying on the lexico-grammatical analysis of the text to help students achieve the comprehension stage.

1. Introduction

Selecting authentic materials for English teaching has been a challenging issue. *Authentic material* is exposed to the natural language and its implementation in its community (Maley & Tomlinson, 2017). Moreover, it benefits teachers or lecturers as the resources in teaching

students include increasing motivation, broadening knowledge, enhancing comprehension, providing particular language, and showing cultural points (Namaziandost et al., 2022). One authentic material the teachers or lecturer focuses on is reading text. Giving the appropriate authentic materials can engage students to participate in reading activities more enthusiastically to improve their reading skills (Mohammed, 2021). Research showed that students positively perceived the authentic materials used by the English lecturers in reading class because it was straightforward and convenient and could improve their reading comprehension (Fitriana et al., 2019). However, the resources of authentic materials nowadays cannot only be obtained from textbooks but also through the utilization of technology development, particularly ChatGPT.

ChatGPT, known as the Generative Pre-trained Transformer, introduced in 2018, is deemed the most sophisticated and modern Artificial Intelligent used by many people today, particularly in Indonesia. It also becomes one of the essential tools in natural language processing and can potentially revolutionize how humans do their lives, mainly in academic sectors (Lund, 2023). ChatGPT provides scholars with powerful tools to facilitate their work (Rahman et al., 2023). Recent research showed that ChatGPT has the potential to be used in various domains of academic research (Grimaldi & Ehrler, 2023). Besides, ChatGPT can be used by educators as a resource to find authentic materials, particularly reading text, for students. This technology can produce some samples of reading texts arranged with the levels that the English lecturers need. However, the English lecturer should carefully select it and take it as the materials discussed in the classroom.

Teaching reading becomes an essential part of teaching English as a foreign language. Reading is one of the complex skills taught in every educational stage to help students broaden their knowledge, expand their vocabularies and know other cultures (Kim, 2015). The lack of reading can affect students' intellectual and emotional growth (Cekiso, 2017). The complexity of the reading process occurs because, in the process of reading, besides reading the words, students also need to be able to include their prior knowledge, language proficiency, and understanding of the real meaning and information encoded in the text (Mara & Mohamad, 2021). In other words, the reading process should achieve the comprehension stage. According to Dijk & Kintsch (1983), comprehension is the process of meaning creation from the text by deeply understanding it rather than gaining meanings from individual words or sentences. Furthermore, the factors that influence comprehension are students' interest and motivation, anxiety, and appropriately selected materials suited to students' level of proficiency (Gashti, 2018). In this case, selecting appropriate materials suited to students' proficiency level impacts students' comprehension of reading text (Khaleel, 2021). The variety of text features largely influences the difficulty level of comprehending the texts (Beck et al., 1995). Therefore, English lecturers should carefully choose the reading texts as authentic materials to make students easier in learning and avoid anxiety.

Students' success at the university level largely depends on their text comprehension influenced by different features characterizing the text. However, selecting the appropriate reading text suited to students' level remains an issue. No clear standard has been used to classify the appropriate text selected by the lecturers to teach students based on their level of proficiency due to the difficulty level in comprehending them (Sujatna et al., 2021). The problem is that most English lecturers in Indonesia, especially in one private university in the

Garut regency, still subjectively select the text by using their analysis to determine the complexity level of text that is only partially suited to the student's proficiency level. Most lecturers create materials, including reading text, to teach students in the classroom since the government provides no standard textbook for the university level compared to Junior and Senior High School levels. It influences the students' comprehension if the texts are inappropriate with the students' proficiency level. Therefore, setting a particular standard in choosing the texts is essential since it can be used as a parameter to determine the readability of the text that matches the students' proficiency level (Sujatna et al., 2022). Besides, it can help the English lecturer adjust the text's complexity level before distributing it to students (To et al., 2013).

The ability of the students to comprehend the text depends on the readability of the text. The students' readability level is determined by the complexity of the text provided by the teachers. *Readability* is the feature that makes the text easier to read than others (Dubay, 2004). Furthermore, readability is also viewed as the ability of a writer to use grammar and vocabulary to create a complex language (Renandya et al., 2018). Readability analysis aims to develop practical methods to develop reading materials that fit with students' and adults' abilities (Bailin & Grafstein, 2015). The readability analysis is determined by some linguistic factors, including semantics, syntactic, morphological, and textual properties (McCannon, 2019). One of the language tools used to determine the readability of the text is through analyzing the lexical density, grammatical intricacy, and lexical variation of the text.

Lexical density, grammatical intricacy, and lexical variation as part of systemic functional analysis are used to determine the complexity of written language. These language tools are also applied to determine the readability level of text for students (Halliday & Matthiessen, 2004). These analyses use the formula proposed by Halliday, which indicates that the result of lexical density calculation is the number of lexical items per clause, which can be counted from the total number of lexical words divided by the number of ranking clauses (Eggs, 2004). A text with a lower lexical density is understood easily and considered spoken text, while a high lexical density refers to written text (Martin, 2007). On the other hand, grammatical intricacy deals with the measure of tactic complexity in the clause complexes concerning the difficulty level of the vocabulary (Gerot & Wignell, 1994). Eggs (2004) stated that the grammatical intricacy index could be counted by denoting the number of clauses in a text as a portion of the number of sentences (Syarif, 2019). Furthermore, the third essential element of readability analysis is the lexical variation index which refers to the number of different lexical words compared to the total number of lexical words (Halliday & Matthiessen, 2004). Lexical variation determines the level of complexity depending on the repeated lexical items occurring in the text. If the lexical items in one text are mentioned many times more than others, the text is considered more straightforward and readable (Poonpon, 2010).

There have been several prior kinds of research related to the readability analysis of the text using lexical density in written text. The first was done by To et al. (2013), who focused their research on English textbooks' lexical density and readability. The research reported that the lexical density analysis showed the complexity level of the text where three of the four texts were of high lexical density. However, this study concluded that hard evidence shows that increased lexical density and readability influence text levels. Moreover, Putra & Lukmana (2017) also conducted the same related issue, which focused on the complexity analysis of

Senior High School English textbooks through lexical density analysis. The research reported a consistent pattern of text complexity progression across grade levels of the textbooks. It indicated that the language used in the text is increasingly complex from chapter to chapter. Furthermore, another research conducted by Sujatna et al. (2022) about the readability of PISA-like reading the text through lexical density analysis reported a decrease in the complexity of reading text in PISA-like reading texts compared to PISA reading texts in 2018. It indicated that PISA reading texts in 2018 are lexically denser and grammatically intricate than PISA-like reading. Moreover, the PISA-like reading texts still need to achieve the readability standard from PISA reading texts 2018.

The prior research has clearly shown the importance of lexical density analysis in determining the complexity and readability of reading text. Moreover, most of the researchers directed their attention to textbook analysis. The researchers have yet to study the lexical density analysis of reading text produced by Natural Language Processing or AI chatbots. In this study, the researcher is interested in analyzing the text complexity and readability levels of reading texts produced by ChatGPT. This study is conducted to inform the English lecturers in Indonesia whether the complexity level of the texts produced by ChatGPT and selected by the lecturers matches the students' proficiency level through the lexical density, grammatical intricacy, and lexical variation principles. Theoretically, this study is expected to give new insight to English lecturers to analyze the complexity level of texts. Practically, this study aims to inform the English lecturer to select the texts carefully ranged by ChatGPT based on the complexity levels to avoid difficulty for the students in comprehending the texts.

From the fundamental issue mentioned above, the purposes of this study are to investigate and describe (1) the lexical density of reading texts as authentic materials produced by ChatGPT, (2) the grammatical intricacy of reading texts as authentic materials produced by ChatGPT, (3) the lexical variation of reading texts as authentic materials produced by ChatGPT, and (4) the suitability levels of text complexity produced by ChatGPT with the standard used by the British Council on CEFR.

2. Research Methodology

2.1 Research Design

The present study investigated the readability of reading text as authentic materials produced by ChatGPT analyzed through three categories: lexical density (LD), grammatical intricacy (GI), and lexical variation (LV). The study employed a qualitative method supported by some descriptive quantifications to analyze the three categories (Creswell, 2012). The qualitative procedures through content analysis were implemented to determine the category of functional and lexical words and to analyze the category of ranking clauses in the texts. The phenomena figured out in the data were then investigated through quantification using a simple descriptive statistic of the formula mentioned above to find the indexes of lexical density, grammatical intricacy, and lexical variation. The analysis used the language tools from systemic functional linguistics proposed by Halliday & Matthiessen (2004) and Gerot & Wignell (1994).

2.2 Sample and Data Collection

The data of this study were taken from reading texts produced by ChatGPT, ranging from easy to challenging levels. The texts are categorized into the level of students' proficiency,

including basic user (A1 and A2), Independent User (B1 and B2), and Proficient User (C1 and C2) based on the Common European Framework of Reference for Languages: Learning, Teaching, and Assessment (CEFR) proposed by British Council (Europe, 2020). Eighteen texts were randomly selected from the answers provided by ChatGPT with different levels following the distribution: six texts for basic users, six texts for independent users, and six texts for proficient users. The data collected were analyzed following the perspective of systemic functional linguistics proposed by Halliday & Matthiessen (2004) through three categories, including lexical density, grammatical intricacy, and lexical variation, which become a robust analytical tool for analyzing the complexity level of the texts (Freebody, 2003).

2.3 Data Analysis Procedures

The data selected from the answers provided by ChatGPT were analyzed in terms of their complexity, which covered lexical density, grammatical intricacy, and lexical variations. The data were marked and classified for the number of words, lexical items (content words), grammatical items (function words), lemmas (word family), ranking clauses, and clause complexes. The words categorized as lexical items are verbs, nouns, adjectives, and adverbs, and the remaining categories are function words from word classes (Gerot & Wignell, 1994). The phrasal verbs are counted as one word or lexical item, and one tense is considered one verb. A clause consists of one predicator, and a clause complex is the combination of two or more clauses. Then, the identified data were tabulated for lexical density index, lexical variation index, and grammatical intricacy index. The lexical density analysis and grammatical intricacy were conducted using <https://www.analyzemywriting.com/> website, while the lexical variation was analyzed through AntConc 3.2.1w for Windows, developed by Anthony (2007).

3. Findings and Discussion

This part focused on analyzing the data by answering the research identifications. As stated earlier, this study examined the complexity of the texts through three different measurements, i.e., lexical density, grammatical intricacy, and lexical variation, as part of Systemic Functional Analysis tools. The first research question examined the lexical density of reading texts produced by ChatGPT. The subsequent analysis focused on the grammatical intricacy of reading texts produced by ChatGPT. Then, it investigated the lexical variation of reading texts produced by ChatGPT. The last step dealt with the suitability level of text complexity produced by ChatGPT that matches the standard level of texts used by the British Council on CEFR. In determining the complexity of the text, Sujatna et al. (2021) suggested that a text is viewed to have low lexical density if it ranges from 40% to 50%, which is appropriate for the basic user (A1 and A2), for quite lexical density ranged from 51% to 60%, which is appropriate for the independent user (B1 and B2), and for high lexical density ranged from 61% to 70% and more, which appropriate for proficient user (C1 and C2) (Gerot & Wignell, 1994). A high number of lexical densities influences many lexical items in a clause. On the other hand, a low number of lexical items in a clause is relatively influenced by a low number of lexical densities. It indicates that the denser information it provides, the higher the text's lexical density and the more complex it is. Furthermore, the higher the readability of the text, the easier the text is to read (Gregori-Signes & Clavel-Arroitia, 2015).

3.1 The Lexical Density of Reading Texts as Authentic Materials Produced by ChatGPT

Lexical density is applied to symbolize the extent of presented information in the text. The result of lexical density is measured using the abovementioned formula and described qualitatively. The analysis is done based on the complexity level of the text with the student's proficiency level categorized by ChatGPT, including basic user (A1 and A2), independent user (B1 and B2), and proficient user (C1 and C2). The analysis results are presented as follows.

Table 1. Lexical Density Index of Texts for Basic User (A1 and A2) Issued by ChatGPT

Features	Text					
	A1			A2		
	1	2	3	4	5	6
Number of words	158	145	145	165	170	139
Grammatical Items	89	79	68	87	94	68
Lexical Items	69	66	77	78	76	71
Ranking Clauses	15	14	13	14	16	13
Halliday's Lexical Density (HLD)	4.6	4.7	5.9	5.57	4.7	5.4

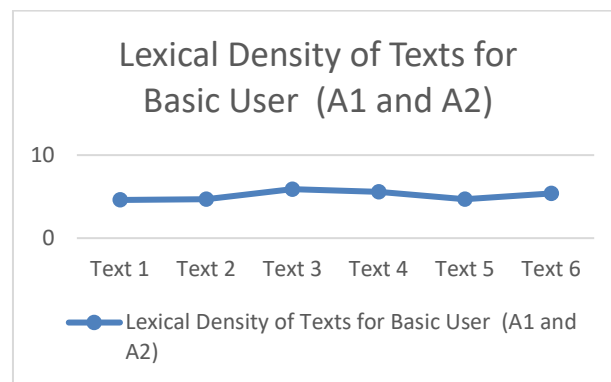


Figure 1. Lexical Density Percentage of Texts for Basic User (A1 and A2)

Table 1 above shows that there are 69 lexical items in the first text of the basic user (A1), 66 lexical items in the second text, and 77 lexical items in the third text. Furthermore, for the texts for basic users of the A2 level, there are 78 lexical items in the fourth text, 76 in the fifth text, and 71 in the sixth text. Meanwhile, regarding the number of ranking clauses in each text, there are 15 clauses in text 1 for basic users (A1), 14 in text 2, and 13 in text 3. Besides, for the basic user A2 level texts, there are 14 clauses in text 4, 16 in text 5, and 13 in text 6. With the numbers presented above, the lexical density of each text for basic users (A1 and A2) can be determined: 4.6 (46%) in text 1, 4.7 (47%) in text 2, 5.9 (59%) in text 3, 5.57 (5.57%) in the text 4, 4.7 (47%) in the text 5, and 5.4 (54%) in the text 6. The percentages of lexical density calculation are also presented in Figure 1 to show the complexity levels of the texts produced by ChatGPT for basic learners (A1 and A2).

Figure 1 shows the conformity of the complexity level of texts based on their lexical density for basic users (A1 and A2). Text 1 has a lexical density index of 4.6. Text 2 has a higher lexical density index than text 1 for basic users A1, 4.7, and text 3 for 5.9 lexical density index, which becomes the highest lexical density index among the texts for basic users. Meanwhile, text 4 also has a high lexical density index of 5.57, while text 5 has a 4.7 and 5.4 lexical density index for text 6. In line with what Sujatna et al. (2021) mentioned above, a low lexical density for basic users (A1 and A2) ranges from 40% to 50%. The percentage shown in Figure 1 above indicates that text 1, text 2, and text 5 are categorized as having a low lexical density. A low lexical density shows that the texts are readable or easy to comprehend (Noviyenti, 2021). In

contrast, text 3, text 4, and text 6 are categorized to have a pretty lexical density which indicates that the text consists of more lexical words and the complexity level increases (Ismail et al., 2023). This result concludes that only text 1, text 2, and text 5 are appropriate for basic users or learners (A1 and A2). According to Flesch Reading Ease Score on CEFER complexity analysis, the texts with A1 and A2 level has value about 80-90, which is equivalent to 40 – 50% in lexical density score, and are considered to have a lower lexical density index, indicating that the texts are less dense and easy to understand consisting of sentences with more closed words, such as modals, articles and pronouns (Natova, 2021). Moreover, the texts with these levels focus on basic information about primary school subjects, personal life, public interest, and family (Natova, 2021). It shows that texts 1, 2, and 5 by ChatGPT talk about family, hobbies, and personal life. It indicates that the categories provided by CEFR on texts 1, 2, and 5 match the standard lexical density score.

Table 2. Lexical Density Index of Texts for Independent User (B1 and B2) Produced by ChatGPT

Features	Text					
	B1			B2		
	7	8	9	10	11	12
Number of words	256	221	253	306	285	311
Grammatical Items	113	93	113	123	130	132
Lexical Items	143	128	140	183	155	179
Ranking Clauses	27	22	25	31	29	31
Halliday's Lexical Density (HLD)	5.5	5.8	5.6	5.9	5.4	5.8

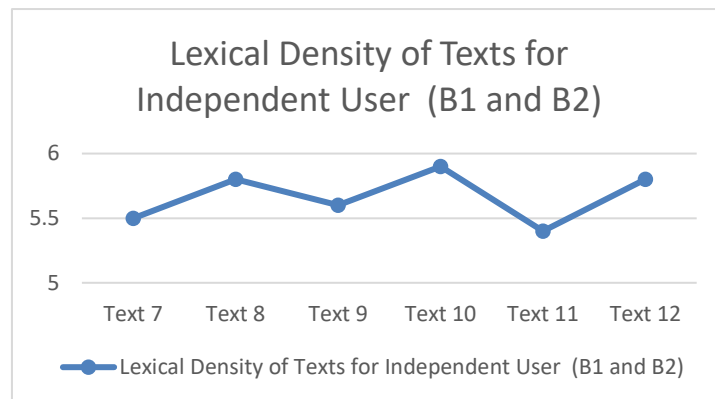


Figure 2. Lexical Density Percentage of Texts for Independent User (B1 and B2)

Table 2 above shows 143 lexical items in text 7 for independent users (B1), 128 lexical items in text 8, and 140 lexical items in text 9. Meanwhile, in the text for independent users of B2, there are 183 lexical items in text 10, 155 lexical items in text 11, and 179 lexical items in text 12. Regarding the number of ranking clauses, it shows 27 clauses in text 7 for independent users (B1), 22 in text 8, and 25 in text 9. Meanwhile, for independent users of B2, texts 10 and 11 have a total of ranking clauses of 31 and 29, respectively. Then, text 12 consists of 31 clauses in total. Therefore, with the numbers above, the lexical density index of each text for independent users (B1 and B2) can be determined: 5.5 (55%) in text 7, 5.8 (58%) in the text 8, and 5.6 (56%) in the text 9, 5.9 (59%) in the text 10, 5.4 (54%) in the text 11, 5.8 (58%) in the text 12. Furthermore, the percentages of lexical density calculation are also presented in Figure 4 to show the complexity levels of the texts produced by ChatGPT for independent learners (B1 and B2).

Figure 2 shows the conformity of the complexity level of texts based on their lexical density for independent users (B1 and B2). Text 7 has a lexical density index of 5.5. Text 8 has a higher lexical density index than text 7 for independent users B1, 5.8, and text 9 for 5.6, which becomes the second highest lexical density index among the texts for independent users. Meanwhile, for independent users of B2, text 10 has the highest lexical density index of 5.9, while text 11 has a lexical density index of 5.4 and 5.8 of the lexical density indexes for text 12. In line with what Sujatna et al. (2021) mentioned above, a low lexical density for the independent user (B1 and B2) ranges from 51% to 60%, which are 51% - 55% for the independent user of B1 and 56% - 60% for the independent user of B2. Based on the percentage shown by Figure 4 above, it indicates that text 1 is the only appropriate text that can be categorized for the independent user of B1 with the lexical density index of 5.5 (55%), and the rest should be categorized as the text for the independent user of B2. In contrast, text ten and text 12 can be categorized for the independent user of B2, while text 11 matches the category of the text for the independent user of B1. According to Flesch Reading Ease Score on CEFR complexity analysis, the texts with B1 and B2 level has a value of about 60-80, which is equivalent to 51 – 60% in lexical density score and are considered to have a pretty lexical density index (Natova, 2021). It indicates that the texts are denser and quite challenging to comprehend, and those consist of sentences with more content words, including nouns, verbs, adjectives, and adverbs (Sujatna et al., 2022). Moreover, According to CEFR standards, texts with B1 and B2 level talk about detailed knowledge of all secondary school subjects and vocational disciplines, such as sports basics, politics, finance, technology, and economics (Europe, 2020). In this case, text one on the B1 level produced by ChatGPT focused on economics and finance, while texts 10 and 12 focused on sport and technology. It indicates that texts 1, 10, and 12 match the category of CEFR standard through lexical density analysis (Natova, 2021).

Table 3. Lexical Density Index of Texts for Proficient User (C1 and C2) Produced by ChatGPT

Features	Text					
	C1			C2		
	13	14	15	16	17	18
Number of words	347	381	318	355	350	339
Grammatical Items	128	161	151	154	160	144
Lexical Items	219	220	167	201	190	195
Ranking Clauses	23	29	27	34	32	27
Halliday's Lexical Density (HLD)	9.5	7.6	6.2	5.9	5.9	7.2

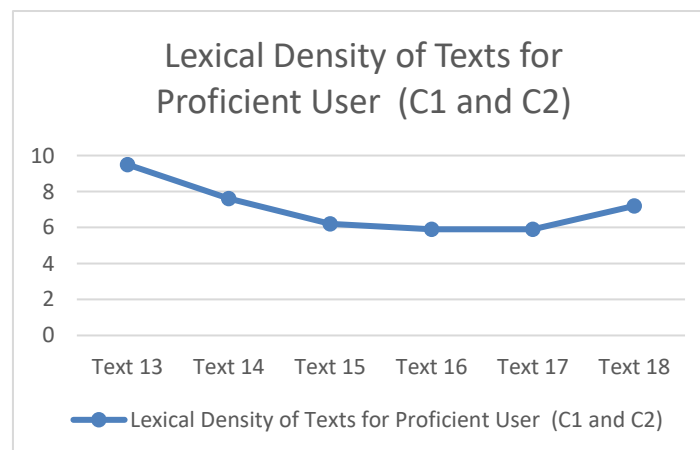


Figure 3. Lexical Density Percentage of Texts for Proficient User (C1 and C2)

Table 3 above shows 219 lexical items in text 13 for proficient users (C1), 220 lexical items in text 14, and 167 lexical items in text 15. Meanwhile, in the text for the proficient user of C2, there are 201 lexical items in text 16, 190 lexical items in text 17, and 195 lexical items in text 18. Regarding the number of ranking clauses in the text for proficient users (C1 and C2), it shows 23 clauses in text 13 for proficient users (C1), 29 in text 14, and 27 in text 15. Meanwhile, for proficient users of C2, text 16 has a total of ranking clauses 34, and text 17 has a total of ranking clauses 32, respectively. Text 18 consists of 27 clauses in total. Therefore, with the numbers above, the lexical density index of each text for proficient users (C1 and C2) can be determined: 9.5 (95%) in text 13, 7.6 (76%) in the text 14, and 6.2 (62%) in the text 15, 5.9 (59%) in the text 16, 5.9 (59%) in the text 17, 7.2 (72%) in the text 18. Furthermore, the percentages of lexical density calculation are also presented in Figure 7 to show the complexity levels of the texts produced by ChatGPT for proficient learners (C1 and C2).

Figure 3 shows the conformity of the complexity level of texts based on their lexical density for proficient users (C1 and C2 on CEFR). It shows that text 13 has the highest lexical index for proficient users of C1 (95%), followed by text 14 (76%) and text 15 (62%). However, only text 15 (62%) can be categorized as the text for proficient users of C1. Meanwhile, in the text for proficient users of C2, text 18 shows the highest result of lexical density index (72%), followed by texts 16 and 17 with the same number of lexical density index (59%). This result shows that text 15 can only be categorized as the text for the proficient user (C1), while texts 13, 14, and 18 should belong to the texts for the proficient user (C2). However, it indicates that texts 16 and 17 should be categorized as texts for independent users based on the standard of lexical density index stated by Sujatna et al. (2021). According to Flesch Reading Ease Score on CFER complexity analysis, the texts with B1 and B2 level has value about 0-50, which is equivalent to 70 – 100% in lexical density score and are considered to have a high lexical density index (Natova, 2021). A high lexical number indicates many lexical items in a clause (Putra & Lukmana, 2017). The higher frequency of lexical items (noun, verb, adjective, and adverb) that occur in a text, the more difficult it is to read (Halliday & Matthiessen, 2004). According to CEFR standards, texts with C1 and C2 levels on CEFR focus on advanced university and postgraduate courses in humanities and sciences, such as engineering, physics, astronomy, phycology, and computer science (Arikan, 2015). The texts categorized as C1 and C2 on CEFR produced by ChatGPT above talk about astronomy and computer science. The analysis above indicates that those texts fulfilled the standard of advanced texts proposed by the British Council of CEFR level through lexical density analysis (Sujatna et al., 2022).

3.2 The Grammatical Intricacy of Reading Texts as Authentic Materials Produced by ChatGPT

Grammatical intricacy is used to analyze the complexity of the text through the use of clause complexes compared to simple clauses occurring in the text. However, this tool is appropriately used for analyzing spoken text. However, it is also worth measuring the complexity level of written text (Putra & Lukmana, 2017). The result of grammatical intricacy is measured using the abovementioned formula and described qualitatively. The analysis is done based on the complexity level of the text with the student's proficiency level categorized by ChatGPT, including basic user (A1 and A2), independent user (B1 and B2), and proficient user (C1 and C2). The analysis results are presented as follows.

Table 4. Grammatical Intricacy Index of Texts for Basic User (A1 and A2) Produced by ChatGPT

Features	Text					
	A1			A2		
	1	2	3	4	5	6
Number of words	145	158	145	165	170	139
Number of Ranking Clauses	14	15	13	14	16	13
Number of Clause Complexes	7	9	10	11	13	8
Grammatical Intricacy (GI)	2	1.6	1.3	1.2	1.2	1.6

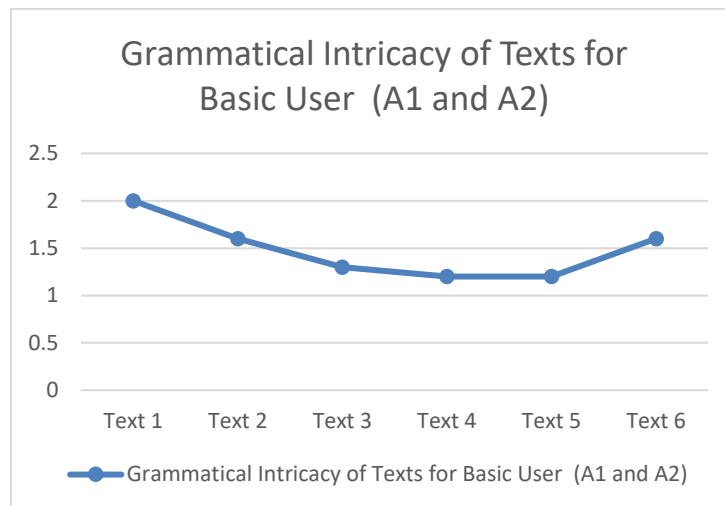


Figure 4. Grammatical Intricacy Percentage of Texts for Basic User (A1 and A2)

In addition to lexical density, text complexity can be measured by examining a text's intricacy of grammatical representation. Grammatical intricacy regards the number of ranking clauses and the occurrence of clause complexes in the text (Gerot & Wignell, 1994). Table 4 shows the grammatical intricacy index of the texts for basic users (A1 and A2) issued by ChatGPT. There are 14 total clauses in text 1, 15 clauses in text 2, and 13 in text 3 for basic user A1. Meanwhile, in the texts for basic user A2, text 4 and text 5, respectively, have a total number of clauses of 14 and 16. Moreover, there are 13 total clauses in text 6. Regarding the number of clause complexes in a clause, text 1 consists of 7 clause complexes in a clause, 9 for text 2, and 10 for text 3 for basic user A1. Furthermore, for basic user A2, text 4 contains 11 clause complexes, 13 for text 5, and 8 for text 6. The result of the grammatical intricacy calculation of each text shows that the GI of text 1 for basic user A1 is 2, while text 2 is 1.6, which is lower than text 1, and text 3 is 1.3, which is lower than text 1 and 2. For basic user A2, the results of the GI index are as follows: 1.2 for text 4, 1.2 for text 5, and 1.6 for text 6. The percentages of grammatical intricacy calculation are also presented in Figure 2 to show the intricacy levels of the texts produced by ChatGPT for basic learners (A1 and A2).

Figure 2 shows the percentages of text complexity level based on analyzing grammatical intricacy for basic users A1 and A2. Text 1 provides the highest level of grammatical intricacy, i.e., 2. It is followed by text 2 (1.6) and then text 3 (1.3) for basic user A1 level. Meanwhile, in the texts for basic user A2, text 6 shows the highest level of grammatical intricacy, 1.6, followed by text 4 and text 5 with the same number of grammatical intricacies (1.2). According to Putra & Lukmana (2017), many clauses combined in clause complexes are relatively influenced by a high grammatical intricacy index. On the other hand, a low number of clauses combined in clause complexes are influenced by a low number of grammatical intricacy indexes (Sujatna et al., 2022). However, the shortest or the most extended text does

not influence the complexity of the text. In other words, the shortest text does not imply that it is easier to read than other texts. It indicates that the higher the grammatical intricacy index of the text is, the more intricate and complex the clause of the text will be (Putra & Lukmana, 2017). The result implied that text one is considered the most intricate or complex for basic user A1. Meanwhile, in the text for basic user A2, text six is considered more intricate or complex than texts 4 and 5. The text with a lower grammatical intricacy contains more simple clauses (Rizkiani et al., 2022). According to the CEFR standard, the texts with A1 and A2 levels use sentences with present simple and continuous 'to be' and complete verbs and simple sentences (Arikan, 2015).

Table 5. Grammatical Intricacy Index of Texts for Independent User (B1 and B2) Produced by ChatGPT

Features	Text					
	B1			B2		
	7	8	9	10	11	12
Number of words	256	221	253	306	285	311
Number of Ranking Clauses	27	22	25	31	29	31
Number of Clause Complexes	7	7	8	8	7	6
Grammatical Intricacy (GI)	3.9	3.2	3.1	3.9	4.2	5.2

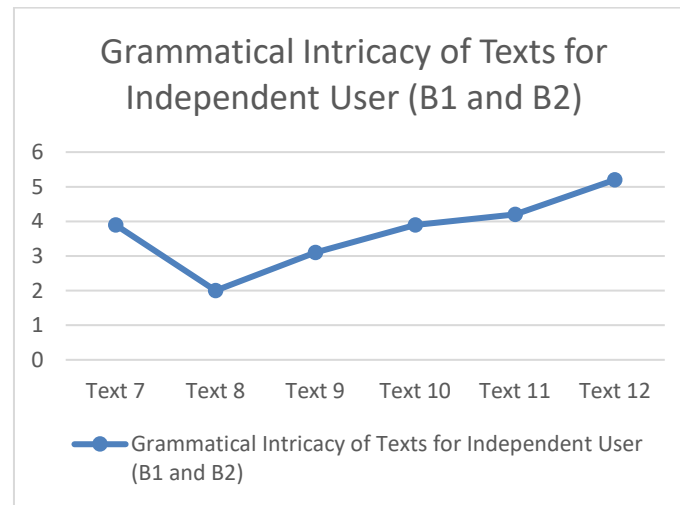


Figure 5. Grammatical Intricacy Percentage of Texts for Independent User (B1 and B2)

The grammatical intricacy index is obtained from the total number of ranking clauses divided by the number of clause complexes. Table 5 shows the grammatical intricacy index of the texts for independent users (B1 and B2) produced by ChatGPT. There are 27 of the total number of clauses in text 7, 22 clauses in text 8, and 25 clauses in text 9 for independent users of B1. Meanwhile, in the texts for independent user B2, texts ten and 11 have a total number of clauses of 31 and 29. Furthermore, there are 31 of the total number of clauses in text 12. Regarding the number of clause complexes in a clause, text 7 consists of 7 clause complexes in a clause, 7 for text 8, and 8 for text 9 for independent user B1. Furthermore, for the independent user of B2, text 10 contains eight clause complexes, seven clause complexes for text 11, and six for text 12. The result of the grammatical intricacy calculation of each text shows that the GI of text 7 for independent users of B1 is 3.9, while text 8 is 3.2, which is lower than text 1. Text 3 is 3.1, which is the lowest grammatical intricacy index. For independent users of B2, the results of the GI index are as follows: 3.9 for text 10, 4.2 for text 11, and 5.2 for text 12. The percentages of grammatical intricacy calculation are also presented in Figure 5

to show the intricacy levels of the texts produced by ChatGPT for independent learners (B1 and B2).

Figure 5 shows the percentages of text complexity level based on analyzing grammatical intricacy for independent users B1 and B2. Text 7 provides the highest level of grammatical intricacy index for independent users of B1 text, i.e., 3.9. It is followed by texts 8 (3.2) and 9 (3.1). Meanwhile, in the texts for independent user B2, text 12 shows the highest level of grammatical intricacy, 5.2, followed by text 11 (4.2) and text 10 (3.9). The result implied that text seven is considered the most intricate or complex for independent user B1. Meanwhile, in the text for independent users of B2, text 12 is considered more intricate or complex than texts 11 and 10.

Table 6. Grammatical Intricacy Index of Texts for Proficient User (C1 and C2) Produced by ChatGPT

Features	Text					
	C1			C2		
	13	14	15	16	17	18
Number of words	347	381	318	355	350	339
Number of Ranking Clauses	23	29	27	34	32	27
Number of Clause Complexes	7	12	14	10	8	7
Grammatical Intricacy (GI)	3.3	2.41	1.93	3.4	4	3.86

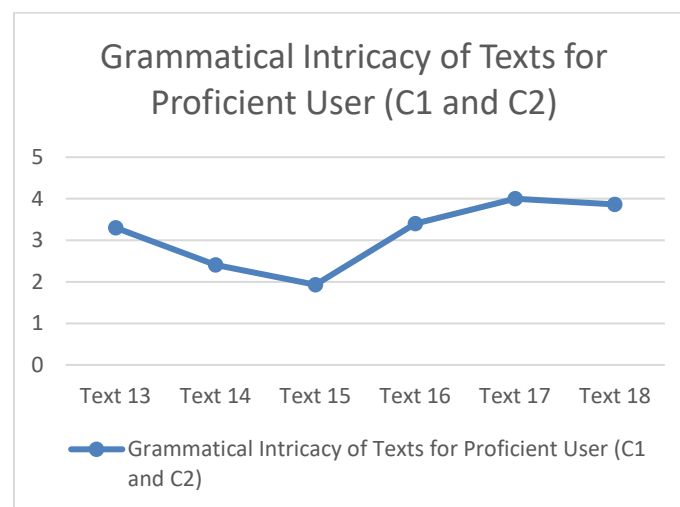


Figure 6. Grammatical Intricacy Percentage of Texts for Proficient User (C1 and C2)

Regarding the grammatical intricacy contained in the text for the proficient user (C1 and C2 on CEFR) produced by ChatGPT, from Figure 8, there are 23 of the total number of clauses in text 13, 29 clauses in text 14, and 27 clauses in text 15 for the proficient user of B1. Meanwhile, in the texts for proficient users of C2, text 16, respectively, has a total number of 34 clauses, and text 17 contains 32 of a total number of clauses. Furthermore, there are 27 total clauses in text 18. Regarding the number of clause complexes in a clause, text 13 consists of 7 clause complexes in a clause, 12 for text 14, and 14 for text 15 for a proficient user of C1. Furthermore, for the proficient user of B2, text 16 contains ten clause complexes, eight clause complexes for text 17, and seven for text 18. The result of the grammatical intricacy calculation of each text shows that the GI of text 13 for proficient users of C1 is 3.3, while text 14 is 2.41, which is lower than text 13. Text 15 is 1.93, which is the lowest grammatical intricacy index. For proficient users of C2, the results of the GI index are as follows: 3.4 for text 16, 4 for text 17, and 3.86 for text 18. The percentages of grammatical intricacy calculation are also presented

in Figure 8 to show the intricacy levels of the texts produced by ChatGPT for proficient learners (C1 and C2).

Figure 8 shows the percentages of text complexity level based on the analysis of grammatical intricacy for proficient users C1 and C2. Text 13 provides the highest level of grammatical intricacy index for proficient users of C1 text, i.e. 3.3. It is followed by text 14 (2.41) and then text 15 (1.93). Meanwhile, in the texts for proficient user C2, text 17 shows the highest level of grammatical intricacy, 4, followed by text 18 (3.86) and text 16 (3.4). The result implied that text 13 is considered to be the most intricate or complex for proficient users of C1. Meanwhile, in the text for proficient users of C2, text 17 is considered more intricate or complex than texts 16 and 18.

3.3 The Lexical Variation of Reading Texts as Authentic Materials Produced by ChatGPT

Lexical variation is the language tool used to analyze the complexity of vocabulary to measure the reading level. The result of lexical variation is measured using the abovementioned formula and described qualitatively. The analysis is done based on the complexity level of the text with the student's proficiency level categorized by ChatGPT, including basic user (A1 and A2), independent user (B1 and B2), and proficient user (C1 and C2). The analysis results are presented as follows.

Table 7. Lexical Variation Index of Texts for Basic User (A1 and A2) Produced by ChatGPT

Features	Text					
	A1			A2		
	1	2	3	4	5	6
Number of words	158	145	145	165	170	139
Grammatical Items	89	79	68	87	94	68
Lexical Items	69	66	77	78	76	71
Lemmas (word family)	24	29	37	30	29	18
Halliday's Lexical Variation (HLV)	0.8	0.4	0.5	0.3	0.3	0.2

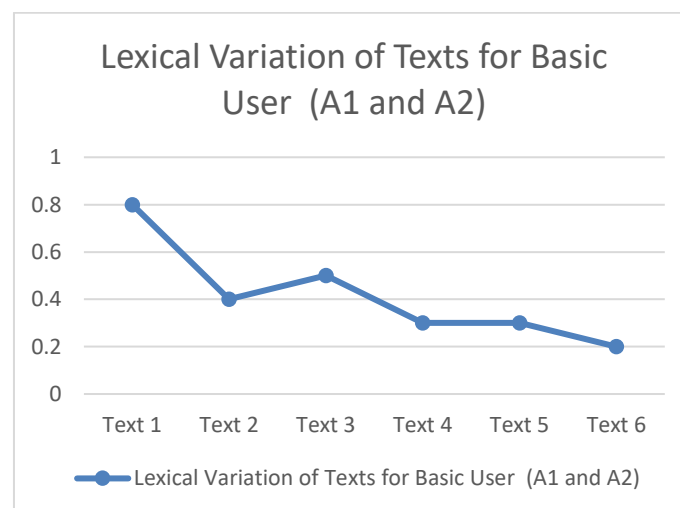


Figure 7. Lexical Variation Percentage of Texts for Basic User (A1 and A2)

Lexical variation, in addition to lexical density and grammatical intricacy, becomes another critical measurement of text complexity in systemic functional linguistics analysis. Lexical variation refers to the repetition of the exact words in the text, which reduces the complexity or density of the text. In other words, the text with minimum repetition of lexical words indicates that the message is easier to understand. Furthermore, the more variation the

words in the text, the more information the reader can grasp and the more complex the text will be (Halliday & Matthiessen, 2004). Table 3 shows that text 1 has a lexical variation index of 0.8 for basic user A1 by dividing the variation of lexical items or lemmas (24) by the number of lexical items in the text (69). Meanwhile, text 2 has a lexical variation index of 0.4 and text 3 of 0.5. Furthermore, in the text for basic user A2, text 4 has a 0.3 lexical variation index, with different lexical items or lemmas of 30 and lexical items in the text of 78. Meanwhile, text 5 has a lexical variation index of 0.3 and text 6 of 0.2.

Figure 3 shows the conformity of the lexical variation index in the texts for basic users (A1 and A2). Text 1, compared to other texts, has the highest lexical index of 0.8, followed by text 3 with a lexical variation index of 0.5 and text 2 with a lexical variation index of 0.4 in the texts for basic users (A1). This result indicates that text 1 is varied compared to texts 2 and 3 and contains more information to graph. Meanwhile, in the texts for basic users (A2), texts 4 and 5 have the same lexical variation index of 0.3, followed by text 6 with a lexical variation index of 0.2. This result shows that text 6 contains many repetitions of the text's lexical items, and the text's complexity is lower and more readable than other texts. According to the CEFR standard, texts categorized into A1 and A2 levels consist of a short text with simple repetitive words (Europe, 2020).

Table 8. Lexical Variation Index of Texts for Independent User (B1 and B2) Produced by ChatGPT

Features	Text					
	B1			B2		
	7	8	9	10	11	12
Number of words	256	221	253	306	285	311
Grammatical Items	113	93	113	123	130	132
Lexical Items	143	128	140	183	155	179
Lemmas (word family)	56	71	66	71	73	88
Halliday's Lexical Variation (HLV)	0.4	0.5	0.5	0.4	0.5	0.5

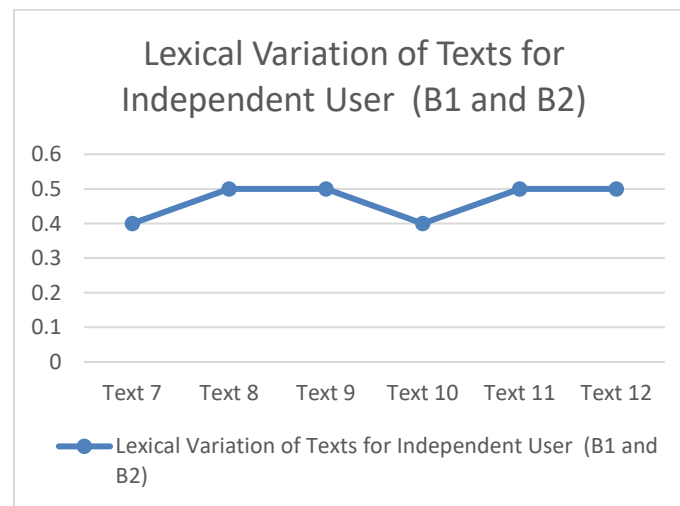


Figure 8. Lexical Variation Percentage of Texts for Independent User (B1 and B2)

Regarding the lexical variation in the texts for independent users (B1 and B2 on CEFR), table 6 examines the number of words, the grammatical items, the lexical items, and the lemmas of three texts for B1 and three texts for B2 produced by ChatGPT. Moreover, table 6 shows that text 7 has lexical variation index of 0.4 for independent user B1 by dividing variation of lexical items or lemmas (56) with the number of lexical items in the text (143). Meanwhile,

text 8 and text 9 have the same lexical variation index of 0.5. Furthermore, in the text for independent user B2, text 10 has 0.4 of lexical variation index, with different lexical items or lemmas of 71 and lexical items in the text of 183. Meanwhile, text 11 and text 12 also have the same lexical variation index of 0.5. Besides, figure 6 shows the percentages of lexical variation in each text.

From the figure, it shows that text 7 has the lowest lexical variation among the texts for independent user B1 even though it has the highest number of words (256) led by the text 8 and 9 with the same lexical variation index (0.5). Meanwhile, text 10 has the lowest lexical variation among the texts for independent user B2 led by the text 11 and 12 with the same lexical variation index (0.5). It indicates that the longest text does not determine the high number of lexical variations in it. On the other hand, a short can possibly contain a high lexical variation that can affect the readability of the texts. Moreover, it also indicates that the higher the lexical variation index of the text is, the more complex the text will be and the more information contained in the text will be comprehended (Gregori-Signes & Clavel-Arroitia, 2015).

Table 9. Lexical Variation Index of Texts for Proficient User (C1 and C2) Produced by ChatGPT

Features	Text					
	C1			C2		
	13	14	13	14	13	14
Number of words	347	381	318	355	350	339
Grammatical Items	128	161	151	154	160	144
Lexical Items	219	220	167	201	190	195
Lemmas (word family)	146	124	100	109	86	104
Halliday's Lexical Variation (HLV)	0.7	0.56	0.6	0.54	0.45	0.53

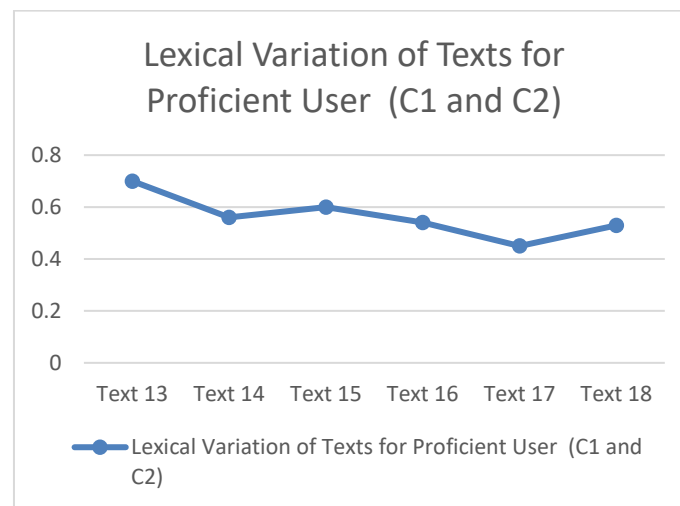


Figure 9. Lexical Variation Percentage of Texts for Proficient User (C1 and C2)

Regarding the lexical variation in the texts for proficient users (C1 and C2 on CEFR), table 9 shows that text 13 has a lexical variation index of 0.7 for proficient users of C1 by dividing the variation of lexical items or lemmas (146) with the number of lexical items in the text (219). Meanwhile, text 14 contains a lexical variation index 0.57, and text 15 is a 0.6 lexical variation index. Furthermore, in the text for proficient users of C2, text 16 has a 0.54 lexical variation index, with different lexical items or lemmas of 109 and lexical items in the text of 201. Meanwhile, text 17 has a 0.45 lexical index, and text 18 has a 0.53. Besides figure 6 shows the percentages of lexical variation in each text.

Figure 9 shows that text 13 has the highest lexical variation among the texts for proficient users of C1 even though its number of words (347) is lower than text 14 (381). Meanwhile, text 14 has the highest lexical variation among the texts for proficient users of C2. It indicates that the most extended text does not determine the high number of lexical variations in it. On the other hand, a short can contain a high lexical variation that can affect the readability of the text. Moreover, it also indicates that the higher the lexical variation index of the text, the more complex the text will be, and the more information it contains will be comprehended (Gregori-Signes & Clavel-Arroitia, 2015).

3.4 The Suitability Levels of Text Complexity Produced by ChatGPT with the Standard Used by the British Council on CEFR

This study investigates the readability level of reading texts issued by ChatGPT through their lexical density, grammatical intricacy, and lexical variation indexes. The investigation is focused on whether the texts' complexity level matches the Common European Framework of Reference (CEFR) standard proposed by the British Council. The findings revealed that the text complexity level issued by ChatGPT has yet to fully follow the standard level of the texts used by the British Council on the CEFR level. The result shows that some texts are inappropriate with their complexity levels based on lexical density, grammatical intricacy, and lexical variation analyses. The implication of this study is to inform the lecturer to carefully select the texts produced by ChatGPT used as the material for students. The inappropriate complexity level of the texts given to inappropriate levels of students' proficiency will significantly impact students' reading comprehension. From the analysis, it indicates that the length of the texts determines the complexity level of most of the texts issued by ChatGPT, increasing from the basic level to the proficient level seen from the number of words in each text; however, it is not determined by the percentage levels of their lexical density index, grammatical intricacy index, and lexical variation index. The following figure shows the number of words in each text level produced by ChatGPT.

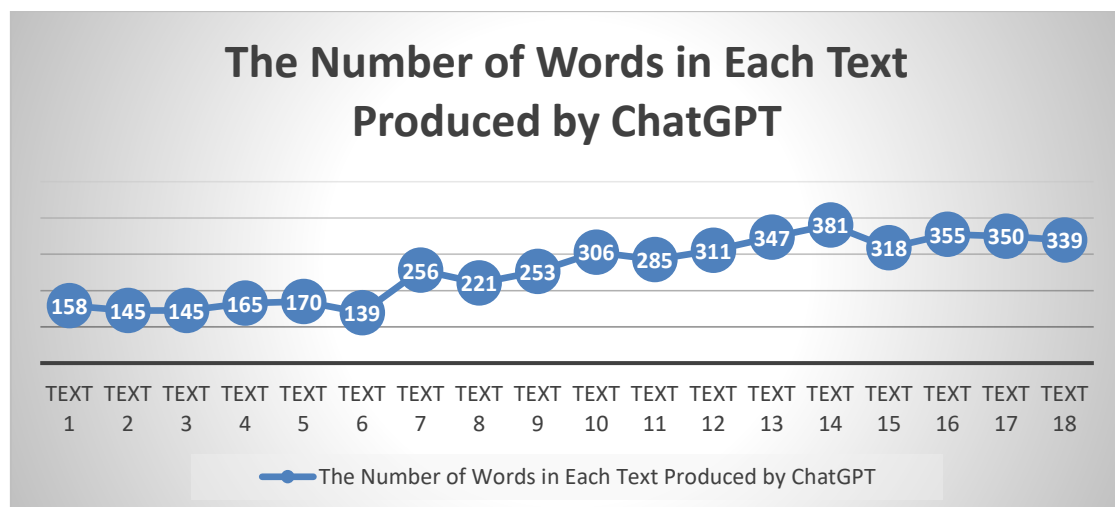


Figure 9. The Number of Words in Each Text Produced by ChatGPT

The number of words in text 1 until text 6 for basic users (A1 and A2 on CEFR) ranges from 139 to 170. Then, the number of words in text 7 until text 12 for independent users (B1 and B2 on CEFR) increase from 221 to 311. Meanwhile, the number of words in text 13 until text 18 for proficient users (C1 and C2 on CEFR) increase from 311 to 381. It indicates that the number

of words in each text issued by ChatGPT determines its complexity level. However, compared to the existing theory used in this study, according to the perspective of systemic functional linguistics, the length of the texts does not determine their complexity and readability levels (Halliday & Matthiessen, 2004). Similarly, Bani Amer & Baarah (2021) stated that in determining the vocabulary levels of the textbook, lexico-grammatical analysis through lexical density analysis should be done since lexical density can make the learner hard to easy to comprehend the text. Besides, this result strengthens the research conducted by Natova (2021) that the length of the text does not determine the level of text difficulties. He also stated that besides using lexical density tools, the complexity level of the texts can be measured through qualitative criteria and quantitative indices. Moreover, the study conducted by Fadhil et al. (2023) also showed that the sentence structure and length did not impact the reader's comprehension, who tended to use lexical meaning in understanding the text, while lexical items did. In this case, the readability of the texts should be determined by some linguistic factors, including semantics, syntactic, morphological, and textual properties (McCannon, 2019). Besides, Rizkiani et al. (2022) found in their research that one tool to assist teachers in analyzing the complexity and readability of the texts is through lexical density analysis, not the length of the text. Besides, measuring lexical density can help readers know how challenging a text is to comprehend (Fadhil et al., 2023).

Through this analysis, knowing the critical factors of the text complexity can be easier by analyzing the vocabulary used, the sentences and syntax aspects, and the coherence level (Gregori-Signes & Clavel-Arroitia, 2015). A text with a lower lexical density index has a higher readability level, indicating that the text can be easily understood (Noviyenti, 2021). The result shows that in determining the complexity level of the texts, the language tools through lexical density, grammatical intricacy, and lexical variation analyses have not been applied by ChatGPT. The impact of choosing the inappropriate difficulty level of the text given to the students can influence their understanding of obtaining knowledge and creating meaning from what they read. It is in line with what Rizkiani et al. (2022) stated, that the text given to the students should follow their proficiency level to achieve the reading comprehension stage.

6. Conclusion

The present study explores the readability and the complexity level of reading texts as authentic materials issued by ChatGPT. The investigation is focused on whether the texts' complexity level matches the Common European Framework of Reference (CEFR) standard proposed by the British Council through lexical density, grammatical intricacy, and lexical variation analyses. Among the limitation of this research are the subjective keywords chosen by the researcher to get the data and the free trial account that can affect the result of ChatGPT responses. From the research problem proposed, the study concludes that the complexity levels of the texts issued by ChatGPT have yet to fully follow the standard level of the texts used by the British Council on the CEFR level. The findings show that the length of the texts determines the complexity level of most of the texts issued by ChatGPT, increasing from the basic level to the proficient level seen from the number of words in each text; however, it is not determined by the percentage levels of their lexical density index, grammatical intricacy index, and lexical variation index.

This study provides the implication to inform the lecturer to carefully select the texts used as authentic materials issued by ChatGPT. The lecturers should sufficiently analyze the lexicogrammatical features of language used in the texts to determine their complexity. The complexity level of the texts influences how students properly comprehend the text. The inappropriate level of texts provided to an inappropriate level of students' proficiency will significantly impact students' learning process, affecting their learning success in creating the meaning from the text they read. This study suggests a necessary further step to do deeper analysis by collaborating text analysis and lecturers' and students' perspectives on the texts used in the learning process selected from ChatGPT to get a broader perspective and understanding of the topic.

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