Lexeme : Journal of Linguistics and Applied Linguistics

Vol. 7 No. 1, 2025. Available online at http://openjournal.unpam.ac.id/index.php/LJLAL

ISSN (print) : 2685-7995 ; ISSN (online) : 2656-7067

Text Complexity in Digital Language Learning: Analyzing the Readability and Lexical Density of Duolingo's Guidance Textbook

Sekar Azzahra[1], Jelly Prima Krisnawati Silaban[2], Tengku Silvana Sinar[3]

[1,2,3] Universitas Sumatera Utara

sekarazzhr@gmail.com[*]

ABSTRACT

This paper establishes the lexical density and readability levels of the Duolingo guidance textbook, with the view of establishing further the accessibility levels that the textbook has for use in language learning by users. Qualitative content analysis was conducted on 10 segments of the guidance text; lexical density was determined through content word proportions analyzed and readability by the Flesch Reading Ease formula. The results ranged between 47.6% and 56.1% for lexical density, while for nouns, just one word class, the most frequent class of words for all observed segments was 24.9-32.5%. Scores for readability ranged from 53.21 to 85.2. For example, "How to Test Your Best" sections obtained very high readability scores of 85.2, whereas sections more suited to the content, such as "Reading Texts", scored as low as 53.21. Further analysis then showed that there indeed was a strategic range in the section's complexity: the technical content was generally higher in lexical density and low in readability scores, while practical guidance sections maintained higher accessibility. Given this is the conclusion, recommendations go to Duolingo on adding extra scaffolding mechanisms for complex parts by developing supplemental material at different proficiencies, including adaptive learning whereby the complexity of the content would change based on performance. Also, periodic assessment of textual complexity across different versions guarantees that users are uniformly having their experience across the world. The current study added to the cognition of how digital language learning materials balance the issues of accessibility and educational effectiveness.

ARTICLE INFO

Keywords:
Duolingo;
guidance textbook;
language learning;
lexical density;
readability

Article History:
Received: 20 November 2024
Revised: 4 December 2024
Accepted: 8 December 2024
Published: 21 December 2024

How to Cite in APA Style:
Azzahra, S., Silaban, J. P. K., & Sinar, T. S. (2024). Text Complexity in Digital Language Learning: Analyzing the Readability and Lexical Density of Duolingo's Guidance Textbook. *Lexeme : Journal of Linguistics and Applied Linguistics, 7*(1), 29–36. https://doi.org/10.32493/ljlal.v7i1.44985

INTRODUCTION

Readability and lexical density are currently two important parameters to evaluate the accessibility and pedagogical efficiency of learning materials. Readability pertains to the ease with which a reader processes a certain text, and this is conventionally determined by factors like the difficulty of sentence structure, vocabulary, and syntactic organization. Lexical density is understood as the ratio between content words-nouns, verbs, adjectives, adverbs-and grammatical words, and it is used to obtain information about the complexity and the informational load of the text. While high lexical density normally comes with richer content, it can only increase the cognitive demand and diminish comprehension. All these measures, taken together, go a long way in affecting the cognitive load of readers, impacting how they will engage with, understand, and retain information. Readability and lexical density, therefore, become of keen importance within

the context of language-learning materials, which have to negotiate a tightrope between ease of access and linguistic richness to suit learner needs.

These indicators will be very important in online language-learning services such as Duolingo. Since its release in 2012, Duolingo has revolutionized the way people study languages through the concept of gamification; it provides users with small, interactive exercises that are intended to amuse independent learners of all proficiency levels. These users, ranging from absolute beginners to intermediate learners, use the guidance textbook for further linguistic structure and explanations that support their progress. Unlike traditional textbooks, Duolingo's materials are modular, concise, and aimed explicitly at users with minimal prior formal training in grammar and syntax. Features that make the case of Duolingo unique to investigate readability and lexical density in terms of learning outcomes produced within app-based environments. Specifically, Duolingo's textbook must cater to a global audience with diverse linguistic and educational backgrounds, ensuring accessibility while maintaining sufficient linguistic complexity to foster meaningful language acquisition.

Most previous research into readability and lexical density has been conducted on conventional educational materials, such as textbooks, storybooks, and academic texts. The findings from the studies, such as in (Rizkiani et al., 2022), have established that Indonesian high school textbooks have a high lexical density coupled with moderate readability to present an appropriate level of difficulty for learners. Also, (To et al., 2018)found no definite relation in English textbooks between the lexical density and the difficulty of texts at different levels; hence, it has been mentioned that something more than vocabulary richness works in comprehension. Studies regarding children's storybooks, including that of (Aswani et al., 2023) indicate that lexical complexity can be found to different extents, hence dictating the need for conditionally prepared materials to suit the cognitive demand of children. (Pratiwi & Indriani, 2018) refer to the deficiencies in Malaysian textbooks: insufficient scaffolding in vocabulary made comprehension difficult. (Waruwu, 2018)states similarly that while junior high school textbooks were passed through readability standards, the guidance from a teacher was necessary to help students understand it.

In academic texts, lexical density is often directly proportional to the complexity of the text. Siregar et al. reported high lexical density in undergraduate thesis introductions and claimed that it was a very high hurdle to readability (Gruber-Miller & Mulligan, 2022) indicated the strong relationship of lexical density and readability in Latin texts, hence supporting the link between higher knowledge of advanced vocabulary and comprehension. Similarly, (Erarslan, 2021)discussed metadiscourse use in essays of students by relating high lexical complexity and readability with high class academic writing.

Other than educational contexts, lexical density and readability have also been explored, providing a different perspective on the same metrics with respect to access to the text. For example, (Afrouz, 2022) found translations of literary texts by non-native translators to be more reader-friendly, which underlines the trade-off between lexical richness and accessibility. Likewise, (Nash et al., 2023) showed that often, parent information leaflets are written above the national reading level, hence posing an accessibility challenge to their caregivers. (Siregar et al., 2024) noted that in academic writing, high lexical density appeared to serve as a barrier to readability in undergraduate thesis introductions. (Putri et al., 2024) also mentioned that there was considerable variation in lexical richness within the writing produced by IELTS students. These findings support the wider generalization of how complexity and readability balance in instructional materials.

Until recently, though few studies considered the peculiarities of digital and, even more so, of the interactive learning platforms. Clearly different from traditional, static, and text formats, the texts in the applications like Duolingo appear to be gamified, modular, concise, probably requiring alternative ways to measure readability and lexical density. Recent advancements, such as Imperial and (Imperial & Ong, 2021) application of machine learning to assess readability in

children's books, demonstrate the potential for innovative methodologies in evaluating digital content. Despite this, the specific demands of app-based learning remain underexplored, leaving a critical gap in understanding how traditional metrics can be adapted to assess the effectiveness of digital instructional materials.

All these studies have kept the measures of lexical density and readability the same. However, there are still shortcomings in the way these measures are applied to language learning tools like Duolingo. In the case of (Ahmad et al., 2021), the authors analyzed the situation of English textbooks in Jordan and Oman with the conclusion that the readability of the texts was not on par with what was expected. This once again goes on to assert that standardization is required in readability as well as lexical density measures at the students' level of learning. (Hasnain, 2020)compared the mission statements of manufacturing and service firms. The conclusion reached was that service firms statements had a higher lexical density. An approach that could be furthered into text in educational materials to measure appropriateness for professional and academic contexts.

While these studies have provided insight into text complexity and readability, few specifically deal with language learning applications. However, dense and complex texts are the common challenges found in present literature; hence, there is a need for a language-learning tool balancing readability with lexical richness for better comprehension and retention. It is based on (Miskiyah & Amalia, 2022; Neneng Farida Rahmah, 2022). In light of these gaps, the next studies could focus on readability and lexical density assessment within some digital language learning materials such as Duolingo to later serve for effectibaave vocabulary and reading skill development across levels of proficiency.

Such features make Duolingo a suitable context within which to analyze the relationship between readability and lexical density. The guidance textbook, which complements the gamified exercises in the app, needs to balance simplicity and linguistic richness for both the beginner and the intermediate learner. In the case of the former, very complex language hampers comprehension; in the case of the latter, higher-order vocabulary and more complex structures are needed to progress in one's proficiency. Additionally, Duolingo's global audience, encompassing learners from diverse linguistic and educational backgrounds, necessitates materials that are both accessible and adaptable to varying levels of linguistic proficiency.

This study seeks to address these gaps by analyzing the readability and lexical density of Duolingo's guidance textbook. The research is guided by two key questions: (1) To what extent do readability and lexical density in Duolingo's guidance textbook align with the linguistic needs of beginner and intermediate learners? (2) How do these metrics reflect the instructional effectiveness of the textbook in fostering language acquisition? The present study positions itself within the rapidly increasing number of studies dealing with digital educational tools, since it further informs how classic metrics of readability and lexical density can be refitted for app-based environments. The study hereby aspires to inform the design of language-learning materials that strike a balance between complexity and accessibility, suitable for learners from a wide range of linguistic and cultural backgrounds.

METHOD

Content analysis will be performed in this qualitative approach, studying lexical density and readability of Duolingo's guidebook. This study is informed by long-standing frameworks, including the lexical density approach by (Halliday & Matthiessen, 2013) and the readability formula by Flesch Reading Ease for a more systematic and valid analysis of instructional content. These approaches have widely been used in educational research and hence chosen to enable congruence with previous studies and therefore yield meaningful results across other studies.

Only 10 selected text segments from one Duolingo language course were analyzed here, so that the analyses could be focused and consistent. That is, it removes the variability of the natural productions because of the translation and instructional design between languages, which

overrides the actual features of the guidance content concerning linguistics and pedagogy. Segments were purposefully selected in order to represent different types of instructional material such as tips, explanations, and direct guidance, given their centrality to support learners' engaging and comprehension.

However, this restricts the analysis to 10 segments, which appears to offer the right balance between depth and manageability: each text can be analyzed in some detail while allowing overall insight into larger trends relating to lexical density and readability. The best sample size will make sure that the nuances of Duolingo's instructional design are captured while the relative feasibility of the scope, regarding qualitative research, is maintained.

Data were collected directly from the Duolingo app, with screenshots taken of content showing the guidelines that may be provided. Text was captured using OCR software, preserving completely the integrity of the original material. Each text segment was extracted in isolation from others to provide for an exact measurement of lexical density and readability separately, uncontaminated by other texts that may appear either before or after it.

Lexical density is the relation between content words-namely, nouns, verbs, adjectives, and adverbs-and the total number of words in each text fragment. Analysis at this point will be informed by Halliday's systemic functional linguistics theory, which views syntax as contributing greatly to lexical richness. The content words were classified manually, since this is in tune with conventions grammatical classification to maintain accuracy. Besides classifying them manually, cross-checking was carried out to further establish coherence and reliability.

$$\text{Lexical Density Percentage} = \frac{Number\ of\ content\ of\ words}{total\ number\ of\ words}\ x\ 100$$

Analyzing Readability Readability scores are worked out via the Flesch Reading Ease formula. The formula counts the accessibility of the text by two factors, namely average sentence length and average no. of syllables/word. ASL is worked out by dividing the total count of words by the total count of sentences, whereas ASW is worked out by dividing the total count of syllables by total count of words.

$$RE = 206{,}835 - (1{,}015\ X\ ASL) - (84{,}6\ X\ ASW)$$

These are then entered in the Flesch formula for readability scores, hence giving insight into how easy or hard it is for the learner to process the contents of guidance. Flesch scores are inversely proportional to difficulty, with high scores indicating easy text.

Table 1. Reading Score

Reading Ease Score	Description	Reading Grade
0-29	Very Difficult	Collage Graduate
30-49	Difficult	$13^{th} – 16^{th}$ grade
50-59	Fairly Difficult	$10^{th} – 12^{th}$ grade
60-69	Standard	$8^{th} – 9^{th}$ grade
70-79	Fairly Easy	7^{th} grade
80-89	Easy	6^{th} grade
90-100	Very Easy	5^{th} grade

Descriptive statistics calculations are done for lexical density percentages and readability scores across the 10 segments to provide, thus, an overall picture of the degree of complexity and accessibility of the guidance content provided by Duolingo, and general patterns or trends therein. Text segments are classified by type, such as tips, explanations, and direct guidance, to determine whether some text types exhibit higher lexical density or lower readability. This may reveal a

possible variation in linguistic complexity which may arise across instructional contexts with possible consequences for learner comprehension. Pearson's product-moment correlation coefficients were computed to test the relationship between lexical density and readability score. This would test whether the more dense the text is, the less readable it is-a finding supportive of or against those repeatedly obtained in research studies into educational materials.

While the methodology is designed to be robust and systematic, certain limitations must be acknowledged. First, the focus on a single language course may restrict the generalizability of findings to other Duolingo courses. Future research could address this by incorporating multilingual datasets. Second, the manual classification of content words, while thorough, may introduce human error. Employing automated linguistic analysis tools in future studies could enhance reliability and efficiency. Finally, the influence of translation on readability, especially in those languages which possess quite a different syntactic structure, remains to be seen.

Rationale Behind Strategy This methodological framework is designed to balance depth and precision so that the research objectives of the study would be adequately met within practical limitations. With 10 representative text segments, it is manageable without compromising the validity of the findings. Manual classification supplements the established readability formulas for a multidimensional look at Duolingo's instructional content. This represents a gap in the literature because this research applies established linguistic metrics to the emerging domain of digital language-learning materials, therefore indicating shortcomings.

FINDINGS AND DISCUSSION

FINDINGS

Table 2. The results of lexical Density

Segments	Noun	Adjective	Verb	Adverb	Total Words	Lexical Density
Reading Texts	32.2%	10%	11.9%	1.9%	324	55.9%
About Test Readiness	30.3%	9.8%	11.5%	3.7%	244	55.3%
How to Practice English	27.6%	7.7%	15.4%	4%	534	54.7%
How to Test Your Best	24.9%	4.9%	18.2%	4.4%	196	52.5%
How to Pace Yourself	25.3%	5.4%	13.5%	3.4%	303	47.6%
How The Questions Are Scored	25.6%	7.6%	15.2%	3.9%	349	52.4%
Understand the Test Questions	26.6%	7.6%	15.2%	6.7%	341	56.1%
Tips For Making Sure	25.2%	5.2%	15.7%	4.8%	417	50.9%
Understand Your Scores	31%	9%	12.8%	1.6%	311	54.3%
Reading Texts	32.5%	7.4%	9.9%	2.9%	445	52.7%

A close reading of the guidance textbook provided by Duolingo indicates striking deviations in both lexical density and word-type distribution across the chosen chapters, pointing toward deliberate linguistic choices in writing the text. The lexical density, or the proportion of content words to the total number of words, varies between 47.6% and 56.1%. The part "Understand the Test Questions" displays the highest lexical density at 56.1%, showing that it is highly informative. On the other side, "How to Pace Yourself" has the lowest lexical density: 47.6%, showing closer balance between content and function words, hence higher readability. Most of these sections have a quite steady range between 52% and 56%, indicating that there might have been an attempt to keep the information accessible with the delivery of complex linguistic material.

The calculation of word-type distribution gives the following picture: nouns are prevailing and comprise from 24.9% to 32.5% of the total number of words, the section "Reading Texts" heads the list with 32.5% of nouns. And the striking predominance of nouns points to the preponderance of concrete notions and terms, particularly in those parts which deal with complex themes. Verbs, the second in frequency, vary between 9.9% and 18.2%; "How to Test Your Best" has the highest frequency of verbs, which is indicative of action-oriented content. Adjectives range from 4.9% to 10%, and adverbs, from 1.6% to 6.7%, are less frequent but give way to more subtle elaboration in the text; the latter reaches a high of 6.7% in "Understand the Test Questions,"

showing that it is indeed a descriptive piece.

Table 3. The results of Readability

Segments	Total words	Total sentences	Total syllables	ASL	ASW	Readability Score	Description
Reading Texts	324	18	534	18	1.6	53.21	Fairly Difficult
About Test Readiness	244	15	394	16.3	1.6	54.9	Fairly Difficult
How to Practice English	534	32	772	16.7	1.4	71.4	Fairly Easy
How to Test Your Best	196	17	260	11.5	1.3	85.2	Easy
How to Pace Yourself	303	18	409	16.8	1.3	80	Easy
How The Questions Are Scored	349	20	557	17.5	1.6	53.7	Fairly Difficult
Understand the Test Questions	341	22	500	15.5	1.5	64.2	Standard
Tips For Making Sure	417	21	622	19.8	1.5	60	Standard
Understand Your Scores	311	18	513	17.3	1.6	53.9	Fairly Difficult
Reading Texts	445	42	693	10.6	1.6	60.7	Standard

Therefore, the readability test, within the framework of ASL and ASW indices, was useful in highlighting a deeper level of text difficulty explanation. The ASL measures range from 10.6 ("Reading Texts") to 19.8 ("Tips for Making Sure"), thus suggesting variation in sentence difficulty among the six sections. In general, when the sentences are short, readability scores are higher, thus showing a less complex organizational format. By contrast, the ASW values, which range between 1.3 and 1.6, define the contribution of syllabic complication to text readability. Accordingly, texts that have lower ASW values, for example 1.3 for "How to Test Your Best", receive higher readability scores, and the texts receiving higher ASW values, such as 1.6 for "Reading Texts", are labeled "Fairly Difficult."

The results indicate that readability scores range from 53.21 to 85.2, which indicates great inequality in readability. Paper "How to Test Your Best" has the highest readability score of 85.2 rated "Easy" due to the presence of short sentence structure and simple vocabulary. In contrast, the paper "Reading Texts" rated at 53.21 falls in the category "Fairly Difficult" reflecting high lexical density and complicated syntactic structure. These suggest an intent in design methodology where the level of text difficulty matches the learning objectives prescribed for each section.

DISCUSSION

These results indicate that the lexical density, readability, and educational purpose in the Duolingo guidance textbook point toward a multi-angular relationship that reflects explicit considerations in meeting diverse learner needs through design. In sum, although the textbook had shown regular balance between levels of information depth and comprehensibility, the distribution of differences along both lexical and syntactic complexities provides challenges and opportunities at different levels of learner proficiency.

Sections such as "Understand the Test Questions" and "Reading Texts," which have recorded 56.1% and 55.9%, respectively, are cases where high information content enhances the levels of cognitive load. These extracts contain specialist terms and complex explanations that make them very useful to the advanced user but challenging to the novice or intermediate user. This also explains that the prevalence of nouns, ranging between 24.9% and 32.5%, underlines an emphasis on more concrete and specialized concepts relevant to the necessity of providing

accurate and field-specific information. On the other hand, this focus on lexical exuberance is normally related to the low rating of readability, as was confirmed in the "Reading Texts" section with a score of 53.21 ("Fairly Difficult") on the Flesch Reading Ease scale. This result suggests that dense linguistic information is difficult to comprehend when insufficient scaffolding or contextual support is provided.

The interrelationship of ASL and ASW would suggest that both syntactic and lexical complexity are important influences on text accessibility. For example, the "How to Test Your Best" section has an ASL of 11.5 and an ASW of 1.3, reaching an "Easy" readability score of 85.2, showing that sentence construction and vocabulary for this passage are direct and concise. Conversely, "Reading Texts" combines a shorter ASL (10.6) with a higher ASW (1.6), resulting in lower readability despite its brevity. This pattern highlights the outsized influence of word-level complexity—particularly syllable density—on overall text comprehensibility, an insight consistent with prior research on readability metrics (e.g., Imperial & Ong, 2021).

While high lexical density and low readability scores often go together, this should not be understood in a pejorative manner only. Pedagogically, the complexity does play a developmental role of encouraging students toward more complicated linguistic forms and extending their lexical and syntactic repertoire. For instance, although the "Reading Texts" section has a relatively low readability score, it exposes learners to technical vocabulary and complex structures that may give higher levels of proficiency, such as C1-C2. However, it does not include supportive materials or adaptive features; hence, these benefits can be unreachable for the lower-level learners of A1-A2, who have to be exposed by special teaching strategies.

Other relevant variables have included an incoherent pattern of word class distribution, driving the cognitive demands for portions: the dominant presence of verbs throughout the action-oriented portion-for "How to Test Your Best", the frequency was 18.2%-underlines their emphasis on the procedural aspect, whereas the descriptive portions-in the case of "Understand the Test Questions", it comes to 6.7%-are hence presenting clear explanations. The variability here also reveals an intentional articulation of linguistic features with the educational goals of the respective sections while at the same time raising questions concerning the cognitive load carried by students unaccustomed to such diversity in linguistic structure.

The absence of learner-centered data in the current study limits the possibility of directly assessing how users interact with and comprehend these textual elements. Adding usability studies or obtaining feedback from the Duolingo community could thus offer some empirical evidence on how learners deal with the sections that are dense and have lower readability, giving a sense of the practical implications from these design choices. More precisely, knowing whether the learners find technical sections such as "Reading Texts" too challenging or useful would help to confirm the pedagogical rationale of the textbook and further improve changes in content design.

In order to enhance the accessibility and educational efficacy of the textbook, a variety of strategies may be employed. Initially, scaffolding techniques, including glossaries, interactive annotations, or preparatory reading activities, could facilitate the bridging of understanding gaps in particularly dense sections. Subsequently, adaptive learning functionalities that modify text complexity according to user performance could tailor the learning experience, thereby ensuring that both novice and advanced learners receive content that is suitably challenging. Thirdly, inserting simplified summaries or practice exercises into dense sections can make points memorable, without necessarily sacrificing depth in original material.

By exploring all of these variables, the textbook will be in an even better position to respond to the very broad linguistic needs of Duolingo's users worldwide and, by doing so, function as a rich language acquisition tool. This chapter has, therefore, reinforced the need for deliberate variation in text difficulty and has pointed to further avenues of investigation in relation to text design and student engagement within digital learning spaces.

CONCLUSIONS

This paper argues for lexical density and readability of Duolingo's guidance textbook, pointing to huge fluctuation among its sections. The lexical density ranged from 47.6% to 56.1%. The most widespread word class consisted of nouns ranging between 24.9% and 32.5%. The scores of readability ranged within 53.21 to 85.2. "How to Test Your Best" turned out to be highly readable and scored 85.2, while "Reading Texts" were the most difficult ones, scoring 53.21. These patterns do indeed support the hypothesis that Duolingo maintains a good balance between beginner-friendly accessibility and complexity for more intermediate learners.

On the other hand, high lexical density is equivalent to low readability, which, in turn, increases the cognitive load, especially for more information-dense sections. To further facilitate ease, we would suggest adding scaffolding mechanisms, adequate supplementary material at different levels of proficiency, and adaptive learning concepts where the level of difficulty would go up or down according to learners' performance. Although these components have been very successful in other learning contexts, their introduction into Duolingo requires a really intensive technical and pedagogical preparation. That could use student progress toward dynamically changing the level of simplicity and complexity of the text.

Although promising, these recommendations need further exploration and implementation feasibility. For example, language-specific challenges, such as syntactic differences, were not considered in this study and should be addressed in future research. Incorporating learner feedback and usability studies would further validate these recommendations and guide effective content design.

This study, therefore, highlights the importance of strategic text design within digital language learning tools and strikes a balance between complexity and accessibility. For example, Duolingo can do more by enhancing its content for both the beginner and advanced learners through scaffolding, additional materials, and adapting learning.

REFERENCES

Afrouz, M. (2022). Investigating the readability of literary texts translations A step towards formulating the 'Nativity Hypothesis.' *Kervan*, *26*(1), 365–386. https://doi.org/10.13135/1825-263X/6888

Ahmad, M., Amer, B., & Baarah, H. A. (2021). Readability and Lexical Density of Reading Sections of Tenth Grade English Textbooks in Jordan and Sultanate of Oman: A Comparative Study. *Article in Budapest International Research and Critics in Linguistics and Education (BirLE) Journal*, *September*, 1138–1148. https://doi.org/10.33258/birle.v4i3.2438

Aswani, A. N., Perangin-Angin, A. B., & Aswani, A. (2023). Lexical Density in Children's Story Book. *LingPoet: Journal of Linguistics and Literary Research*, *4*(3), 50–58.

Erarslan, A. (2021). Correlation between Metadiscourse, Lexical Complexity, Readability and Writing Performance in EFL University Students' Research-based Essays. *Shanlax International Journal of Education*, *9*(S1-May), 238–254. https://doi.org/10.34293/education.v9is1-may.4017

Gruber-Miller, J., & Mulligan, B. (2022). Latin Vocabulary Knowledge and the Readability of Latin Texts: A Preliminary Study. *New England Classical Journal*, *49*(1), 80–101. https://doi.org/10.52284/necj.49.1.article.gruber-millerandmulligan

Halliday, M. A. K., & Matthiessen, C. M. I. M. (2013). Halliday's introduction to functional grammar: Fourth edition. In *Halliday's Introduction to Functional Grammar: Fourth Edition*. https://doi.org/10.4324/9780203431269

Hasnain, S. S. (2020). A Critical Comparison between Manufacturing and Service Firms' Mission Statements: Manage Your Firms' Mission Statements with Care Using Readability and Lexical Techniques. *Business Management and Strategy*, *11*(1), 216. https://doi.org/10.5296/bms.v11i1.17171

Imperial, J. M., & Ong, E. (2021). *Application of Lexical Features Towards Improvement of Filipino Readability Identification of Children's Literature*. http://arxiv.org/abs/2101.10537

Miskiyah, N., & Amalia, T. Z. (2022). Analyzing Lexical Density and Readability of Reading Texts in English Textbook "Stop Bullying Now" by Mahrukh Bashir. *Journal of English Teaching and Learning Issues*, *5*(1), 39. https://doi.org/10.21043/jetli.v5i1.12199

Nash, E., Bickerstaff, M., Chetwynd, A. J., Hawcutt, D. B., & Oni, L. (2023). The readability of parent information leaflets in paediatric studies. *Pediatric Research*, *94*(3), 1166–1171. https://doi.org/10.1038/s41390-023-02608-z

Neneng Farida Rahmah. (2022). The Readability of Junior's Level in Mentari's Textbooks: A Systemic Functional Linguistic Study. *Journal of English Pedagogy and Applied Linguistics*, *3*(1), 56–64.

Pratiwi, Y., & Indriani, L. (2018). An Analysis of Lexical Density and Readability in Reading Text on English Textbook Used By Form 4 Level of Secondary School Students in Smkbsb Malaysia. In *Journal of Research on Applied Linguistics Language and Language Teaching* (Vol. 1, Issue 1, pp. 66–75). http://jom.untidar.ac.id/index.php/jralllt/article/view/197

Putri, A. S., Anshary, E. P., Sinar, T. S., & Maharani, P. (2024). Analyzing Lexical Density and Readability in IELTS Band 4 Students' Writing Test. *International Journal Linguistics of Sumatra and Malay*, *2*(2), 96–102. https://doi.org/10.32734/ijlsm.v2i2.17886

Rizkiani, D., Mahdi, S., & Sujatna, E. T. S. (2022). Lexical Density and Readability of the Facil's 'Advanced Learning Textbook' for Indonesian High School Students. *AL-ISHLAH: Jurnal Pendidikan*, *14*(1), 741–752. https://doi.org/10.35445/alishlah.v14i1.1157

Siregar, M. S., Hara, N. T., & Sinar, T. S. (2024). Lexical Density and Readability in Students' Thesis Introductions. *KLAUSA (Kajian Linguistik, Pembelajaran Bahasa, Dan Sastra)*, *8*(1), 71–79. https://doi.org/10.33479/klausa.v8i1.948

To, V., Fan, S., & Thomas, D. (2018). *Lexical Density and Readability: A Case Study of English Textbooks*. *December*. http://aaref.com.au/en/publications/journal/

Waruwu, N. R. (2018). *Lexical Density and Readability in English for Junior High School VII Textbook*.