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Prominent Linguistic Features of Pedagogical Texts to Provide Consideration for Authentic Text Simplification

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Abstract

Teaching materials are significant items that are unique and specific. Therefore, the selections should be relevant to students' proficiency. This research aimed (1) to disclose lexical density, readability, nominalizations, and modifiers in pedagogical texts as teaching materials, (2) to reveal the linguistic features functional roles on text for pedagogical demand, and (3) to attempt to suggest consideration for simplification on authentic text. This research employed qualitative content analysis. The data sources were 18 pedagogical texts from senior high school textbooks by the Indonesian Ministry of Education. Human instruments and a text analyser for the automatic computation were utilized for the analysis under Systemic Functional Linguistics (SFL) pilots. This research disclosed the appropriate text lexical density for senior high school students is a fairly difficult construction. Then, nominalizations within the texts are unpreventable and process nominalization is frequently used. The nominalization and the modifiers affect sentence complexities; the nominalizations function to condense information, collocate words, create cohesiveness, interfere with conciseness, and use as trans-categorization while modifiers are to add explicitness to nouns. The simplification considerations are by utilizing lexical density and readability algorithm, de-nominalization, measuring modifiers, and splitting substance of modifiers to increase text accessibility.

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1. INTRODUCTION

Reading materials are considered unique and specific because they are only fit for typical purposes to certain learners in some contexts (Prastowo, 2011). In this case, selecting the right text for Second/Foreign Language Teaching (S/FLT) has always been substantial. There is a wide range of text sources, one of which can be taken from authentic sources that production is fundamentally for the public, including education (Johansson, 2006; Simonsen, 2019). Novels, newspapers, magazines, articles, handbooks, recipes, and so on are a variety of authentic texts suggested to be adopted and adapted for language teaching (Crossley et al., 2007). Nevertheless, direct adoption and adaptation in Indonesian educational contexts require a critical review due to the students' uneven language abilities (Tomlinson, 2012). Authentic texts represent a real language nuance with deeper and more difficult lexical selection and complex strings of sentences (Sheang, 2020). This is considered difficult for some learners (Crossley et al., 2012). In this case, it is necessary to simplify the authentic texts before using them in class.

Numerous assumptions for simplified text adoptions in EFL class are found from those who refused and accepted the text versions. The first, simplified texts, which are unlike authentic texts, are highlighted as more artificial mostly leaving their original socio-cultural purposes, and presented in shorter sentences (Johansson, 2006; Crossley et al., 2007; Simonsen, 2019). The application of these may suffer learners as a result of unclear information left by the simplification process. The texts are limited contextually because of the linguistic feature removal. It denies learners the opportunity to interact with and acquire the natural forms of the target language (Crossley et al., 2007). In this case, the authentic texts are more adequate for EFL teaching than the simplified ones.

Contrary to popular belief, text simplification in education is emphasized to create unambiguous language without changing the represented meaning (Crossley et al., 2007). The simplification, or so-called pedagogical texts, has the purpose of adjusting the language based on students' demands without making new knowledge, however improving the accessibility of what has been provided on its origin (Aamotsbakken, 2008). The term *simplified* is not theoretically identical to *shorten* (Brunato et al., 2015; Petersen & Ostendorf, 2007) but rather to make it easier for the target readers to while its actual meaning is retained (Collantes et al., 2015; Sheang, 2020). This text version is indeed a valuable aid because the accuracy can reflect learners' language knowledge. The materials allow them to explore and extend their existing knowledge (Crossley et al., 2007). Concerning EFL learners' comprehension and reading speed, the simplification yielded better literary than those in authentic text versions (Javourey-Drevet et al., 2022; Margarido et al., 2008). Saggion et al. (2011) added that simplifications on texts with higher difficulties are beneficial to low-level learners, people with disabilities, and teachers with customized teaching resources.

In Indonesia, simplified texts have been applied by public textbook publishers and the Indonesian Ministry of Education and Cultures by compiling texts through simplification of their authentic formats. The process is either simplified on levels of

words, sentences, or contents from its original sources (Crossley et al., 2007; Javourey-Drevet et al., 2022; Margarido et al., 2008). This process occurs as a result of internal textual qualities such as high-level dictions, natural language complexity, lexical variances, and so on with regard to students' proficiency (Crossley et al., 2007; Javourey-Drevet et al., 2022; Kirana, 2016; Margarido et al., 2008). When comparing both versions, some distinctions have been identified; the first is a shift in sentence structure as a result of the nominalization process, which transforms verbs into nouns. This process enhances abstraction and opens up a space for extra information in a phrase, making it lexically dense and challenging to read because of professional language constructs (Mueller, 2015; Wei & Yu, 2019). Then, the addition of adjectives and nouns to head nouns (modifiers) increases the specificity of a phrase with lexical variations that indeed affect the readability of sentences or text (Hengeveld & Mackenzie, 2015). To reduce lexically dense sentences, these elements are considered applicable to monitor text difficulties and accessibilities.

Some scholars have conducted studies on both text versions, such as objectifying the analysis of linguistic features (syntax, discourse structure, CELEX word frequency, word familiarity, word meaningfulness, number of words, syntactic complexity, hypernymy, LSA givenness, motional preposition, syntax similarity, noun overlap, logical operator, cohesion, and polysemy) (Crossley et al., 2007, 2012; Petersen & Ostendorf, 2007), considering the effect of the simplified texts for EFL's text comprehension (Crossley et al., 2012, 2014; Safari & Montazeri, 2017), discovering readability formula (Greenfield, 2004), procedures and strategies of simplifying authentic texts based on words and sentences (Dmitrieva & Tiedemann, 2021), and justifying text authenticity (Yudono, 2022). However, fewer details have been found about linguistic features on lexical density, readability, nominalization, and modifiers. The absence of investigation of these elements limits us to an intuitive simplification process, which could potentially pose a risk to students' EFL learning. The investigation of these linguistic domains is considered significant as the results assist teachers and material developers in creating adequate reading materials. Still, it theoretically adds to the study of linguistics by demonstrating how to distinguish and evaluate the features lexicogrammatically and functionally in the same registers.

Therefore, this research aimed to cover the features by using SFL as a core tenet with the following research questions:

1. How are the distributions of lexical density, readability, nominalization, and modifiers in pedagogical texts in EFL textbooks for Indonesian senior high students?
2. What functional roles do nominalization and modifiers contribute to pedagogical texts in EFL textbooks?
3. What linguistics features should the teacher consider to simplify authentic text for teaching materials?

2. LITERATURE REVIEW

2.1 Simplified Text for Pedagogical Purposes

Text simplification is a way to prepare pedagogical texts for students by highlighting key linguistic concepts, for instance, the use of pronouns, modals, verbs,

and other elements. Text simplification is a procedure that decreases a text's lexical and syntactic complexity while retaining the content's original meaning and information (Collantes et al., 2015). The goal is to generate and modify a large number of new lexical inputs for learners as well as to control for combinations of those inputs or propositional inputs (Crossley et al., 2007). A variety of languages are used to simplify texts for EFL and L2 readers (Crossley et al., 2014). The material can be rewritten in a simpler form or as a condensed version of the actual texts to make it more accessible to a broader audience, such as learners or non-native readers (Collantes et al., 2015; Crossley et al., 2014). These are definitely for the sake of students' educational demands.

Additionally, simplified texts lack the coherence of authentic texts and can be produced by employing readability formulae by changing the words, clauses, lexical density, and subtracting connectives from sentences (Crossley et al., 2014). Methods of simplifying a text are to follow guidelines suggested by readability formulas like Fry Readability Graph by Forgan and Mangrum and the reading ease formula by Flesch (1977, as cited in Crossley et al., 2014). The formulas measure the word frequency, syntactic similarity, and content overlap. But it must be made clear that the readability result is only a prediction of how accessible the text would be, with the actual conclusion only being able to be expressed following a test obliged to students.

Most of the time, simplified texts closely mirror what language learners already know and comprehend and provide them with the opportunity to extend their understanding (Crossley et al., 2014). This makes them effective tools for language teaching. However, it must be stated clearly that overt language simplification may lose the author's inherent goals and intentions. As a result, the researchers who were opposed to using simplified materials in class were less acceptable. They are noted as being more artificial and presenting content in shorter phrases that have been streamlined from their original socio-cultural aims (Crossley et al., 2007; Johansson, 2006; Simonsen, 2019). Then, in order to prevent students from encountering a missing piece in their reading, teachers and material creators must be vigilant when reducing the language.

2.2 The SFL for Text Simplification

Systemic Functional Linguistics (SFL) is a linguistic approach to linguistics that reflects on language production as the system of social semiotics. The SFL considers the language product as a unit system of what audients interact with and interpret functionally. A 'text' as a product in SFL refers to anything related to language in any medium, which creates sense to someone with the characterization of language functioning in contexts (Halliday & Matthiessen, 2014). Language is a resource to make meanings (not just a set of rules), and the process of making meaning in contexts (Halliday & Matthiessen, 2014; Karakaya, 2017). Two types of language resources (lexical and grammatical) allow the users to understand the most meaningful sentences according to the characteristics of contexts.

Two essential sections in SFL should be acknowledged; those are included in context and lexicogrammar levels. At the contextual level in SFL, there are situational and cultural contexts of particular texts that can be recognized from their genres and registers. The genre is bolded on the context of culture. Martin (2008, as cited in To, 2018) defines that genre as a staged, intentional-oriented, meaningful activity in which

speakers or writers are included as members of that culture. The genre itself can be realized through the register which is the context situation where the discourses are produced (To, 2018). Meanwhile, in lexicogrammar, meaning is understood via word organization, word groups, and clauses (Halliday & Matthiessen, 2014; To, 2018). A clause is a central unit to process in lexicogrammar with various kinds mapped into an integrated grammatical structure (Halliday & Matthiessen, 2014). Lexical and grammatical meaning selections determine the ideational meaning, while modality, moods, and evaluative language show interpersonal meaning, and thematic as well as informational structure (lexical density) and text periodicity (readability) are interconnected with the textual meaning.

In addition, SFL proposes that language development begins with simpler realization, prototypical or more congruent forms and shows an update or trend to a more sophisticated, metaphorical, or nominalization (Christie, 2012; Halliday & Matthiessen, 2014; Karakaya, 2017). The most appropriate language representation depends on the context or goal of the assignment. Language production is formed by the functions required for the contexts or the registers. For example, if the target learners are children, the textbooks prepared must be more concrete and contain more repetitions. On the other hand, when adults are the target learners, the texts can be produced with more abstract nominalization and various technical terminologies, including modifiers (Karakaya, 2017). It is because they already could progress in various forms of language with certain language levels.

Text simplification is emphasized to create clear language features in text so that can be easily understood by non-native readers (Crossley et al., 2007). Nominalization and modifiers in SFL can be counted as those linguistic features. The existence of nominalizations can create challenges for readers for several reasons, in the process of nominalizing an active actor of a sentence can remove true meaning leading to a loss for readers (Fang, 2005) due to the abstraction in semantic and grammar representation for some readers are difficult (Mueller, 2015). However, nominalization has such textual functions to elaborate with text simplification that is embodied in the following aspects; conciseness, language formality, objectiveness, and cohesion (Wei & Yu, 2019). Additionally, modifiers can lead to unclearness for phrases and even more clauses. Regarding this, simplification treatment by the omission of particular modifiers is then measured through its modifier's effects on semantic and lexicogrammar. Nastase et al. (2018) modifiers can be static or dynamic or removed. Therefore, high usage of nominalization and modifiers allows the writer to pack more information with lexical density and text readability increased (Mueller, 2015).

3. METHOD

This research used qualitative content analysis with small quantifications. According to Mayring (2000), qualitative content analysis is a research technique that attempts to infer the content of texts and interpret them within the context (meaning representation and format). Content analysis, as a base, is a potential research technique to analyse findings, and analysis of the manifest and latent content of the materials (books or films) through classification, tabulation, and evaluation of the core symbols and themes (Krippendorff, 2004; Mayring, 2000). In this research, content

analysis was used to examine linguistic features of the texts; lexical density, readability, nominalization, and modifiers.

3.1 Data Sources

The data sources were from three students' EFL textbooks that the Indonesian Ministry of Education, Culture, Research and Technology (*Kementrian Pendidikan, Kebudayaan, Riset dan Teknologi*) uploaded and published in 2017-2018. Three students' textbooks were entitled *Bahasa Inggris* [English] (*SMA/MA/SMK/MAK*) [senior high levels] for grades X, XI, and XII. The data sources were purposively selected based on research objectives under simplified authentic texts following Campbell's (1979) simplifying text considerations (words/phrases, sentences, and contents) on the linguistic features. See the representative section of data checking in Figure 1 (modifiers):

Original version: Niagara Falls is a <u>group of three waterfalls at the southern end of Niagara Gorge, spanning the border, between the province of Ontario in Canada and the state of New York in the United States. The largest of the three is Horseshoe Falls, also known as the Canadian Falls which straddles the international border of the two countries. The smaller American Falls and Bridal Veil Falls lie within the United States.</u> (http://en.wikipedia.org/wiki/Niagara Falls)
Textbook version: Niagara Falls is <u>the collective name for three waterfalls that cross the international border between the Canadian province of Ontario and the USA state of New York.</u> They form the southern end of Niagara George. <u>From the largest to smallest,</u> the three waterfalls are the Horseshoe Falls lie on the Canadian side, and the American Falls on the American side.

Figure 1. The representative section of data checking.

There are typical points realized from the text section: the first, lexical selection [spanning the broader] changed into [crossing the international border], having a decrease in phrasal level under a reduced clause construct that acts as modifiers. The second, clausal and phrasal modifiers reconstructed in a more readable version by removing a redundance ranking clause [three waterfalls at the southern end of Niagara George, spanning the border, between...] into packaged information form in downranking clause [three waterfalls that across...], maintaining text difficulty levels. Based on Campbell (1979), this section had been simplified on the phrasal and clausal level. With the same identification, overall, 18 texts were selected, those are considered articles, news, novels, folklore, or those practically related to authentic discourse adoption and adaptation for teaching purposes.

3.2 Technique of Data Collection, Phases of Analysis, and Unit of Analysis

The technique of data collection was document analysis (Arikunto, 2010; Mayring, 2000). Non-participant observation, repetitive reading, and note-taking were some of the methods used to collect data from those documents (EFL textbooks). The note-taking in content analysis on linguistic features is significant, particularly for data categorization and analysis (Pribady, 2019). Bogdan and Biken (1982, as cited in Latif, 2015) emphasize that these methods are mainly performed with humans as primary

instruments. Therefore, the researchers stood and acted as research planners, data collectors, data analysts, and report makers.

The categorization and analysis were done manually under SFL theory as proposed by Halliday and Matthiessen (2014) with supplementary theories (in Table 1) regarding the lexical density, nominalization, and modifiers (Castello, 2008; Droga & Thomson, 2012; Flesch, 2006; Hengeveld & Mackenzie, 2015; To, 2018; Yue et al., 2018). Furthermore, an automatic computation with <https://www.online-utility.org/> was done for readability prediction. See the following phases of data analysis adopted from Mayring (2000) and Bengtsson (2016):

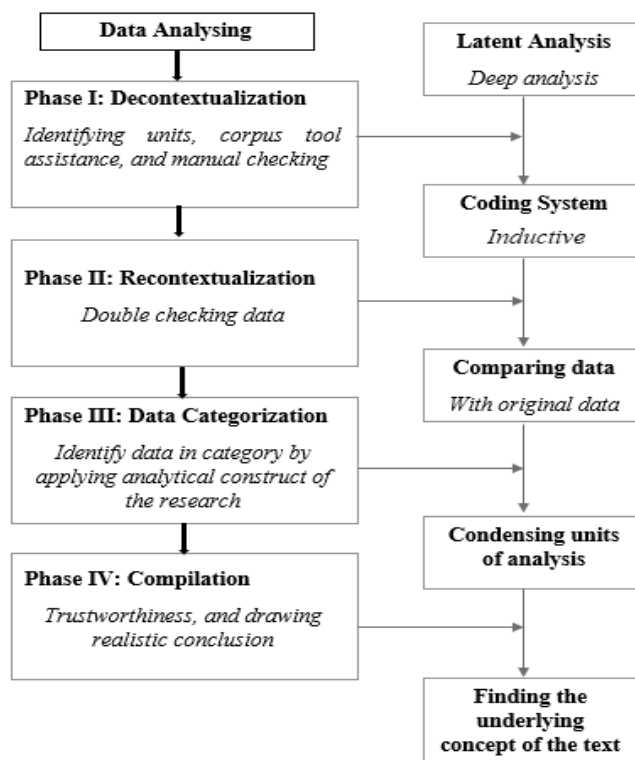


Figure 2. The phases of data analysis.

In SFL perspectives, lexical density, grammatical intricacy, and nominalization as a part of grammatical metaphor are ideal features of the language (Halliday & Matthiessen, 2014). Nevertheless, both spoken and written language features are different; in that spoken language is characterized by grammatical intricacy while written language is more about lexical density determination. As the objectives of this research were to analyse EFL textbooks, grammatical intricacy was not taken into account. In addition, readability and modifiers in simplified texts were also analysed because both features are essential for text simplification, as shown in Table 1.

Table 1. Unit analysis under SFL perspectives.

Features	Units	Instruments
Lexical Density (LD)	Formula:	Manual Analysis
	LD	

Table 1 continued...

	Indexing:			
	Index	Categories		
	3.0-4.0	Low (L)		
	4.1-5.0	Moderate (M)		
	5.1-6.0+	High (H)		
Readability	Readability Proportion by Flesch (2006): Easy- 6 th to 7 th grade (70-80%) Standard- 8 th to 9 th grade (60-70%) Fairly Diff.- 10 th to 12 th grade (50-60%) Diff.- Collegian (50 to 0%)			Automatic Computation
Nominalization	Semantic	Grammatical	Lexicogrammar	Manual Analysis
	Quality to Entity	Epithet to thing	Adj. to noun	
	Process to Entity	Event, Aux. to thing	Verb to noun	
	Entity Expansion	Head Modifiers	Zero nominalization	
Modifiers	Categories of modifiers Premodifiers Noun ('learners' output', 'soul structure', etc) Adjectives ('optimal solution', 'negative effect', etc.) Postmodifiers Prepositional ('in any field', 'of people', 'access to', etc.) Relative clause ('The resistance that inflames desire')			Manual Analysis

The SFL considers both lexicogrammar (lexical-syntax) and semantics of the language. Consequently, this study deployed both; focusing on structures of nominalization and modifiers that further affect the sentence semantically.

4. RESULTS

4.1 The Distributions of Lexical Density, Readability, Nominalizations and Modifiers

The distributions of linguistic features in the presentations are to give a depiction of how consequential the items are to the language constructions and meaning representations of the texts for simplification. Initially, this is to define a leading factor in the organization of artificial and complex language, moreover assisting in how to maintain the authentic value of the discourses (texts) which might deny students' textual interaction. Table 2 presents the linguistic distributions of the investigated texts:

Table 2. Micro linguistics feature, lexical density, and readability distribution.

Text	LW				Σ LW	Σ W	Clauses		LD		R		Nom	Mod
	N	V	Adj	Adv			RC	E C	In	Ca	Prop (%)	Ca		
X-T1	136	36	31	11	214	413	40	8	5.4	H	54	F. Dif.	4.6	21.4
X-T2	174	37	43	6	260	485	46	4	5.7	H	54	F. Dif.	7.4	23
X-T3	202	47	18	10	277	512	45	1	6.0	H	36	Dif.	3.9	14.1
X-T4	212	67	23	12	314	583	62	2	5.1	H	56	F. Dif.	3.6	6.8
X-T5	149	121	43	10	323	678	95	3	3.4	L	73	E	1.5	11.1
X-T6	104	57	31	9	201	411	47	3	4.3	M	75	E	2.4	12.0
XI-T1	77	23	27	6	133	262	23	1	5.8	H	48	Dif.	6.8	21.8

Table 2 continued...

XI-T2	168	160	67	41	436	1013	145	2	3.1	L	87	E	2.1	8.4
XI-T3	150	102	64	30	346	760	78	4	4.5	M	57	F. Dif.	6.0	9.2
XI-T4	235	145	78	37	495	1158	145	3	3.4	L	76	E.	1.4	6.2
XI-T5	236	147	80	35	498	1011	129	3	3.9	L	80	E.	0.9	7.4
XI-T6	211	60	44	14	329	678	56	4	5.9	H	39	Dif.	6.9	12.1
XII-T1	52	14	10	5	81	163	15	2	5.4	H	56	F. Dif.	4.2	22.2
XII-T2	34	6	10	1	51	98	8		6.4	H	41	Dif.	7.1	21.5
XII-T3	56	28	15	4	103	212	19	3	5.5	H	47	Dif.	9.4	26.2
XII-T4	31	21	14	2	68	139	16		4.3	M	73	E.	4.3	22.0
XII-T5	135	66	36	18	255	572	62		4.3	M	71	E.	2.7	14.9
XII-T6	171	83	33	16	303	587	62	1	4.9	M	65	St.	2.5	9.5
Total	2533	1220	667	267	4687	9735	1093	44	Prop. Nom. = Frequency: $\Sigma W \times 100\%$					
%	54	26	14	6	48	-	96.2	3.8	Prop. Mod. = Frequency: $\Sigma L \times 100\%$					

Table 2 displays the prominent items for lexical density computation and the lexical density itself, along with readability proportion as a benchmark for text appropriateness. Of the entire texts, only five texts (X-T1, X-T2, X-T4, XI-T3, and XII-T1) were considered adequate for senior high school students by both the adopted theories of lexical density and readability. Then, nouns become the most common occurrence type for the lexical item feature because they are graded as open-class words that can be transformed or modified for legitimate purposes (e.g., challenging students for text density). Unfortunately, the nominalization and modifier proportions are both reserved due to their inability to be compared with the original texts. However, it was confidently discovered that higher occurrences have a significant influence on the text's compactness about the total number of lexical. Therefore, both nominalizations and modifiers are crucial from a linguistic perspective for text simplification.

4.2 The Functional Roles of Nominalization and Modifiers on Texts

4.2.1 Functional roles of nominalizations

a. Condensing information by objectification and abstraction

The occurrences of nominalization show this process can condense information, whereby the sentence can be reduced in length without changing its meaning drastically or its grammatical accuracy. According to SFL, 'process' (a verb) is a core system of clauses. In contrast, nominalizing a verb condenses the information expressed by a whole clause (from sentence to phrasal) and leads to abstraction and objectification. See the following Datum XI-T1S7:

- (1) Incongruent form: [The construction of the Jakarta metropolitan area's new 21-kilometer-long-Antasari-Depok-Bogor-toll-road kicked off on Thursday]
 Congruent form: [Governments construct the Jakarta Metropolitan area's new 21-kilometers-long-Antasari-Depok-Bogor-toll-road on Thursday]

The process shows an elimination of certain elements (such as the grammarian's construct S+V) by the occurrence of nominalizations, which further indeed invites particular elements accordingly as replacements. The clause in congruent form (with Subject) is reduced to phrase form after transformation to an entity. See the illustration in Figure 3.

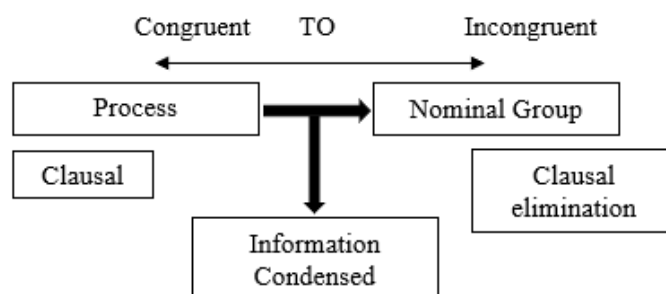


Figure 3. (De) Nominalization process.

The illustration of Datum XI-T1S7 shows that the incongruent type of nominalization promotes action over agency. The lack of context (subject in the grammarian’s construct) may lead readers to wonder who carried out the action [construction]. It narrows the reader’s understanding of what or who is genuinely involved in the transaction. The congruent form [construct], on the other hand, clearly shows agency involvement to the verb with a full clausal/sentence structure. In this sense, the incongruent form might be perplexing, but it can also be apt when the primary objective of the sentence is precisely about the action or process, which is known as objectification by abstract lexical selection.

b. Creating phrasal collocations

It is found that some of these word transformations (from verb or adjective to noun) create particular collocation patterns, such as those with certain prepositions (of, with, for, and so forth). The reason is that its roles have become equal to all original nouns in terms of parts of speech that identify any class of people, places, names of activities, and so on. This common collocation is ideal for an additional detail with post-modification.

Table 3. Collocation with a preposition.

Post modifier with preposition in nominalization	Collocative preposition	Frequency	Examples
	from	5	Tourist from...
	to	16	Access to, ...
	for	8	Decision for...
	at	4	Trip at, looking at...
	of	22	Development of, liability of...
	in	8	Living in...
	with	5	Communication with, connection with...
	on	6	Stamp on...

Table 3 depicts that nominalization can be post-modified by prepositions to build collocational phrases that contain more lexical items and variations. This type of result is a habitual juxtaposition of nominalization using a static-morphological process. The words, proven for the static construction, have a similar frequency of word collocations.

c. *Creating cohesiveness*

The other functional role of nominalization is as a cohesive device. It is used to link relevant information in a sentence, or between or among sentences in a text. See the datum XI-T3S19 in (2):

- (2) Nominalization: [It is estimated that hundreds of children miss school every day due to the fear of being mistreated by other students] [and in some extreme cases they choose to home school,] [or in severe circumstances they stop studying altogether.] [Children should not be living in constant fear.] [They shouldn't be afraid.]

The instance given shows that nominalization is used as cohesion, that is, to connect sentences grammatically and semantically. The zero-nominalization the 'fear' indicates a connection to the second zero-nominalization 'fear' and also the adjective 'afraid'. The occurrence of nominalization as a cohesive device indicates that the paragraph is still discussing the same ideas, and thus it will assist readers in comprehending the text more easily with reference. The topic is expanded in more detail, but it is unified as a whole by the term cohesive design.

d. *Interfering sentence directness*

Besides the fact that nominalization can function to create denser sentences, it can also interfere with the writing directness by making the sentence unnecessarily redundant. Nominalization, the process of changing an adjective or verb into a noun, may require the use of prepositions and articles or even extra verbs compulsory. It is depicted in datum XII-T1S3 in (3).

- (3) Incongruent: [Captions can consist of a few words of description or several sentences.]
 Congruent: [Captions are described in a few words or several sentences.]

The incongruent form (nominalization) can make a sentence longer and wordier because of more words incorporated. In nominalization (incongruent) form in (3), we can see verb consists is required to replace the entitizing verb description, and it is compulsory to make the sentence acceptable and grammatically correct.

e. *Trans-categorizations as death metaphor*

What is more, trans-categorization is the other functional role of nominalization in pedagogical texts. It means particular ideas can only be expressed as nominalization. Therefore, the de-nominalization to its congruent form will affect the whole semantics/meaning of the sentences. See the following datum X-T4S4 in (4).

- (4) Incongruent: [She was awarded the title of Indonesian National Hero on 2 May 1964 by the Indonesian government.]

There is no other way to express 'government' for that sentence, and if the writer forces to unpackage this nominalization with 'govern', its congruent form, it will also change the natural nuance of a sentence entirely. The trans-categorization stands on either subject or object in a sentence or text, as a topic discussion, and is unchangeable to verbal sentences. It is different from objectification/im-personalization as

forementioned in the earlier function. The difference is the objectification transformation still allows to return of its original agent to the sentence or replaces it back to its grammarian language system (subject+verb), while the trans-categorization does not.

4.2.2 Functional roles of modifiers

a. Phrasal simplification

If the resulting semantic implications are given by extending context in a sentence, pre-modifiers can be independently used in that context. This is because the pre-modifier's function is to give supplementary words more simply. The pedagogical text writers or material developers tend to shorten the length of the noun phrase to which they add pre-modifiers, they enrich its attribute. See the following datum XII-T4S5 in (5) and the reconstruction:

- (5) Pre-Modifiers: [Second, switch to the louse detection comb.]
Reconstruction: [Second, switch to the comb which used to detect the louse.]

The reduction implies the writer can deliver information using limited coding, and spaces, and creating compact packaged information. The modifiers which have ideally written with post-modifiers will be turned out simpler while it is in the form of pre-modification. These findings show the pre-modifier and post-modifier can be interchangeable in attributing nouns.

b. Phrasal explication

Contrastively to premodifiers, the postmodifiers' roles are to present additional information in longer and more explicit ways. The explicitness, using the grammatical items that were lost in pre-modifiers, appears in post-modifiers. Information is stated clearly with the related verb, preposition, and relative pronoun. It inserts specific descriptions that lead to a specific extent once or several times in sentences. See the datum realization XI-T2S42 in (6).

- (6) Realization: [There were great black waves]; [great black waves were swelling up like mountain]; [mountain has crown] [crown made up from white foam] [crown is on their head].

We can see throughout the realization that with the help of post-modifiers, we can arrange more concepts in fewer clauses, giving some extent to nominal or noun phrases. Nonetheless, as lexical and content word variation leads to a denser sentence or package, this typical sentence is becoming more difficult for some readers in terms of accessibility and readability. Readers must be more observant to understand what is linked to what is in a sentence. Contrastingly, while the post-modifiers are fragmented into several clauses, they become clearer with more clauses; however, they can become artificial or unnatural in daily language grammar.

c. *Ambiguity reduction*

The other role of post-modifiers is to avoid ambiguity from intended information. See the datum XI-T3S23 in (7) with its genitive construction:

- (7) Post Modifier: [Orangutans, [which literally means the man of the forest,] are the largest arboreal animal on the planet.]
 Genitive: [...Forest's man.]

The phrase with post modifiers above is easier to understand as 'what is it' than 'whom is it'. Writers have avoided using phrases that draw impreciseness, instead, they use the ones with post-modifiers to create more understandable phrases and the post-modifier construction seems to be easier to reduce that ambiguity existence.

4.3 Suggestive Considerations for Text Simplifications

4.3.1 Lexical density and readability algorithm as the set off for simplification

Before assigning a reading material to a class, it is important to calculate the lexical density and readability proportion. Although students are the primary factor to measure, this is certainly something to consider when determining how accessible and acceptable the text is for them. Teachers can reduce the likelihood of students failing during activities by using lexical and readability prediction (see Table 4).

Table 4. Lexical density and readability proportion.

Texts	Lexical Density (LD)	Categories	Readability (%)	Categories
X-T1	5.4	High	54	Fairly Diff.
X-T2	5.7	High	54	Fairly Diff.
X-T3	6.0	High	36	Diff.
X-T4	5.1	High	56	Fairly Diff.
X-T5	3.4	Low	73	Easy
X-T6	4.3	Low	75	Easy
XI-T1	5.8	High	48	Diff.
XI-T2	3.1	Low	87	Easy
XI-T3	4.5	Moderate	61	Standard
XI-T4	3.4	Low	76	Easy
XI-T5	3.9	Low	80	Easy
XI-T6	5.9	High	39	Diff.
XII-T1	5.4	High	56	Fairly Diff.
XII-T2	6.4	High	41	Diff.
XII-T3	5.5	High	54	Fairly Diff.
XII-T4	4.3	Moderate	73	Easy
XII-T5	4.3	Moderate	71	Easy
XII-T6	4.9	Moderate	65	Standard

Based on the findings, some texts are predicted to be quite manageable for readers due to artificial language; however, some other texts are complex to comprehend. The LD index that could be used as the underlying portion for senior high students is between 5.0 and 5.7 LD, or high lexical density. This index is quintessential to text readability prediction with Flesch's reading ease theory, providing students with

a fairly difficult text. This LD index is equal to 50 to 60% readability and is expected to be adequate for a senior high level. It is important to remember that the language for senior high students must not be overtly simplified by artificially creating it, but the sentences for text must resemble natural language nuance, regardless of when or where those languages were produced.

4.3.2 *Nominalization substitution to limit overuse and compactness of the transformation*

Nominalization can make for complex writing due to expansion that occurs because of nominalizing words. It provides room for obligatory words to replace missing verbs or even supplemental content words that can be pre-modified by other words (adjective or noun) or post-modified by its fixed collocation (preposition), appositive, and/or other clauses. Using the verb hidden within nominalization can force authors and writers to write in more clear ways with more passages. This is probably difficult for non-native readers if they are not in the area of expertise due to unfamiliarity. Therefore, transitioning from nominalization to its congruent form can make sentences clearer, more concise, and specific, but also more interpersonal. See the data XI-T4S29 in (8).

- (8) Incongruent form: [Education, by definition, means guiding student lives in a strong foundation of good character,] [so that they would be civilized humans of highest moral fibre, thus laying the foundation of a great nation without distinction of religion, ethnicity, customs, economic and social status.]
- Congruent form: [Education is defined to guide students to live in a strong foundation of a good character,] [so they would be civilized humans of high moral fibre]. [They will lay on the foundation of a great nation and] [will not distinct of any religion, ethnicity, customs, economic and social status.]

The difficulty and accessibility of the two constructions above can be attested from the lexical density index and readability proportion. The sentence has a high lexical density of 13.0 LD (26 lexical words divided by two rank clauses). This index is out of reach of students' proficiency as an approximation (5.0–5.7). However, by rearranging it back to its congruent form, the sentence's lexical density has significantly decreased, dropping to only 6.25 LD (25 lexical words divided by 4 rank clauses). Furthermore, it increases the readability prediction of the sentence. See the automatic readability in Table 5.

Table 5. Nominalization readability.

Number of characters (without spaces)	234.00
Number of words	43.00
Number of sentences	2.00
Lexical Density	60.47
Average number of characters per word	5.44
Average number of syllables per word	1.88
Average number of words per sentence	21.50
Flesch Reading Ease	25.65

Table 6. De-nominalization readability.

Number of characters (without spaces)	227.00
Number of words	48.00

Table 6 continued...

Number of sentences	3.00
Lexical Density	52.08
Average number of characters per word	4.73
Average number of syllables per word	1.73
Average number of words per sentence	16.00
Flesch Reading Ease	44.31

It demonstrates that de-nominalizing the incongruent form to its congruent form dramatically increases the proportion of the sentence, from 26% readability on the incongruent form to 44% readability prediction. With such treatment of nominalization, it is beneficial for simplification purposes. Because of the proportion, the congruent form remains slightly challenging for them, implying that the sentence is not artificial but more readable and accessible with clauses.

4.3.3 *Noticing critical appraisal of modifiers to include or discard*

All types of modifiers manifested to lexicogrammar and semantic with static meaning. Therefore, the modifier's recognition and existence in authentic sentences are crucial for text simplification. It is because some pre-modifiers are restrictive and some others are not restrictive because too much content/meaning will be lost of its discarding. In addition, it is recommended to use a simple pattern of modifiers; pre-modifiers (pre-adj.+N or pre-N+N), or post-modifiers (N+preposition/single clause) in pedagogical sentences. The reason for this is that there will be more lexical diversity and information the more modifiers are added to the head noun. Because of the heavy substance of the modified noun, this will affect text readability and accessibility and may confuse readers. See the datum XII-T2S1 in (9).

- (9) Modifiers: [The construction of the Jakarta metropolitan area's new 21-kilometer-long Antasari–Depok–Bogor-toll-road kicked off on Thursday] [as the government boosted efforts to support the capital city's expansion.]

We can see from the preceding representative example that an overtly post-modified head noun can make a nominal phrase longer and contain more messages. It is also definitely complete to specify which noun is about; however, it becomes challenging, decreasing readability, as well as increasing the density of a sentence due to lexical variations.

4.3.4 *Splitting over-weight modifiers*

Writers use a complex sentence structure in which two or more clauses are combined into one complete sentence. With such complexity, it is possibly increasing the difficulty of a text's readability for certain readers. But it does not mean that longer or more complex sentences are bad (both are interchangeable); there will be a situation where this type of writing is necessary. Following this research, it can be realized that complex sentences can be created with the use of clausal post-modifiers. These clauses primarily serve to provide detail to a noun to make it more explicit. Withstanding the analysis, material developers considered providing students with various constructions, including simple-complex sentences. It attempted to give students a

depiction of what a real foreign language is about. Nevertheless, as indicated by the LD index and readability, some complex constructions are a warning because they might not fit the students. Therefore, in terms of simplification, the researcher suggests splitting some sentences into two or more sentences or using a less inclusive sentence. An inclusive language frequently requires more words; the capaciousness of inclusion usually demands capacious sentences, which of course leads to complexity.

5. DISCUSSION

5.1 Lexical Density and Readability Algorithm

As far as the Lexical Density (LD) processing in the examined texts, the analysis began with identifying particular parts of speech (lexical items; noun, verb, adjective and adverb, functional words; preposition, determiner, relative pronoun, etc) and types of clauses (rank or down-rank clauses). The result confirms Halliday's formulation that the average LD for written text is approximately 3.0 to 6.0 scales and this depends on the text's formality level (Halliday & Matthiessen, 2014; To, 2018). The lexical density indexing has corresponded with sentence complexity and compactness with more lexical items or texts that contain less close to professional and academic language.

The LD by Halliday and Matthiessen (2014) and the readability proportion by Flesch (2006) are both associated with this research. It has been demonstrated that the increasing text densities affect the prediction of text readability. In respect to the findings, lexical density and readability proportion indicated some texts are inadequate for senior high school students, it is either not-challenging due to short clauses or less-features, otherwise, overtly challenging because of some over-weight lexical items. The adequate texts for senior high school students are 5.0 to 5.7 LD on high categorization and these equal to 50% to 60% readability with fairly difficult language presentation. Therefore, it is confidently stated that the readability prediction would be affected by text information since the readability percentage would theoretically change consequently.

The nominalization in the examined texts was found with transformations from quality to entity and process to entity with derivational or without derivational (zero-nominalization). Despite the fact that pedagogical texts require readability and accessibility for readers, in this research, the nominalizations are still unpreventable in usage in simplified texts, particularly when senior high students as target readers. This result is in line with Halliday and Matthiessen's (2014) determination that some students might be (in)-capable of encountering grammatical metaphors, one of which is nominalization.

Additionally, the two types of Halliday and Matthiessen (2014)'s modifiers; pre-modifiers and post-modifiers, were discovered in the form of phrases and clauses. According to the results, to add a specific aspect to a head noun in typical texts, material developers utilize pre-modifier adjectives more frequently. These adjectives are acknowledged to be attributive for noun/noun phrases in which they cannot stand alone as a subject or object, as opposed to a noun as modifiers to other noun/noun phrases. Fundamentally, the previous findings in the categories confirmed that pre-

modifiers in sentences with adjectives are more common than those with nouns (Gómez, 2009).

Furthermore, the nominalization functions in the results are to condense information, increase abstraction and objectification, create collocation, function as cohesive devices, and interfere with conciseness, or become a trans-categorization. These findings are supported by the previous grammatical metaphor results and literature (Halliday & Matthiessen, 2014; Mueller, 2015; Wei & Yu, 2019), particularly on the nominalization of functional roles and effects. First, the nominalizations condense information within sentences referring to the ability to package a message in a sentence without losing any of its meaning and grammatical accuracy. In SFL by c, condensing information is to state information in a compact manner, which nominalization can use for this purpose. Regarding the research findings, nominalizations eliminate such an active clause and become phrases or nominal groups. With this system, certain features can be added as either compulsory or supplementary meanwhile at the same time particular elements are elided.

The second is that nominalization can increase an abstraction in a sentence because the process is hidden in a nominal group. Not only that, but nominalization also disguises the sense of agency by prioritizing the action rather than who does the action (objectification). According to Fang (2005), this nominalization can lead readers to lose the related meaning of what it represents in the absence of active actors. This research accepts that the idea of language construction might confuse readers about who was initially involved in the activities, however, it can be apt when the general information to deliver is about the action.

In lexicogrammar, nominalization can create such a fixed-collocation pattern. This emphasises supplementary detail to nouns. Nominalization can contain variative lexical items and obtain larger information, but the meaning becomes compact and static. Moreover, the scholars emphasized that nominalization can be utilized as a cohesive device (Halliday & Matthiessen, 2014; Mueller, 2015; Wei & Yu, 2019). That function is also found that the nominalizations are used as a linkage in sentences to notify readers to connect to the information. The cohesive device with nominalization is used to minimize the synonymy of lexical items to prevent the inaccessibility of sentences due to lexical variations.

Furthermore, the other effect of nominalization is found to interfere with writing conciseness by creating sentence denser; however, nominalizations also create redundancy such as the occurrence of prepositions, articles, and even extra verb compulsory (Mueller, 2015; Wei & Yu, 2019). Then, nominalization is also functioned as word trans-categorizations. It is in line with Halliday and Matthiessen (2014) that nominalization cannot be unpackaged or as a dead-grammatical metaphor. This type of SFL denotes a phenomenon with the characteristics of metaphorical expression that faded gradually (Halliday & Matthiessen, 2014). This expression was found unable to make an implicit comparison due to the absence of a congruent form (verbal form). However, the result shows this type has significance in conveying new information/concepts in texts, including sample text types.

On the other hand, modifiers in pedagogical texts are to extend the semantics of the head noun in which they embedded. Based on the findings, the modifier types are lexicogramatically different in sentence length of both modifiers' types based on their position. The lexicogrammar of pre-modifiers, by material developers, is by presenting information in limited coding, spaces, and concisely while post-modifiers

in sentences can attribute larger information for readers. Furthermore, both premodifiers and postmodifiers are interchangeable and pre-modifiers can be presented in post-modifier form, and vice versa. However, post-modifiers can reduce ambiguity attributed to the genitive form that modifies the head noun. The results are in line with the previous studies that they can decrease the readability prediction of sentences if they are constructed denser with more additional descriptions to head nouns (Halliday & Matthiessen, 2014; Karakaya, 2017), especially with various lexical items in sentences.

5.2 Simplification Considerations

There are several considerations the teachers or material developers can take to simplify text from authentic sources. First, in the simplification set off, this research has contrasted results with previous related findings of text simplification by Crossley et al. (2012). The previous results highlighted that material developers are not required to rely on mathematical algorithms, however, do so intuitively. The reason was that intuitive text simplification led to texts that were predominantly more cohesive and less sophisticated as the text level decreased, and differences across levels revealed an unexpected trend (Crossley et al., 2012). Nevertheless, the result suggests contrastively using mathematic algorithms as a hit road of simplification. The reason for this is that teachers and material developers need a fixed-measurement to simplify texts with a specific accessibility stance and prediction.

Utilizing mathematical approximation can minimize unpredictable language simplification becoming overly artificial which affects readers' linkage to the information. The natural aims of texts must also be omitted, as their socio-cultural content is reduced (Crossley et al., 2007; Johansson, 2006; Simonsen, 2019). According to Tomlinson (2011), teaching materials or texts should expose students to language in its natural context. It means the text simplification should not be too artificial. Then, proclaiming that texts, in a pedagogical sense in this research, tend to be communicative rather than formal and professional, the LD found is confidently suggestible because the indexing can maintain text difficulty levels.

Secondly, the teachers need to be attentive to the use of nominalization in sentences. Its congruent (verbal) form could make sentences clearer, more concise, and simpler as readability and LD can be adjusted to a certain rate. With respect to the approximation results, nominalization can maximize information with only one clause presentation with a lexically dense sentence. Fang (2005) supports that a nominalized process of an entity can conceal the existence of actors while also leading readers astray in their reading. Tomlinson's principles (2011) suggest that material for pedagogical purposes must assist students to feel at ease and develop their confidence. Not only that, teachers and material developers are also required to be concerned about modifiers because their extensive usage can lead to unclear phrases or clauses. In this regard, material developers and teachers could perform simplification treatment by omitting specific modifiers, and then measure its effects on semantics and lexicography. Nastase et al. (2018) for text simplification can be labelled as crucial (restrictive), not-crucial (unrestrictive), and grammatical. The ideas are in line with the research findings that modifiers can either be removable or discardable. The results recommend to use of a simple pattern of modifiers; pre-modifiers (pre-adj. + N or pre-N + N) or post-modifiers (N + preposition/ single clause) in pedagogical sentences.

To reiterate the word ‘simplification’ is not theoretically identical ‘to shortening’ (Brunato et al., 2015; Petersen & Ostendorf, 2007), however, it is used to create languages readable without changing the meaning of text (Crossley et al., 2007). Following the findings, material developers can consider providing students with various language constructions (complex and/or simple sentences interchangeably). It attempts to give students a depiction of what a real foreign language is about. Nevertheless, teachers and material developers need to split some over-weight modifiers for the adjustment of text readability and compactness purposes. According to Tomlinson (2011), teachers can push students slightly beyond their proficiency, nevertheless, they still cannot make students resentful. Thus, when the authentic sentence is overtly complex with continuous modifiers, splitting them can be the solution to increase the readability of texts and reduce possible risks that come from students.

6. CONCLUSION

The existence of linguistic features in sentences has affected the text’s readability, posing obvious obstacles for students. Lexical Density, Readability, Nominalization, and Modifiers under SFL theory can be used to predict information tightness, readability rate, phrasal or clausal complexities, and possible semantic shifting. This research found the features to be crucial for developing teaching materials from authentic sources whilst simplifying them to meet students’ proficiency in the target language, as proposed by this research both LD and readability of texts must be at a fairly difficult level. Then, the nominalizations’ functions are to present sentences in a compact arrangement, to create fixed collocations to detail the entity, and to be used as cohesion. Nevertheless, the nominalization existence may affect sentence redundancy by interfering the conciseness. On the other hand, modifiers are interchangeable in presenting information with two constructions: simple or explicit forms of a phrase or clauses, and one of each type can reduce ambiguity.

There are some considerations for text simplification to fit the students’ pedagogical demands, those are utilizing a mathematical algorithm (the LD and the readability), unpacking nominalization, measuring the critical appraisal of modifiers based on lexicogrammar and semantic attribution, and splitting some heavy substances of modifiers for reasonable length in sentences. Therefore, before adopting texts for educational purposes, teachers and material developers should evaluate specific linguistic aspects, the manifestation is to increase the accessibility of texts. The recent findings have the potential for that purpose to moderately simplify and reconstruct the language of a text, particularly in preparing texts for educational purposes.

This research has limitations that only focus theoretically on lexical density, readability, nominalization, and modifiers in small investigated corpora. Then, it directed to new inquiries for future research on the same registers to add topic investigation on lexical variations (including synonymy), find larger corpora that can give direct comparison on linguistic features (such as nominalization with its congruent are juxtaposed that later affect text density), fully recognize types of nominalizations, and do both theoretical and practical investigation for more decent consideration for the utility of simplified texts.

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