Readability of PISA-like Reading Texts: A Lesson Learned from Indonesian Teachers

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Abstract

This article discusses the text readability of Programme for International Student Assessment (PISA)-like reading texts written by Indonesian-English-teachers who are teaching in high schools in Jawa Barat province, Indonesia. The aims of the research are to describe the lexical density, grammatical intricacy, and lexical variation indexes of the PISA-like reading texts compared to PISA reading texts 2018 released field trial new reading items. The method applied is a qualitative with descriptive quantification. The qualitative method is employed to identify and describe both lexical and grammatical words, in addition to specifying the lemmas and ranking clauses in the PISA-like reading texts. Quantifying the indexes of lexical density, grammatical intricacy, and lexical variation are implemented. All analyses utilized are based on the systemic functional linguistic approach. It is reported that, firstly, the texts of PISA reading texts 2018 are lexically denser than the PISA-like reading texts. Secondly, the texts of PISA reading texts 2018 are grammatically more intricate than the PISA-like reading texts. Lastly, PISA-like reading texts have similar index with PISA reading texts 2018.

Keywords: grammatical intricacy, lexical density, lexical variation, PISA-like reading texts, readability

1. Introduction

Indonesia as an archipelago country has many local languages. It was reported that Indonesia has 17,504 islands and it has about 718 local languages in 34 provinces. As a country with various local languages, since October 28, 1928 Bahasa Indonesia has become the lingua franca in Indonesia. It was reported by Kwary (2019) that Bahasa Indonesia is utilized as the language used in education and the united language in Indonesia since Indonesia has many ethnic languages (Kwary, 2019).

Since English is one of the main subjects officially learned by the students from the junior high school up to university in Indonesia, English is positioned as one of the foreign languages formally learned in schools. English is learned in Indonesia since it has been used as a tool of communication internationally, as an acquirement of knowledge related to scientific discipline and tech, and as bases for the lexical growth of Bahasa Indonesia as a "modern language" (Diah, as cited in Lowenberg, 1991, p. 129). It was also mentioned that traditionally, teaching English in Indonesia is classified into Teaching English as Foreign Language (TEFL) since English in Indonesia does not refer to previous Britain's colonies or the United States as India, Singapore, and Philippines (Lowenberg, 1991). Some previous studies reported that many reasons indicated the hampers of the success of TEFL in Indonesia including less qualified teachers; they graduate without any training of TEFL (Mistar, 2005; Sulistiyo, 2016). Since the English teachers' skills are necessary to be improved, the institution should provide some professional trainings for the teachers. To become qualified teachers, it is necessary to be trained, not only in pedagogical matters but also the material things. In terms of the richness of materials, they also need to be trained how to write English texts well, so the teachers could transfer their knowledge in reading comprehension.

Programme for International Student Assessment (PISA) is an ongoing program by OECD; OECD stands for Organization for Economic Co-operation and Development that supervises trends in the awareness and ability of the students worldwide. OECD as an international organization was founded 1961 derived from OEEC. OEEC refers to Organisation for European Economic Co-operation (OEEC) which was established in 1948. The OECD has 38 members and 41 partner countries in the world wide. The PISA test covering three different tests (reading, mathematics, and science) which is held three yearly. In line with Hopfenbeck, Lenkeit, Masri, Cantrell, Ryan, & Baird (2018), PISA measures students' the awareness and ability in three main fields: reading, science, and mathematical literacy (Hopfenbeck et al., 2018). The idea of literacy used in PISA refers to the aptitude of students to implement awareness and ability and to examine, reason, and communicate effectively as they pose, resolve, and decipher problems in any kind of circumstances (Brozo, Shiel, & Topping, 2007). Indonesia has already participated to be one of the partner countries for seven times, from 2000 to 2018. The next PISA test hold in 2022 since the OECD member countries have decided to postpone the 2021 assessment. The OECD reported that the PISA 2022 concentrated on math with supplementary test of creative thinking ("Programme for International Student Assessment (Next step)," 2022).

As mentioned earlier, the PISA test focuses on the three subjects and the assessment scales of the 15 years old ability in the three of them. This present research focuses on one of the subjects, that is reading test.

It was reported by the Head of The Early Childhood and School Division, Directorate of Education and Skill of OECD, that in 2018 the Indonesian students' result of reading score is 371 from OECD average is 487. In details, the following figure describes the trends of performance in reading for Indonesia (2000-2018) ("Country Note - PISA 2018 Results," 2019).

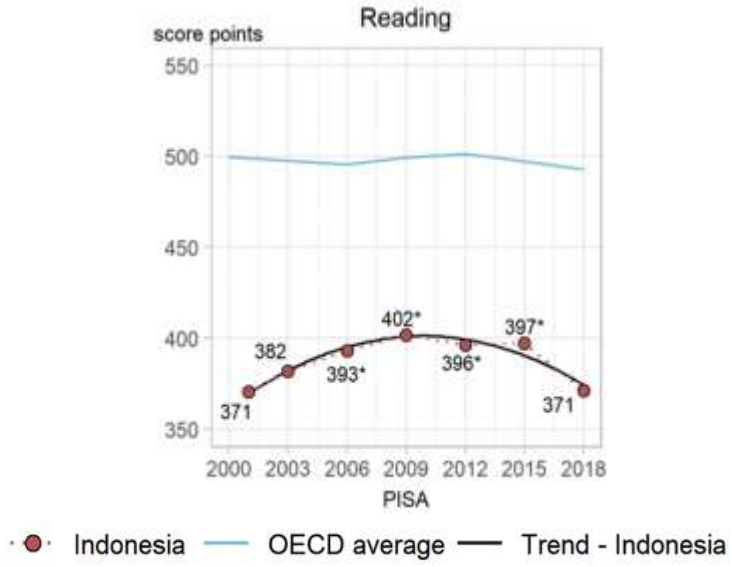

Figure 1. Trends of Performance in Reading - Indonesia (2000-2018)

("Country Note - PISA 2018 Results," 2019)

Figure 1 portrays the Indonesian students in reading since Indonesia participating PISA assessment in 2000 up to 2018. It is indicated that the Indonesian students' reading performance is below OECD average. The highest point achieved by the Indonesian students is 402 points in 2009 but it is still under the OECD average (500 points). The lowest points achieved in the seven assessments is 371 points in 2000 and 2018. The figure describes that the Indonesia government has an unfinished homework on it. The government should have a proper strategy in improving the knowledge not only the students but also the teachers, especially the language teachers in Indonesia.

Teachers have an important role in improving students' literacy. The teachers should be more active in involving the students in reading activities to improve the students' literacy. Besides being more active, the teachers should apprehend the appropriate text for the students' ability in reading according to their level. The reading texts for grade 8, for example, should be more complex than the grade 7 and the reading text for grade 8 should not be more complex than grade 9 indubitably. To treat the problem, it is a must for the teachers to comprehend the text readability adequately related to the capability of the students. To improve their capability in reading, the teachers can share the selected reading texts from the various resources or even produce the reading text which were written by themselves.

Writing is a skill therefore it needs more an appropriate experience to sharpen their ability to improve their knowledge on it. Writing experience consists of a set of events that are cut into significant change by the grammar of its clause (Halliday & Matthiessen, 2004) .

This research attempts to portray the readability of the English-teachers' texts and all the teachers are Indonesian. The teachers are teaching English in some junior and senior high schools in Jawa Barat province, Indonesia. The researchers focused on the teacher's text readability through some components such as the words number, the lexical items number, the grammatical items number, the ranking clauses number, the clause complexes number, and the lemmas. The components measure lexical density index, grammatical intricacy index, and lexical variation index and they relate to the PISA-like reading texts compared to PISA reading texts 2018 released field trial new reading items.

On the basis of the issues mentioned above, the purposes of the investigation are (1) to capture the lexical density of the PISA-like reading texts compared to PISA reading texts 2018, (2) to describe the grammatical intricacy of the PISA-like reading texts compared to PISA reading texts 2018, and (3) to describe the lexical variation of the PISA-like reading texts compared to PISA reading texts 2018.

2. Literature Review

Many researchers did their research on text readability and complexity, including lexical density, such as a study on the readability of the human-machine conversation transcriptions in the instant messaging on the bases of the Gunning-fog index (Goh, Fung, Depickere, & Wong, 2007); a research on a text readability related to post-secondary readiness (Williamson, 2008); an investigation on the density of lexical and the diversity in the students' writing paragraph at the Universitat de València (Gregori-Signes & Clavel-Arroitia, 2015); an

investigation on the reading level of the abstracts Biology and Linguistics (Sujatna, 2016); a research on text complexity on Senior High School English Textbooks (Putra & Lukmana, 2017); an investigation on the English proficiency in Indonesia (Renandya, Hamied, & Nurkamto, 2018); a study on grammatical complexity (Lan, Liu, & Staples, 2019); a research on *Bahasa Inggris* textbook for grade X and its readability on the transactional texts (Sujatna, 2019). From the researches mentioned there is no research of the readability of the text related to the PISA texts. The research related to PISA reading text is an urgent one since it could be referred by the teachers in giving reading texts for the students, especially the teachers in Indonesia.

Scrutinizing texts related to its readability becomes more significant for the teachers. By exploring the texts carefully, it could make the teachers easier in choosing the texts for the students regarding the text readability related to their level. Beside selecting the texts, the teachers could also produce the texts related to the readability in accordance with the level of the students.

The readability of texts is various and the readability refers to the writers' ability in using vocabulary and grammar to form a complex language (Renandya et al., 2018). Text readability or linguistic issue is essential to the contemporary science; nevertheless, its scrupulous definition has still been an open discussion (Putra & Lukmana, 2017). Readability is an important topic for practitioners as well as researchers in a wide range of fields and interests (Bailin & Grafstein, 2016). Kwapien, Drozdz & Orczyk (2010) argued that among the linguistic characteristics of written texts that can influence the degree of difficulty. In 1969, Gunning offered a formula called Fog Index to measure the readability of texts (Gunning, 1969) while formerly Spache (1953) had discussed readability formula, he discussed a new readability formulation for primary grade reading substantial (Spache, 1953).

Complexities become a pedagogical implications of World Englishes (WEs) in second language (L2) writing, employing academic texts produced by non-native speakers of English have been treated with reservation by ESL (English as a Second Language) teachers (Hernandez, 2020). It was reported that grammatical complexity is a significant point in L2 writing while this attempts to reveal the text readability of the English-teachers' writing as a study case in Indonesia (Lan et al., 2019). This research is conducted to help the teachers in producing texts before giving them to the students as reading exercises related to their students' level. To measure readability, in this research, the authors' concern is three main issues: lexical density index, grammatical intricacy index, and lexical variation index.

The students' readability level is determined by lexical density and lexical variation (Sujatna, Heriyanto, & Setiadi, 2021). Lexical density of a text as one of the lexical richness measurements could be counted by the percentage of lexical words in the total number of words (Daller, Van Hout, & Treffers-Daller, 2003). It was informed by some linguists that lexical density provides a measure of the proposition of lexical items (i.e. nouns, verbs, adjectives and some adverbs) in the text (Halliday, 1989; Johansson, 2008). The lexical density is the ratio of lexical words vs. function words (Halliday & Webster, 2009). Ure (1971) and Halliday (1985) reported that a lower density text is more easily perceived and a lower lexical density level in a spoken text is easier to be perceived than a written text (Gregori-Signes & Clavel-Arroitia, 2015; Halliday, 1985; Ure, 1971). Ure (1971) concluded that a spoken text, generally, has a lexical density under 40%, while a written text, commonly, has a lexical density of 40% or higher (Johansson, 2008). The written language commonly has a higher lexical density level than spoken language (Eggins, 2004; Gerot & Wignell, 1995; Halliday & Matthiessen, 2004; Presnyakova, 2011; Syarif, 2019). A text with a high number of lexical items comprises more information than a text with a high number of function words, i.e. conjunction, pronouns, prepositions, interjections and count words (Johansson, 2008). There is an argumentation of adverb whether it is categorized into a lexical item or grammatical item. In line with Halliday (1985) and Johansson (2008), the word *up* (to give up) is an adverb which is classified into grammatical item while an adverb is derived from adjective is categorized into lexical item (Halliday, 1985; Johansson, 2008). It was reported that text lexical density is acknowledged has a significant component written language readability (Halliday, 1989).

Of the three elements related to readability, the first important element discussed in this article is lexical density index. This article applied Halliday's lexical density formula (LD index) which indicates that the amount of lexical items per clause should be concerned as described in the following (Castello, 2008; Halliday & Webster, 2009):

$$\text{LD (index)} = \frac{\text{Total number of lexical words}}{\text{Total number of ranking clauses}}$$

The formula above portrays the lexical density index which is counted from the total number of lexical words divided by the number of ranking clauses.

The second important element discussed in this article is a grammatical intricacy index. The grammatical intricacy index refers to the number of clause complexes revealed in a text compared to the number of ranking clauses. The grammatical intricacy is the measure of tactic complexity in the clause complexes (Halliday & Webster, 2009). In line with the opinion that text complexity concern the vocabulary difficulty (Putra & Lukmana, 2017). The grammatical intricacy index has a correlation with the information found in a text. The more clause complexes than the ranking clauses found in the text, the more complex it is. In other way, it could be said that the more clause complexes than the ranking clauses, it would be a higher grammatical intricacy index, on the contrary, the more ranking clauses than the clause complexes it would be lower grammatical intricacy index. Eggins (2005) argued that grammatical intricacy index pertains to the number of clauses per sentence or clause complexes and the average of counting by denoting the amount of clauses in a text as a portion of the number of sentences in the text (Syarif, 2019).

$$\text{GI (index)} = \frac{\text{The number of ranking clauses}}{\text{The total number of clause complexes}}$$

The formula shows that the number of ranking clauses divided by the total number of clause complexes is needed to find out the grammatical intricacy index. Ranking clause means the clauses (clause simplexes) found in the text while the complex clauses are two or more clause simplexes combination in one sentence.

Another important element of text readability discussed in this article is a lexical variation index. As the third element discussed, the lexical variation index relates to the number of different lexical words compared to the total number of lexical words, in line with the opinion that "repetition reduces the effect of density" (Halliday, 1989). When there are two texts with a similar number of lexical items, but one text consisting lexical items which were mentioned many times than the other, then the first text is likely recognized as easier than the second one. The following is the formula to calculate the lexical variation (Castello, 2008).

$$\text{LV (index)} = \frac{\text{Number of different lexical words}}{\text{Total number of lexical words}}$$

The formula shows that the lexical variation is gained from the number of the different lexical words divided by the number of lexical words in total.

The three indexes are lexical density (LD), grammatical intricacy (GI), and lexical variation (LV), mentioned previously are referred and applied to measure the readability of the PISA-like reading texts and the indexes were compared to PISA 2018 released field trial new reading item index as the standard.

3. Research Method

3.1 Research Design

The research expounds the readability of the PISA-like reading texts compared to the PISA reading texts 2018 (ETS, 2019) especially related to three categories: lexical density (LD), grammatical intricacy (GI), and lexical variation (LV).

The method implemented on this research is a qualitative with quantification descriptively to analyse those sections (Creswell & Creswell, 2018). The qualitative procedure employed is to identify and describe both lexical and function words and to specify the ranking clauses in the PISA-like reading texts. Texts and images as the data collected could be applied in qualitative approach (Fraenkel & Wallen, 2009). This research also employs a simple descriptive statistics as Creswell (2003) mentioned it is used to investigate the phenomena found in the data (Hendrawan et al., 2022).

Quantifying the indexes of lexical density, grammatical intricacy, and lexical variation previously discussed, are implemented. All analyses utilized are based on the systemic functional linguistic approach.

3.2 Sample and Data Collection

To depict the level of the readability levels of the texts, the researchers firstly describe the lexical density, the grammatical intricacy, and the lexical variation of the four PISA reading texts which were taken from PISA reading texts 2018 (ETS, 2019). Then, the researchers compared the result of four PISA reading texts 2018 to the eleven PISA-like reading texts.

The research focused on the PISA-like reading texts which were written by the Indonesian teachers. The eleven PISA-like reading texts compared PISA reading texts 2018 were produced by the English teachers who teach in state and private schools of junior high in Jawa Barat province, Indonesia. The data collected were analyzed based on the lexical density, the grammatical intricacy, and the lexical variation of the PISA-like reading texts compared to PISA reading texts 2018.

3.3 Analyzing of Data

The data acquired were analyzed on the basis of Systemic Functional Linguistics or SFL approach pioneered by Halliday. The eleven texts were classified as an amount of words, lexical items, grammatical items, lemmas, clauses, and clause complexes to investigate the lexical density index, grammatical intricacy index, and lexical variation index based upon the SFL approach.

In the next step, the identified data were tabulated for lexical density index, grammatical intricacy index, and lexical variation index including both lexical and functional words found in both PISA reading texts 2018 and PISA-like reading texts. The phrasal verbs found are counted as one datum, the tense was also considered as depicting one verb. Moreover, a clause was defined as a group of words consisting one predicator while clause complexes are defined as number of clauses that are combined and they could be two or more clauses combined. Lastly, the comparison concerning lexical density, grammatical intricacy, and lexical variations indexes of the PISA-like reading texts are described.

4. Results

This part, as the outcomes of the study provided for the purpose of answering the research identifications. The first research question focused on the lexical density of the PISA-like reading texts compared to PISA reading texts 2018 which were described in Table 1 and Table 2. The second research question concentrated on the grammatical intricacy of the PISA-like reading texts compared to PISA reading

texts 2018 which were illustrated in Table 3 and Table 4. The third research questions emphasized on the lexical variation of the PISA-like reading texts compared to PISA reading texts 2018 which were detailed in Table 5 and Table 6.

Table 1. Lexical Density Index of PISA Reading Texts 2018

	Text				
Features	1	2	3	4	Average
Number of Words	250	371	205	367	298.3
Grammatical items	74	149	83	158	116
Lexical Items	176	222	122	209	182.3
Ranking Clauses	21	30	18	17	21.5
Lexical Density (LD)	8.4	7.4	6.8	12.3	8.7

Table 1 describes four texts taken from PISA reading texts 2018. The number of words, grammatical items, lexical items, and ranking clauses are identified from the four texts from PISA reading texts 2018. The lexical density is counted from the total number of lexical words divided by the number of ranking clauses.

Table 2. Lexical Density Index of PISA-like Reading Texts

	Text											
Features	1	2	3	4	5	6	7	8	9	10	11	Average
Number of Words	499	600	504	378	367	416	260	167	124	118	253	335.1
Grammatical items	224	274	241	187	199	189	116	84	55	51	128	158.9
Lexical Items	275	326	263	191	168	227	144	83	69	67	125	176.2
Ranking Clauses	43	65	62	47	51	71	31	24	11	16	33	41.3
Lexical Density (LD)	6.4	5.0	4.2	4.1	3.3	3.2	4.6	3.5	6.3	4.2	3.8	4.4

Table 2 explains the eleven texts taken from the PISA-like reading texts. Similar to the Table 1, the Table 2 also concerns the number of words, grammatical items, lexical items, and ranking clauses of the eleven PISA-like reading texts.

Table 3. Grammatical Intricacy Index of PISA Reading Texts 2018

	Text				
Features	1	2	3	4	Average
Number of Words	250	371	205	367	298.3
Number of Ranking Clauses	21	30	18	17	21.5
Number of Clause Complexes	5	7	6	12	7.5
Grammatical Intricacy (GI)	4.2	4.27	3	1.42	3.23

Table 3 illustrates four texts taken from PISA reading texts 2018. The amount of words, the amount of ranking clauses, and the amount of clause complexes are detected from the four texts taken from PISA reading texts 2018. The grammatical intricacy is counted from the ranking clauses divided by the total number of clause complexes.

Table 4. Grammatical Intricacy Index of PISA-like Reading Texts

	Text											
Features	1	2	3	4	5	6	7	8	9	10	11	Average
Number of Words	499	600	504	378	367	416	260	167	124	118	253	335.1
Number of Ranking Clauses	43	65	62	47	51	71	31	24	11	16	33	41.3
Number of Clause Complexes	13	22	21	12	19	20	13	8	5	6	11	13.6
Grammatical Intricacy (GI)	3.3	3.0	3.0	3.9	2.7	3.6	2.4	3.0	2.2	2.7	3.0	3.0

Table 4 shows the eleven texts taken from the PISA-like reading texts. Related to the Table 3, the Table 4 also considers the amount of words, the amount of ranking clauses, and the amount of clause complexes of the eleven PISA-like reading texts.

Table 5. Lexical Variation Index of PISA Reading Texts 2018

	Text				
Features	1	2	3	4	Average
Number of Words	250	371	205	367	298.3
Grammatical items	74	149	83	158	116
Lexical Items	176	222	122	209	182.3
Lemmas	119	148	99	139	126,3
Lexical Variation (LV)	0.68	0.68	0.81	0.67	0.70

Table 5 represents four texts taken from PISA reading texts 2018. The amount of words, the grammatical items, the lexical items, and the lemmas are revealed from the four texts from PISA reading texts 2018. The lexical variation are counted from the amount of different

lexical words divided by the total of lexical words.

Table 6. Lexical Variation Index of PISA-like Reading Texts

	Text											
Features	1	2	3	4	5	6	7	8	9	10	11	Average
Number of Words	499	600	504	378	367	416	260	167	124	118	253	335.1
Grammatical items	224	274	241	187	199	189	116	84	55	51	128	158.9
Lexical Items	275	326	263	191	168	227	144	83	69	67	125	176.2
Lemmas	43	65	62	47	51	71	31	24	11	16	33	122.5
Lexical Variation (LV)	0.66	0.66	0.67	0.75	0.70	0.66	0.67	0.72	0.71	0.72	0.89	0.70

Table 6 portrays the eleven texts taken from the PISA-like reading texts. Similar to the Table 5, the Table 6 also examines the number of words, the grammatical items, the lexical items, and the lemmas of the eleven the PISA-like reading texts.

5. Discussion

5.1 The Lexical Density of the PISA-like Reading Texts Compared to PISA Reading Texts 2018

As mentioned previously, the research concerns the readability of PISA-like reading texts. The result of lexical density, grammatical intricacy, and lexical variation indexes of the four PISA texts are described and referred in every parts of the PISA-like reading texts discussion. The four texts are obtained from PISA reading texts 2018. The four titles of the texts are (1) *The Nutritional Value of Milk: Countless Benefit*s!, (2) *Just Say 'No' to Cow's Milk!*, (3) *The Galapagos Islands – A Natural Treasure (the first part – About)*, and (4) *The Galapagos Islands – A Natural Treasure (the second part – Conservation)*. Every PISA-like reading texts written by Indonesian-English-teachers are analyzed and classified into three main groups, specifically lexical density, grammatical intricacy, and lexical variation, then they are compared to the PISA reading texts 2018.

The readability of the texts in this research concerns three main things: lexical density index, grammatical intricacy index, and lexical variation index including both lexical and functional words and the hard words found in each teachers' writing. As stated earlier, this article discussed readability level conducted qualitatively in accordance with Systemic Functional Linguistics. The result of the research is provided in the six tables. The first and second tables refer to the lexical density, the third and the fourth refer to grammatical intricacy, while the fifth and the sixth refer to lexical variation.

Table 1 describes four different texts in which the Text 3 is the shortest among the four ones, it contains 205 words while Text 2 is the longest containing 371 words. Although the Text 2 is the longest text in Table 1, this text does not have a higher lexical density index compared to Text 4 as the highest one. The lexical density index of Text 4 is 12.3. It means that a longer text does not imply more difficult to comprehend than the shorter text since the index of the lexical density of the longer is lower than the short. Concerning the means of the number of words among the four texts, the average is 298.3, the grammatical items is 116, the lexical items is 182.3, the ranking clause is 21.5, and the lexical density index is 8.7 as represented in the Table 1. The table 1 describes the result of the lexical density of four texts taken from PISA reading texts 2018 while Table 2 illustrates eleven lexical density indexes of the PISA-like reading texts.

Table 2 illustrates that the longest Text 2 containing six hundred words while the shortest is Text 10 is consisting one hundred and eighteen words in length. Not all the number of words are dominated by lexical items while Text 5, Text 8, and Text 11 have bigger numbers of grammatical items than lexical items. The highest number of ranking clauses is Text 6 containing seventy one clauses while the lowest number is Text 9 containing eleven clauses. The lexical density index of the eleven texts is various from the lowest 3.2 up to the highest 6.4.

Based on the calculation in Table 2, it is found that the Text 2 as the longest text is not portrayed as a text that has the highest lexical density while Text 9 as the shortest discourse has a higher lexical density than the longest. It is indicated that a discourse containing a high number of words does not imply the difficulty of the text. It shows that a high lexical density implies a high number of lexical items in a clause, at the same time, a low lexical density implies a low lexical item number in a clause.

The higher the lexical density of a text is, the denser the information it supplies, then the more complex the text will be. It is in line with Ure (1971) and Halliday (1985) in principle, texts with a lower density are more easily understood and spoken texts have lower lexical density levels than written texts (Gregori-Signes & Clavel-Arroitia, 2015; Halliday, 1985; Ure, 1971).

Based on the average of the two tables (Table 1 and Table 2), it is reported that the number of words in the PISA-like reading texts (335.1 words) is higher than the PISA reading texts 2018 (298.3 words). It means that the PISA-like reading texts have longer texts than the PISA reading texts 2018. Moreover, the lexical density index of the teacher's texts is lower than the PISA reading texts 2018which is 4.3 in difference. It means that the teacher's texts have a lower number of lexical items in a clause than the PISA reading texts. From the comparison of the components (the number of words and lexical density index) it could be summarized that a longer text does not represent a higher lexical density.

Besides the lexical density index, the grammatical intricacy index is also one of the important elements in calculating readability. Table 3 shows the grammatical intricacy index of the four texts taken from PISA reading texts 2018. It illustrates that the amount of words, the amount of ranking clauses, and amount of clause complexes are the elements to measure the grammatical intricacy index as one of the readability factors. As some linguists stated that the readability of a text could be considered through the grammatical intricacy of the text

(Halliday & Matthiessen, 2004). The grammatical intricacy index is calculated from the total number of ranking clauses divided by the total number of clause complexes.

5.2 The Grammatical Intricacy of PISA-like Reading Texts Compared to PISA Reading Texts 2018

Table 3 describes the grammatical intricacy index of PISA reading texts 2018. It is illustrated in Table 3 that the grammatical intricacy index of Text 1 is 4.2, Text 2 is 4.27, Text 3 is 3, Text 4 is 1.42. Meanwhile, the average of the four grammatical intricacy index is 3.23. It is calculated from the total ranking clauses divided by the total clause complexes from the four PISA reading texts 2018.

Table 4 describes the grammatical intricacy of the PISA-like reading texts. It also describes the amount of words, the amount of clauses, and the amount of clause complexes of each from the eleven PISA-like reading texts. It is described that the longest text in the Table 4 is Text 2 consisting of six hundred words which has twenty two clause complexes and sixty five clauses in total. Meanwhile, the shortest is Text 10 consisting of a hundred and eighteen words which has six clause complexes and sixteen clauses in total. On the basis of the number, it is illustrated that the grammatical intricacy of the longest text (Text 2) is 3.0 while the shortest (Text 10) is 2.7. A high grammatical intricacy index implies, in some extent, a high number of clauses that are combined with the clause complexes. On the other hand, a low number of clauses that are combined with clause complexes produces a low grammatical intricacy index. If the two texts are compared, the longest has a higher grammatical intricacy index than the shortest. It is implied that the shorter text does not mean easier to understand than the longest, since the Text 2 (the longest text) has a higher grammatical intricacy index than the Text 10 as the shortest text. The higher the grammatical intricacy index of a text is, the more intricate the clause of the text will be.

As described in the Table 4, there are eleven PISA-like reading texts and the average of the grammatical intricacy is 3.0. It is reported that the grammatical intricacy of the PISA texts' average is slightly higher than the grammatical intricacy index of PISA-like reading texts. The grammatical intricacy index of the PISA texts' average is 0.23 higher than the PISA-like reading texts. It means that the texts of PISA reading texts 2018 are grammatically more intricate than the PISA-like reading texts.

5.3 The Lexical Variation of the PISA-like Reading Texts Compared to PISA Reading Texts 2018

As stated earlier, the readability concerns three main things: lexical density, grammatical intricacy, and lexical variation indexes. As the last element mentioned, lexical variation or sometimes called lexical diversity (Malvern, Richards, Chipere, & Duran, 2004) is another important measure of text readability. To calculate the lexical variation index of each, the Table 5 and Table 6 describe the number of grammatical items, the lexical items, lemmas that support the measurement of lexical variation index from the eleven PISA-like reading texts obtained. The lexical variation is based on the result of the calculation of the number of different lexical words or lemmas divided by the total number of lexical items (Castello, 2008) as described in Table 5 and Table 6.

Table 6 shows that there are three texts having the lowest index (0.66) of lexical variation index, they are Text 1, Text 2, and Text 6 while the highest one is Text 11 (0.89). It is described that the Text 11 containing two hundred and fifty three words and it is the highest lexical variation index. It indicates that a long text or even the longest one has not always contained the highest number of lexical variation. The short text is possible to have a high lexical variation since it has a higher number of different lexical words or lemmas than the others and the higher lexical variation in a text will affect its readability. Two tables (Table 5 and Table 6) show a similar lexical variation index on average, that is 0.70. It means that the Indonesia teachers are able to produce the lexical variation in their PISA-like reading texts.

6. Conclusions

This research is an effort to describe the readability of the PISA-like reading texts which are compared to PISA reading texts 2018 which were released by the OECD. In this article, lexical density index, grammatical intricacy index, and lexical variation index were applied to measure the readability of the texts.

The research conducted is based on the four texts obtained from PISA reading texts 2018 as the reference. The four texts taken as the data are (1) *The Nutritional Value of Milk: Countless Benefits!*, (2) *Just Say 'No' to Cow's Milk!*, (3) *The Galapagos Islands – A Natural Treasure (the first part – About)*, and (4) *The Galapagos Islands – A Natural Treasure (the second part – Conservation)*. The analyses of the four texts relate to lexical density index, grammatical intricacy index, and lexical variation index are used as the basis of the research. The texts are referred as the data in this research are eleven PISA-like reading texts. The result of the research is shown in the following Figure 1.

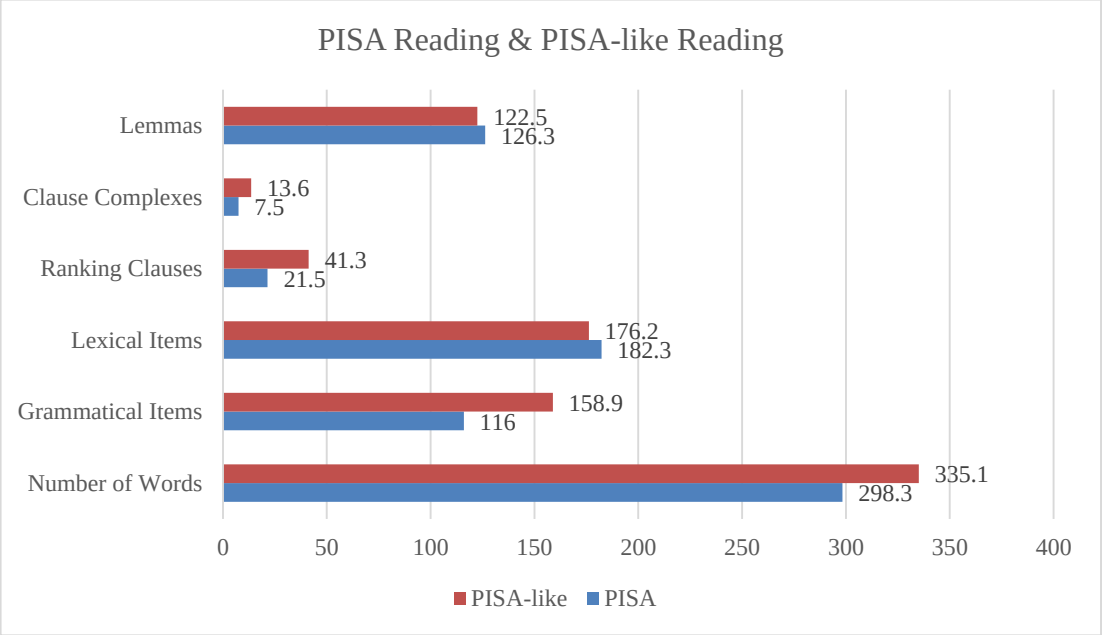

Figure 2. PISA Reading Texts 2018 & PISA-like Reading Texts

Figure 2 describes the average of the components found in PISA reading texts 2018 and PISA-like reading texts. The components involved are a number of words, grammatical items, lexical items, ranking clauses, clause complexes, and lemmas. From the Figure 2, the average of the number of words for PISA-like reading texts is 335.1 words and it is higher than the PISA reading texts 2018 (298.3 words) which is 36.8 in differences. The average of the grammatical items PISA-like reading texts (158.9 items) is higher than the PISA reading texts 2018 (116 items) which is 42.9 in differences. On the other hand, the average of the lexical items of the PISA-like reading texts are slightly lower than PISA reading texts 2018 which has 6.1 in differences. The average of ranking clauses of PISA-like reading texts results a higher number than PISA reading texts, it has 19.8 in difference. The Figure 2 also shows that PISA-like reading texts have more clause complexes than PISA reading ones in average. On the contrary, the average of lemmas in PISA-like reading texts has 3.8 lower than PISA reading texts 2018.

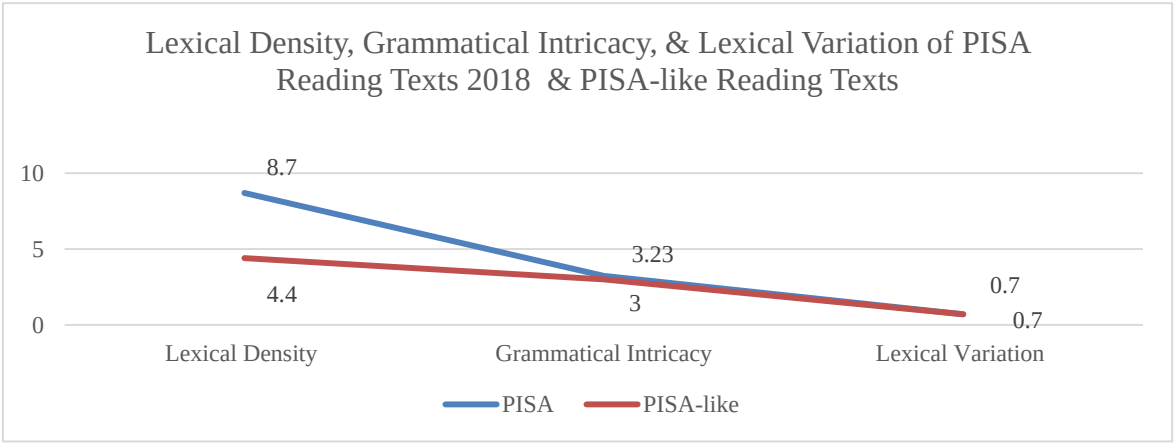

Figure 3. Lexical Density, Grammatical Intricacy, and Lexical Variation of PISA Reading Texts 2018 & PISA-like Reading Texts

Figure 3 portrays three important elements of readability in texts; lexical density, grammatical intricacy, and lexical variation. The three elements of readability found in the four PISA reading texts 2018 and eleven PISA-like reading texts. It was reported that, firstly, the average of the lexical density index of PISA-like reading texts is 4.3 lower than the PISA reading texts 2018. It means that the texts of PISA reading texts 2018 are lexically denser than the texts of PISA-like reading texts. Secondly, the grammatical intricacy index of the PISA-like reading texts is 0.23 lower than the PISA reading texts 2018. It implies that the texts of PISA reading texts 2018 are grammatically more intricate than the texts of PISA-like reading texts. Lastly, another important element, both lexical variation index of PISA reading texts 2018 and the PISA-like reading texts are 0.7. That is to say that the PISA-like reading texts has a similar index with PISA reading texts 2018.

Based on the result of the research, it could be summed up that the grammatical intricacy indexes and the lexical variation indexes of the PISA-like reading texts have reached the level of PISA reading texts 2018 but the lexical density indexes of the PISA-like reading texts have not reached yet.

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Conflicts of Interest

All co-writers have no controversy of any nature to declare or to report.

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