ANALYSIS OF TEXT READABILITY IN INDONESIAN LANGUAGE TEXTBOOKS USING FRY GRAPH FORMULA

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Abstract: Textbooks are one of the materials or resources used in the teaching and learning process in schools. Learning Indonesian language cannot be separated from the use of textbooks. In using textbooks, teachers must consider several aspects, especially text readability. This study aims to measure of text readability in Indonesian textbooks using the Fry Graph Formula and to determine the readability of the text contained in the Indonesian Language Textbook using the Fry Graph Formula, and to find out the suitability of the text used in the book with the student's school level. The present study applied the descriptive analysis and quantitative approach method to count and analyze texts in several Indonesian language textbooks readability using Fry graph formula. Three Indonesian language textbooks with 45 measured text in 11th grade were analyzed. This study found that 25 texts showed the results " Not Appropriate ", 16 texts showed the results "Appropriate " and 4 texts showed the results "Invalid". Based on analysis, the number of readability of text in Indonesian language textbooks was easy for textbooks at 11th grade.

Keywords: Readability; Fry Graph Formula; textbook; Indonesian language; Learning

INTRODUCTION

Language is a tool used to communicate and interact with other people. Language becomes a tool of unifying the nation and means of communication. In addition, language, which is basically tied to people's life, is changing (not fixed) which results in language changing according to life in society, so language is also said to have a dynamic character. The language changes occur at all levels of language, including phonemes, morphemes, syntax, semantics and lexicons (Byram & Wagner, 2018).

As part of society, education is closely related to language. It is also learning the language both in school and in college, namely Indonesian as the language of unity. In language learning, we recognize language skills. Language skills consist of four language skills, namely listening skills, speaking skills, reading skills, and writing skills (Gilakjani, 2017). Reading is an activity to understand the content of textbooks which is part of language skills. Reading contributes to the achievement of language learning outcomes and the success of other skills. Good reading skills make students more creative and communicative in understanding knowledge, identifying and solving problems in learning activity (Penick & Harris, 2006). Therefore, reading is one of important aspects in learning language and other disciplines.

In learning Indonesian language, the teacher must concern to reading material that can be read by students. Reading material is important enough for the teacher to select as long as it can improve students' ability to understand the material. Language textbooks used in learning activities can help students to understand the material properly. The ability to determine the right textbook is a basic skill that must be possessed by teachers. In Indonesia, there is a selection of textbooks available under the guidelines for the National Curriculum Standards in Indonesia (Curriculum 2013) (Gunawan, 2017). The electronic version of Indonesian textbooks is widely used by teachers and students in teaching because the material is more

in accordance with the indicators to be achieved. As a language educator or teacher, the readability of the textbooks they recommend for use in the class they teach is essential. Therefore, it is important to recognize that in many resource-deficient classrooms, textbooks have a higher role in the teaching and learning process as they may be the only teaching resource on which teachers explain their explanations. this situation places high responsibility on the quality of the textbook itself in meeting appropriate criteria regarding the age of the student, educational and cultural background, and linguistic proficiency. Textbook writers need to be guided by these requirements. Therefore, the teacher's ability to determine and to analyze the level of textbook readability is required for effective teaching and learning (Chen & Meurers, 2018; Kasule, 2011). Thus, the readability of textbooks is an interesting research focus, especially on Indonesian language textbooks.

In measuring the readability of a reading material, various formulas for readability are usually used. The formulas used to measure readability which refer to the factors that affect readability are formulas based on Fry Graphs (Fry, 1977) . Fry graph is a formula that can be used to measure the readability of a text. The name of the fry chart comes from the name of the person who studied it named Edward Fry, which became known as the fry chart (Misra et al., 2013). The fry graph measures readability based on two factors, namely the length of the word and the difficulty of the word which is indicated by the number of the syllables that make up each word in the textbook (Fitzgerald, 1981; Misra et al., 2013). The fry graph formula is actually intended to measure the readability of English text. However, for Indonesian language textbooks researcher has to add step to determine the readability of a text.

A lot of textbooks are used in the learning process, both those issued by the government and other publishers. The majority of these books have been assessed for the quality of textbooks at the Book Center. One of the criteria for assessing the quality of textbooks is readability assessment. The process of testing the readability of text in textbooks conducted by the Book Center focuses on the reader's understanding of the text being read in relation to the suitability of meaning, moral values and learning objectives (Sulistyanto & Wiyono, 2008). In other words, the assessment of textbook readability by the Book Center has not focused on the number of syllables and sentences used in the text used in learning. This condition is inspiring the researcher to test the readability of the text in the textbook by focusing the test on counting the number of syllables and sentences.

Textbooks have benefits as a support in the learning process in schools are now available everywhere, there are various kinds of publishers and writers who print textbooks for use in the learning process. We as prospective teachers or even teachers must consider teaching materials such as textbooks to be used in the learning process in the classroom. Therefore, students are able to easily understand what is being said and learned based on textbooks. Therefore, this study aims to determine the readability of the text contained in the Indonesian language textbooks using Fry graph formula, and to determine the suitability of the text used in the book with the student's school level.

LITERATURE REVIEW

This section is literature review section explaining some related knowledge about textbook readability and related recent studies. We construct this section into four subsections, namely textbook and reading skills, the readability, measuring readability using Fry graph formula, and recent studies of textbook readability.

Textbook and reading

Textbook is also a reference book used by schools which contains learning material to improve knowledge mastery skills based on educational standards and the curriculum (Hernawan et al., 2017). In a Textbook there is text which is part of the textbook. Text is defined as a language unit used as an expression of a social activity both orally and in writing with a complete thinking structure (West, 2019). In learning Indonesian, it is always related to the text, even in textbooks there are lots of texts. There are various types

of text such as anecdotal text, exposition text, observation report text, procedure text, negotiation text, short story text, description text, explanatory text, review text, news and novels (Isodarus, 2017).

Reading is a process that is carried out and used by readers to get messages, which the writer wants to convey through the media of words or written language (Henry, 2008). Reading activities are usually carried out intentionally or unintentionally, in order to get messages or information from what is read. Likewise, writers make reading material because it is to provide information to readers. From a linguistic point of view, reading is a process of encoding and decoding (a recording and decoding process), in contrast to speaking and writing which actually involve encoding. An aspect of decoding is connecting written words with the oral language meaning which includes converting the written / printed words into meaningful sounds (Henry, 2008; Mackey et al., 2006; West, 2019). We can assume that reading is a receptive activity, which is receiving all information in the form of a decoding process. While writing and speaking are productive in nature, namely producing written and oral information. In addition, reading can also be interpreted as a method that we use to communicate with ourselves and sometimes with other people, namely communicating the meaning contained or implied in written symbols. In fact, there are some writers who seem to think that "reading" is the ability to see written symbols and change written symbols through phonics (phonics = a method of teaching reading, speech, spelling based on phonetic interpretation of ordinary spelling) being to oral reading. Reading can also be considered as a process of understanding between the lines, seeing the thoughts contained in written words (Anderson & Cheng, 2004).

The readability

Readability can be defined as whether a particular reading material is read or not by the reader. Readability questions the level of difficulty and convenience of a particular reading material for a certain reader rating (Himala, 2016; Pramuwibowo, 2015). We can conclude that readability is a matter of whether or not a text is readable which is influenced by the readability and difficulty of reading material to be understood by readers. This relates to the reader's ability to understand the content of the reading. Readability can also be interpreted as the level of ease of the text to read and understand. People who read what is written don't want to be forced or tortured to bother to understand what is written (Mulyadi, 2015). Therefore, the writer must try to make the reading easy to understand so that the problem of understanding or not can be resolved. With readability, it can help every reader read reading material according to their level of understanding, so that readers don't feel forced to understand a reading material.

Widyaningsih and Zuchdi (2015) stated that the level of readability must be in accordance with the level of the reader's ability. So that we can conclude that the harmony between the readability level and the readability level of the reader will greatly affect the reader's understanding of the text they read. If the readability level is equal to the reader's ability level, the reader will find it easier to understand the text they are reading. If the reading ability level is limited while the readability level is high, it is certain that the reader will have difficulty understanding the text. in relation to readability and book preparation there are signs that must be considered (Crossley et al., 2017; Mackey et al., 2006). There are several guidelines for compiling a textbook: (1) the frequency distribution of vocabulary that can be absorbed by elementary school students; (2) Range: the measured range, how far the words in the textbook are used;(3) Availability: how far is the use of vocabulary, sentence structure, and other forms of language in supporting the contents of the book;(4) Learn ability: a measure of the level of difficulty: words, sentences learned by students.

In this study, researchers chose to use the fry graph formula as the formula used to measure the readability of the text, because according to the literature review, the fry chart is a relevant graphic used to test text readability. When compared with other readability formulas, the fry graph is able to measure the readability of the text before teaching and learning activities begin, meaning that the text can be tested without involving the reader. Meanwhile, other formulas always involve the reader in measuring the readability of the text.

Measuring readability using Fry graph formula

Measuring readability involves several pivotal factors. The four factors influence readability, namely: style (including semantic and syntactic elements), content (including propositions, organization, coherence), structure (including chapters, headings, and navigation), design (including typography, format, and illustrations) (Crossley et al., 2017; DuBay, 2015). Reading activity is an interactive process implying the existence of text-based, reader-based, and writer-based factors regarding readability. Not all factors are able to carry out a readability analysis because there are factors related to communicating meaning such as print readability, clarity and relevance of illustrations, and conceptual difficulties. In addition there are factors closely related to the subject of the reader such as faulty top-down and bottom-up processing; lack of motivation; excessive motivation; familiarity with the topic; linguistic skills; and questions that are misleading or unfocused, so a test or formula is needed to measure the level of readability (Benson, 1998; Cho & Ma, 2020). Therefore, tests that measure the suitability of the readability level provide a more reliable assessment of the readability of items at a specific level.

To analyze the readability of a textbook, a measuring instrument or formula is needed that is able to measure readability properly and precisely. Fry's graph formula is a measuring tool that is able to assess readability and is easy to use. Graph Fry's formula is taken from the name of the creator, Edward Fry. This formula began to be published in 1977 in the Journal of Reading (Fry, 1977). Fry's readability formula takes a hundred words in a discourse as a sample regardless of the length of the discourse. So, no matter how thick the number of pages of a book is or the length of any reading, the measurement of readability, if you use this formula, someone only uses 100 words (Pebriana, 2021). After calculation of parameters in Fry formula, researchers can plot suitability of the representative text based on student level into Fry Graph (see Figure 1). The benefit of using the Fry graph formula is to measure the readability of a text, so that we will find out a person's ability to make discourse according to the level of readability. After it is known the percentage of student success in making discourse that is in accordance with the level of readability, measurable and well-programmed improvements can be made which in the end make students' skills in making discourse increase.

Recent studies of textbook readability

Measuring the text readability is the pivotal topic in learning language. Chen & Meurers (2018) conducted study to measure the readability of text from a frequency lexical perspective, which showed that the effective use of word frequency for assessing text readability must consider the various characteristics of the distribution of the number of words to categorize text readability. Recent research related to readability assessors was also carried out by Pebriana (2021) on thematic books at elementary level using Fry Graph which showed that the level of readability of thematic books in 4th grade was suitable according to students' abilities. Fry graph formula is still a measurement tool that is considered appropriate and easy to use even though there are recent studies related to the development of text readability measurements (Soh, 2019; Wang et al., 2019).

Pramuwibowo (2015) examined the use of Fry graph in measuring the text readability in Indonesian language textbooks based on 2013 curriculum by ministry of education. This study found that the readability level is relatively easy (88%) based on the characteristics of effective sentences, the level of text readability is classified as difficult (15%) based on the reader's initial knowledge, and the level of readability of the text in the book fits the 7th grader students. Similarly, Fadilah (2016) found that the readability of Indonesian language textbooks at 7th grade and 11th grade published by the ministry of education was not suitable for students. Isabela (2013) also found that the electronic version of Indonesian textbooks in 7th grade published by the ministry of education was not suitable based on the Fry Graph analysis. Therefore, the present study is focused on analyzing the readability of text in Indonesian language textbooks published by the ministry of education. However, to expand and enrich the findings, a comparison of the readability of the text in Indonesian language textbooks published by Yrama Widya (YW) and Erlangga (E) was also carried out.

METHODS

Research design

Quantitative descriptive method was applied in research by using the calculation of the Fry graph formula and expert judgment to assess the validity of the selected text. In quantitative research methods, the philosophy used is post-positivism which examines the results of research which focuses on the variable to be studied in this study, the readability of the text (Creswell, 2002; Sugiyono, 2017). Three experts in the field of Indonesian language and literature consisting of two language lecturers and a senior teacher assessed the completeness of the text. When 45 texts were selected from three different textbooks whereby 15 texts from each book were selected as representative sample in this study, the calculation using Fry Graph formula used to categorized texts into Appropriate, Not appropriate, and Invalid category. We can also assess the level of the text based on Fry Graph.

Materials, instrument, and procedures of data collection

The research materials used in this study were texts from three types of Indonesian language textbooks at the 11th grade level at senior high school. The textbooks are the Indonesian Language Textbook published by Yrama Widya, the Indonesian Language Textbook published by the Ministry of Education, and the Indonesian Language Textbook published by Erlangga. The three books were selected based on the number of representative texts needed in this study and those books was used in teaching activity by teachers. The texts selected as the research data were 15 texts from each textbook. In addition, the text to be used is text that has a minimum number of 100 words because the measurement using the Fry chart formula only requires 100 words or more.

Table 1. Representative text selected based on three Indonesian language books.

Number	Text type or title based on publisher		
	Yrama Widya (YW)	Ministry of Education (ME)	Erlangga (E)
1	Making an Android Smartphone into a Laptop Modem Via USB	Job Interview Tips	Interpreting Poetry
2	Online SIM Service	Four Tips to Not Envy Other People	Snowfall
3	The occurrence of floods	Relieves irritation on Monday	Earthquake
4	Landslide	Mass Demonstrations	Tsunami
5	Poverty	Aceh earthquake	The occurrence of a rainbow
6	Unemployment	Lecture Text	Lecture Text
7	Earthquake	Lecture Text	Lecture Text
8	Moral Decline in Youth Today	About Japan	Make Obstacles Become Bridges
9	Moral Decadence	Sandal Steal Case	Review Text
10	The Importance of Character Education	Review Text	Review Text
11	The rise of promiscuity in society	Review Text	Review Text
12	Our Environment	Review Text	Review Text
13	Character	The Legend of Love Layla-Majnun	Review Text
14	Communicate Fluently by Binding Meanings	Review Text	Review Text

15	Be the Winner of Your Future	Review Text	Review Text

When selecting the texts, the suitability of the text was validated with a triangulation instrument by three experts to determine the categories and a readability calculation was performed using the Fry Graph Formula (Fry, 1977). The complete description of representative text based on the type of books is presented n in Table 1.

Data analysis

After triangulation assessment by expert judgement was done, the data analysis technique ran using manual calculation with Fry Graph Formula. This process was conducted by researchers for each text sample to find the category and the level of readability of texts. The represented formula was used in calculation to find Syllable Average of as below:

$$Syllable\ Average\ =\ Number\ of\ Syllables \times 0.6$$

The number "0.6" is part of the formula for calculating the average syllable and is a form of adding to the formula because the text used is Indonesian language text (Fry, 1977; Hidayati et al., 2018). Besides Syllable Average, we also calculate the Number of Syllables, Number of Main Sentences, Remaining Words in the Last Sentence, Average Whole Sentences as presented in Table 2. Fry Graph is used to determine the readability level of a text.

FINDINGS AND DISCUSSIONS

FINDINGS

In Table 1. We calculated all elements needed to categorize all text samples. The final category obtained from the calculation result readability and comparing with Fry Graph (see Figure 1).

Table 2. Results of calculation of text readability.

No	Title / Text Type	P	Parameter						Category
			SK	KU	S	JKKA	$\overline{X}$ KU	$\overline{X}$ SK	
1	Making an Android Smartphone into a Laptop Modem Via USB	YW	256	5	3	9	5,3	154	Appropriate
2	Online SIM Service	YW	256	4	43	46	5,0	154	Appropriate
3	The occurrence of floods	YW	254	5	7	15	5,5	152	Not Appropriate
4	Landslide	YW	265	7	1	25	7,0	159	Appropriate
5	Poverty	YW	273	7	9	11	7,9	164	Appropriate
6	Unemployment	YW	280	5	18	20	5,9	168	Appropriate
7	Earthquake	YW	238	6	2	14	6,1	143	Not Appropriate
8	Moral Decline in Youth Today	YW	261	5	5	17	5,3	157	Appropriate
9	Moral Decadence	YW	277	5	11	13	5,9	166	Appropriate

10	The Importance of Character Education	YW	264	7	3	13	7,2	158	Appropriate
11	The rise of promiscuity in society	YW	241	6	15	17	6,9	145	Not Appropriate
12	Our Environment	YW	248	7	2	17	7,2	149	Not Appropriate
13	Character	YW	282	9	9	12	9,8	169	Not Appropriate
14	Communicate Fluently by Binding Meanings	YW	258	4	11	14	4,8	155	Appropriate
15	Be the Winner of Your Future	YW	246	6	21	27	6,8	148	Not Appropriate
16	Job Interview Tips	ME	252	6	14	15	6,9	151	Not Appropriate
17	Four Tips to Not Envy Other People	ME	260	6	2	14	6,1	156	Appropriate
18	Relieves irritation on Monday	ME	253	7	9	15	7,6	152	Not Appropriate
19	Mass Demonstrations	ME	274	7	9	19	7,3	164	Appropriate
20	Aceh earthquake	ME	264	7	16	23	7,7	158	Not Appropriate
21	Lecture Text	ME	288	6	14	19	6,8	173	Not Appropriate
22	Lecture Text	ME	249	6	5	10	6,5	149	Not Appropriate
23	About Japan	ME	259	9	5	17	9,3	155	Not Appropriate
24	Sandal Steal Case	ME	272	6	2	13	6,1	163	Appropriate
25	Review Text	ME	253	6	15	19	6,7	152	Not Appropriate
26	Review Text	ME	251	6	15	23	6,6	151	Not Appropriate
27	Review Text	ME	283	6	8	18	6,4	170	Not Appropriate
28	The Legend of Love Layla-Majnun	ME	246	4	17	30	4,6	148	Not Appropriate
29	Review Text	ME	256	12	4	14	12,3	154	Not Appropriate
30	Review Text	ME	245	9	1	7	9,0	147	Not Appropriate
31	Interpreting Poetry	E	260	9	8	11	9,8	156	Not Appropriate
32	Snowfall	E	239	8	4	28	8,0	143	Not Appropriate
33	Earthquake	E	234	6	6	23	6,3	140	Not Appropriate
34	Tsunami	E	246	8	0	17	8	148	Not Appropriate
35	The occurrence of a rainbow	E	257	8	9	11	8,9	154	Not Appropriate
36	Lecture Text	E	278	8	18	32	8,6	167	Invalid
37	Lecture Text	E	276	8	11	15	8,7	166	Invalid
38	Make Obstacles Become Bridges	E	262	7	14	42	7,3	157	Not Appropriate
39	Review Text	E	275	7	5	24	7,2	165	Appropriate
40	Review Text	E	266	5	13	25	5,5	160	Appropriate
41	Review Text	E	249	8	16	17	9,0	149	Not Appropriate
42	Review Text	E	269	8	6	19	8,3	161	Appropriate
43	Review Text	E	258	10	2	16	10,0	155	Not Appropriate
44	Review Text	E	279	7	14	26	7,6	167	Appropriate
45	Review Text	E	259	6	10	19	6,6	155	Not Appropriate

Note: P : Publisher code, WY: Yrama Widya, ME: Ministry of Education, E: Erlangga, SK: the number of syllables per 100 words, KU: the number of complete sentences per 100 words, S: the number of words

remaining in the last sentence per 100 words, JKKA: The number of words in the final sentence per 100 words, $\overline{X}$ KU: the average number of whole sentences, $\overline{X}$ SK: the average number of syllables.

Table 2 shows the calculated data from 45 analyzed texts. The results show the readability level of each text contained in the three books assessed. Then, researcher categorized the readability level at the level of readability based on category showed that "Not appropriate" (25 texts), "Appropriate" (16 texts) and "invalid" (4 texts). The unsuitable level category is intended for text that indicates an unsuitable class from a predetermined class, namely 11th grade, the appropriate level category is intended for text that shows grade results according to 11th grade, and the invalid level category is intended for text that is in the shaded area. the appropriate level category is intended for text that shows grade results according to 11th grade, and the invalid level category is intended for text that is in the shaded area (see Figure 1). 55% of the analysis results show that the text is not suitable with the class level and is below the 11th grade level, so the readability of the text is relatively easy for student at 11th grade.

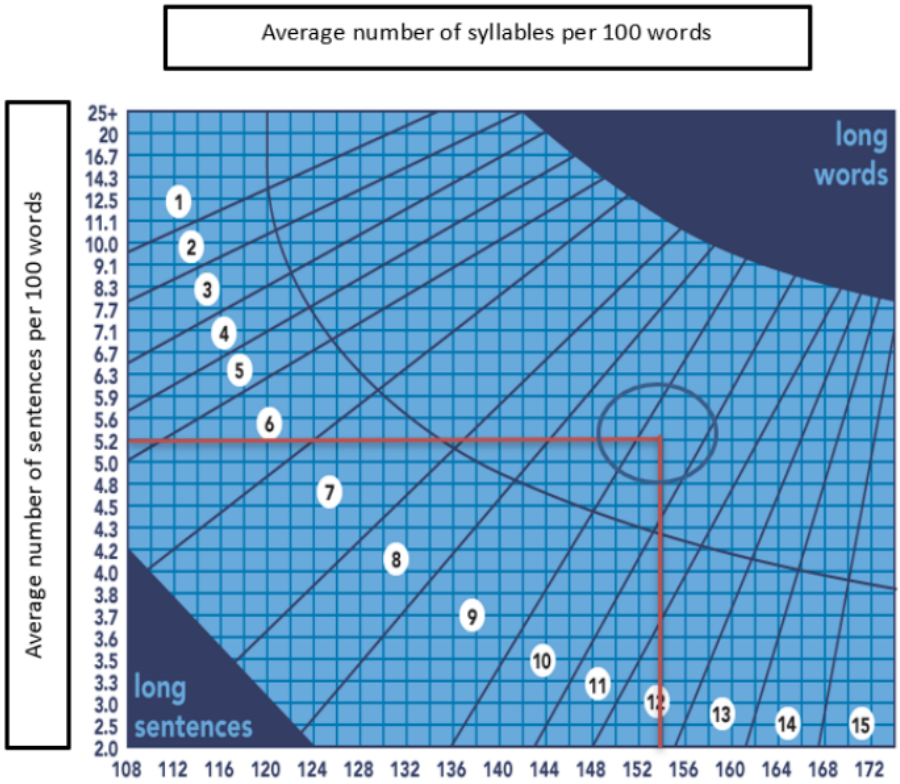

Figure 1. Fry graph mapping sample for Text 1(YW) "Making an Android Smartphone into a Laptop Modem Via USB."

Fry graph can specifically place the readability level of text based on class levels. Figure 1 shows the sample analysis of Text 1(YW) about "Making an Android Smartphone into a Laptop Modem Via USB" in the fry graph. Text 1(YW) in the Fry graph shows that the text is suitable for 10th grade. To make the range more visible, the result of this determination must be added by subtracting and adding by one number. So, (10-1 = 9) and (10 + 1 = 11). The final result shows that this text is suitable for the 9th, 10th, and 11th

grade levels. Based on the results of class determination in this text, if it is included in a predetermined category. This text will fall into the "Appropriate" category because. The class position is right at the appropriate class level, namely 11th grader students.

DISCUSSIONS

The results highlighted important finding related to the text readability of Indonesian language textbooks in the 11th grade as illustrated in Table 2 and Figure 1. The results of the text readability of the 45 texts show that there are 25 texts that fall into the "Not Appropriate" category, 16 incoming texts in the "Appropriate" category, and 4 texts in the "Invalid" category. An interesting point is that Indonesian language textbooks published by the Ministry of Education (ME) have the highest unsuitability in the readability level, 12 out of 15 texts are in the "Not appropriate" category. This finding corresponds with the study by Isabela (2013) and Fadilah (2016) who also found that Indonesian language textbooks published by the Ministry of Education (ME) were not suitable based on readability text even though the Ministry of Education (ME) was the main educational institution that became a pillar development of textbooks in various disciplines at various levels of school. This fact indicates that the readability analysis of a learning book needs to be done and adjusted based on the development of learners' knowledge. Indonesian language textbooks published by Yrama Widya (YW) and Erlangga (E) are more matching with the 11th grade level based on readability analysis.

Based on the level of readability of Indonesian textbooks at the publishers of the Ministry of Education (ME), Yrama Widya (YW) and Erlangga (E). The level of text readability in Indonesian textbooks is relatively easy because most text levels are below 11th grade. This result is in line with study by Pramuwibowo (2015) which showed the readability level of Indonesian textbooks based on the 2013 curriculum is relatively easy with a percentage of 88% . Similarly, Widyaningsih and Zuchdi (2015) also stated in his research that Indonesian language textbooks at the elementary school level were classified as easy to read. Understanding the suitability of the text readability in a textbook helps teachers to make good learning preparation. Thus, they can adjust and choose the right teaching materials. The fry graph formula is a readability measurement tool that is easy to use globally.

CONCLUSIONS AND SUGGESTIONS

Text readability in Indonesian Language Textbooks at 11th grade using the Fry graph formula showed that the selected texts had been adjusted to the requirements for measuring readability using the Fry graph formula as representative texts. The results showed the readability of the text which amounted to 45 texts from three Indonesian Textbooks including to several categories namely "Not Appropriate", "Appropriate", and "Invalid". The readability of the 45 texts showed that there were 25 texts that fall into the "Not appropriate" category, 16 texts are included in the "Appropriate" category, and 4 texts fall into the "Invalid" category. However, the texts contained in all three textbooks were still relatively easy to read for students in the 11th grade. We suggested this study could encourage other studies related to readability analysis using the Fry chart formula. By using the Fry chart formula as a measure of the readability level of the textbooks, the teacher will be better in preparing the learning process in the classroom. However. Researchers also suggest to combining various formulas to measure the level of readability in further studies (Bozkurt, 2020; Soh, 2019; Wang et al., 2019) so that further studies will be more comprehensive and complex.

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