

Research Article

# SMOG (Simple Measure of Goobledygook) Readability Index in Selecting Reading Materials and Reading Literacy Skills of Primary School Student

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## Abstract

Reading materials for elementary school students generally do not have readability in accordance with the measurement results so that the literacy level of students is low, as shown by the survey results from the United Nations Educational, Scientific and Cultural Organization which noted that the literacy level of Indonesian society was only 0.001 percent. Therefore, it is necessary to measure readability so that the material in books used in learning is in accordance with the age level of readers and can be understood by students. With these conditions, this study aims to overcome the problem of reading materials in elementary schools that are not in accordance with their readability so that they do not support efforts to develop reading literacy. Reading materials in elementary schools need to be measured through a readability measurement in order to know the suitability of readability with the age of the reader. One of the formulas that can be used to measure readability is the SMOG formula (Simple Measure of Goobledygook), this formula is simpler because it does not use graphs only considers the number of sentences and difficult words. This research uses quantitative methods in the process of measuring and collecting data. The research instruments used text readability measurement, text comprehension instrument questionnaire, literacy measurement and student reading habit questionnaire. Based on the results of the linear regression test, there is a relationship between the results of the readability measurement and the results of the student comprehension measurement of 0.688. The positive correlation shows that the higher the score value of the readability measurement results, the lower the students' understanding of the reading. The results show that reading books used in elementary schools have a high readability index value, so that it can reduce students' understanding of reading materials used in learning.

## Keywords

SMOG (*Simple Measure of Goobledygook*), Readability Index, Reading Literacy

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## 1. Introduction

Readability is the overall element of reading that affects the success achieved by a group of readers with the reading material [1]. Readability is closely related to reader comprehension because reading that has good readability will have its own appeal for readers to continue to enjoy reading [2]. Readability must have appeal such as in the form of writing, clarity of writing, and the beauty of the writing style so that readers can easily understand and understand it according to their age level. The readability of teaching materials needs to be measured because the books used as teaching materials must be in accordance with the conditions and age of students so that students can understand the readab.

Measuring the readability of a reading passage is an important step in ensuring that information or teaching materials can be delivered effectively and are accessible to all students [3]. The readability index has a significant relationship with reading comprehension results so that the readability formula can be used to predict the level of difficulty or the ease with which reading material can be understood by readers [4]. Some formulas that are often used to measure readability include Flesh Grade Level, Flesh Reading Ease, Forcast, Spache formula, Dale and Chall formula, SMOG formula, and Cloze Test [5].

One formula that can be used to measure the readability of textbooks is the SMOG (*Simple Measure of Goobledygook*) formula [5]. The use of this formula is intended to measure the suitability between the text and the age of the reader. This formula is designed to measure the readability of very few texts of at least 10 sentences to long texts. The SMOG formula only takes into account the variable word difficulty as a determinant of readability even though it takes sentences into account in its working steps. According to this formula, word length directly affects the difference in semantic difficulty inherent in the text, measuring word length and sentence length is necessary but the variable sentence length is not directly included in the formula [4].

The application of the SMOG formula to measure the readability of student books can use teaching materials in schools. Teaching materials are all materials (both information, tools, and text) that are arranged systematically, which display a complete figure of the competencies to be mastered by students and used in the learning process for the purpose of planning and reviewing the implementation of learning. For example textbooks, modules, handouts, LKS, models or mockups, audio teaching materials, interactive teaching materials, and so on. Printed teaching materials include books, modules, LKS and *handouts* while non-print teaching materials are digital-based teaching materials [6]. One of the printed teaching materials is a book. In the learning process at school, books can be used by teachers or students as the main reference and become a source of student literacy materials.

Literacy is basically a person's ability to read and write.

This is in accordance with the definition of school literacy according to the ministry of education and culture, which is the ability to access, understand and use something intelligently through various activities, including reading, viewing, listening, writing and/or speaking. This definition explains that, with students doing minimal reading and writing activities, it means that students have also carried out literacy activities [7]. Based on the results of the *United Nations Educational, Scientific and Cultural Organization* survey, it shows that the level of literacy in Indonesian society is only 0.001 percent [8]. The tendency to read in Indonesia is minimal due to the preference of Indonesians who prefer watching television, listening to music, watching videos, and engaging in *online* activities rather than reading books [8]. Therefore, reading needs to be taught to children from an early age, so that they can get used to obtaining various information or new knowledge. However, reading materials must be appropriate for the level and level of education so that the reading can improve reading literacy. Thus, it can be stated that students' reading literacy will increase if the reading material has readability that is suitable for the reader. For this reason, a study was conducted to measure the readability of the text with the SMOG formula and its understandability.

This study was conducted to determine the level of reading literacy skills of elementary school students by applying the SMOG readability index so as to obtain the suitability of reading materials with the age and reading interests of students. The samples in this study were students from three schools namely SDN Rajagaluh Kidul II, SD Al-Irsyad Al-Islamiyyah Kota Cirebon, and MI Miftahul Ulum. Reading materials measured using the SMOG formula are reading materials in the form of story texts contained in Bahasa Indonesia package books, namely the story texts *Tak Muat Lagi, Suka dan Tidak Suka, Kepala Suku Len, Ada Vampir di Rumah Ini, Jauh dan Dekat* in the book Nukman Y. Eva and C. Erni Setyowati, year of publication (2021) and the IPAS package book on the text of the story *Hubungan antara Serangga dan Bunga, Marakka Bola: Tradisi Gotong Royong Memindahkan Rumah, Berkenalan dengan Uang, Berkenalan Lebih dengan Indonesia* in the book Amalia Fitri, et al, published year (2021).

## 2. Theoretical Framework

The readability of a text is an important aspect in determining the suitability of the quality of text comprehension. The suitability of the text is related to whether the reading is difficult or not. The level of this reader is related to the level of learning that is being undertaken by the reader [9]. If the discourse is too difficult, the reader will read repeatedly to be able to understand its contents. However, if the discourse is too easy, the reader will quickly get bored,

for this reason, a discourse that is suitable for the reading group is needed [2]. To assess the readability level of textbooks, a readability test tool is used in the form of a readability formula, one of which is SMOG. Determination of this assessment tool on the grounds that (1) the preparation of the readability test tool is relatively easy, (2) administering the test results is easier, (3) the results of the test tool are able to provide a better picture or have a higher correlation than other readability test tools, and (4) the interpretation of the research results is more accountable [10].

SMOG (*Simple Measure of Goobledygook*) is an assessment tool that uses the hand-assessment method [11]. SMOG allows evaluators to determine the readability of a book by counting 10 sentences at the beginning, middle, and end of the document. The evaluator counts every word consisting of three or more syllables in the 30 sentences. The number of syllables in each section is then summed and converted into the appropriate reading grade level score. Previous research shows that SMOG is a useful tool when completing reading grade levels and predicting 100% comprehension. The instrument used was the student's teaching materials at school.

Teaching materials are learning resources in the form of visual and audio visual that can be used as an alternative channel for communication in learning. Teaching materials are used as support in providing examples to students [12]. Teaching materials are materials or subject matter that are compiled completely and systematically based on learning principles used by teachers and students in the learning process. Teaching materials are systematic, meaning that they are arranged in order to make it easier for students to learn. In addition, teaching materials are also unique and specific. Unique means that teaching materials are only used for certain targets and in certain learning processes, and specific means that the content of teaching materials is designed in such a way as to achieve certain competencies of certain targets [13].

Literacy is the ability to learn to access knowledge through reading, otherwise literacy means the ability to use reading skills in terms of gaining access to the world of knowledge, to obtain information from various sources, to evaluate arguments, and also to learn a completely new subject [14]. With good literacy skills, it is able to make students understand the knowledge conveyed and also received by themselves, both in oral, written and visual forms [7]. With the ability to read that is cultured in every child, the level of success in school and in community life will open up success in a better life [15]. However, the reality in the field shows that Indonesian people's interest in reading is still very low, this is indicated by the high number of illiterate people in Indonesia [16].

### 3. Methods

This research uses quantitative methods based on measurement results using the SMOG (*Simple Measure of Goobledygook*) formula. Quantitative research was chosen because the data collected in the form of measurement results [17].

The steps for applying the SMOG test formula [5] there are two ways. The first way, for long texts that are more than 30 sentences with the following steps.

- 1) Select 3 samples of 10 consecutive sentences from different sections of the whole reading material, so that the total number is at least 100 words.
- 2) Count the number of words of 3 or more syllables in 30 sentences
- 3) Calculate the root result of the word count.
- 4) Add 3 and the result is the corresponding reader level.

From these steps, it can be stated that the first method is used when the sentences sampled are 30 sentences or more, while the second method is used to measure the readability of texts with less than 30 sentences.

The population in this study were students of SDN Rajagaluh Kidul II, SD Al-Irsyad Al- Islamiyyah Kota Cirebon, and MI Miftahul Ulum. The sample of this study were grade IV students of SDN Rajagaluh Kidul II as many as 16 people, grade IV C students of SD Al-Irsyad Al- Islamiyyah Kota Cirebon as many as 27 people, and grade IV A and B students of MI Miftahul Ulum as many as 34 people, the total sample amounted to 77 people. The sampling technique used is Proportionate Stratified Random Sampling.

The questionnaire instrument to measure comprehensibility was developed from the story text that had been measured for readability. In addition, the questionnaire was also used to determine students' literacy. The story text questionnaire is by asking questions taken from the story text obtained from the measurement using the SMOG formula while the literacy questionnaire is in the form of questions about students' reading habits. This research was conducted for one week, namely March 21-22, 2024 at MI Miftahul Ulum, March 25-26, 2024 at SDN Rajagaluh kidul II, and March 27 at SD Al-Irsyad Al- Islamiyyah Cirebon City. The data obtained were then analyzed using parametric analysis, the type of analytical tool used is multiple linear regression by considering the type of distribution or distribution of data that meets the assumption of data normality [18].

### 4. Results

The reading materials used as research samples consisted of Indonesian language textbooks and natural and social science textbooks. Reading samples from the textbooks were randomly selected, then measured using the SMOG Test formula. The results of the readability measurement using the SMOG formula are as follows:

**Table 1.** Reading Materials and Measurement Results of SMOG Formula.

No.	Story Text Title	Chapters and Pages	Packet Book	Measurement Results	Qualification
	Tak Muat Lagi	Chapter 1, 3-6	Bahasa Indonesia	12.13	High School
	Kepala Suku Len	Chapter 1, 9-12	Bahasa Indonesia	12.05	High School
	Berkenalan Lebih dengan Indonesia	Chapter 2, 28-30	Bahasa Indonesia	11.77	High School
	Jauh dan Dekat	Chapter 2, 40-42	Bahasa Indonesia	10.62	High School
	Ada Vampir di Rumah Ini	Chapter 3, 58-61	Bahasa Indonesia	10.4	High School
	Suka dan Tidak Suka	Chapter 1, 19-20	IPAS	9.95	High School
	Marakka bola: Tradisi Gotong Royong Memindahkan Rumah	Chapter 6, 155-156	IPAS	9.86	High School
	Hubungan antara Serangga dan Bunga	Chapter 7, 183-184	IPAS	9.86	High School
	Berkenalan dengan Uang	Chapter 8, 199-200	IPAS	8.83	Middle School
	Peraturan Tertulis dan Tidak Tertulis	Chapter 8, 204	IPAS	8.57	Middle School

In the next stage, the researchers measured the readability of the text through measuring students' comprehension of the reading questions in three schools. Based on the measurement results, the average value of the comprehensibility of the story text was obtained as follows:

**Table 2.** Students' average score based on reading comprehension.

No.	Story Text Title	SMOG Measurement Results	Comprehensibility Test Results			Average
			SDN Rajagaluh Kidul II	Al-Irsyad Al-Islamiyah Elementary School	MI Miftahul Ulum	
1.	Tak Muat Lagi	12.13	45	63	-	54
2.	Kepala Suku Len	12.05	-	-	53	53
3.	Berkenalan Lebih dengan Indonesia	11.77	-	72,8	-	72,8
4.	Jauh dan Dekat	10.62	-	72	74	73
5.	Ada Vampir di Rumah Ini	10.4	60	90	-	75
6.	Suka dan Tidak Suka	9.95	75	-	70	72,5
7.	Marakka bola: Tradisi Gotong Royong Memindahkan Rumah	9.86	65	-	64	64,5
8.	Hubungan antara Serangga dan Bunga	9.86	-	-	73,3	73,3
9.	Berkenalan dengan Uang	8.83	-	93,3	92,5	92,9
10.	Peraturan Tertulis dan Tidak Tertulis	8.57	45	70	-	57,5

Both data above after measuring the homogeneity of the data, it is known that both data are homogeneous. Furthermore, to find out the relationship between the results

of reading comprehension measurement using SMOG and reading comprehension measurement based on reading comprehension, the calculation was carried out using multiple

linear regression test with the following results.

**Table 3.** Linear Regression Test Results.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.829 <sup>a</sup>	.688	.649	.698

a. Predictors: (Constant), AVERAGE

ANOVA<sup>a</sup>

Model		Sum of Squares	Df	Mean Square	F	Sig.
	Regression	8.599	1	8.599	17.636	.003 <sup>b</sup>
1	Residuals	3.901	8	.488		
	Total	12.500	9			

a. Dependent Variable: SMOG

b. Predictors: (Constant), AVERAGE

The percentage of the results of the comparison of the measurement of students' reading literacy instruments in the 3 schools studied, namely:

**Table 4.** Percentage of Student Reading Literacy Measurement Comparison Results (%).

No	Pertanyaan	SDN Rajagaluh Kidul II			SD Al-Irsyad Al-Islamiyah			MI Miftahul Ulum		
1.	Apakah kamu selalu membaca setiap hari?	Tidak	Kadang	Selalu	Tidak	Kadang	Selalu	Tidak	Kadang	Selalu
		-	31,3	62,5	29,6	66,7	-	-	76,5	23,5
2.	Kebiasaan apa yang kamu sukai pada saat membaca?	Hening	Musik	Ramai	Hening	Musik	Ramai	Hening	Musik	Ramai
		68,8	18,8	12,5	59,3	33,3	7,4	64,7	23,5	11,8
3.	Dalam sehari, berapa banyak buku yang kamu baca?	Satu	Dua	Lebih dari 3	Satu	Dua	Lebih dari 3	Satu	Dua	Lebih dari 3
		56,3	25	18,8	66,7	22,2	11,1	47,1	29,4	23,5
4.	Hal apa yang akan kamu lakukan jika terdapat buku-buku yang baru?	Tidak dibaca	Disimpan Saja	Segera Membaca	Tidak dibaca	Disimpan saja	Segera Membaca	Tidak dibaca	Disimpan saja	Segera Membaca
		18,8	-	75	14,8	25,9	59,3	-	-	97,1
5.	Bagaimana perasaanmu jika membaca buku di perpustakaan atau di toko buku?	Tertarik	Tidak	Biasa Saja	Tertarik	Tidak	Biasa saja	Tertarik	Tidak	Biasa saja
		68,8	-	25	40,7	18,5	40,7	61,8	-	38,2
6.	Apa yang biasanya kamu baca?	Novel	Komik	Buku pelajaran	Novel	Komik	Buku pelajaran	Novel	Komik	Buku pelajaran
		25	43,8	31,3	-	77,8	22,2	17,6	32,4	50
7.	Topik apa yang paling kamu sukai dalam membaca?	Petualangan	Komedi	Pengetahuan	Petualangan	Komedi	Pengetahuan	Petualangan	Komedi	Pengetahuan
		50	12,5	37,5	74,1	11,1	14,8	32,4	17,6	50



## 5. Discussion

Based on the results of the measurement of reading in textbooks using the SMOG formula as stated in [table 3](#) above, it can be seen that of the 10 titles of story texts, 8 titles of story texts have a readability level of *High School level* and 2 titles of story texts have a readability level of *Middle School level*. Thus the reading has a readability that is appropriate for the age of junior and senior high school students. The use of reading materials for textbooks at the primary school level shows that the readability based on comprehension of the reading is also low, with an average of 68.85 or only mastered by 68.8%, except for the text entitled 'Getting acquainted with Money' which was measured at SD Al Irsyad Al Islamiah and MI Miftahul Ulum which reached 92.9%.

The results of the average value of readability based on reading comprehension with the level of readability based on SMOG including *High School* is at SD Al-Irsyad Al-Islamiyyah Kota Cirebon (90) with the title of the text *Ada Vampir di Rumah Ini* while the average value of students who need to be improved at SDN Rajagaluh Kidul II (45) with the title of the text *Tak Muat Lagi*. For the *Middle School* level, the best average score is at SD Al-Irsyad Al-Islamiyyah Kota Cirebon (93.3) with the text title *Berkenalan dengan Uang* while the average score that needs to be improved at SDN Rajagaluh Kidul II (45) with the text title *Peraturan Tertulis dan Tidak Tertulis*.

The comprehension achievement of Al-Irsyad Al-Islamiyyah Elementary School students in Cirebon City on reading with *High School* and *Middle School* level qualifications has the best average score, while Rajagaluh Kidul II Elementary School students have the lowest average score. This is influenced by several factors as listed in [table 3](#). and [table 4](#). which explains that based on the results of the Linear Regression Test there is a relationship between the measurement of readability and the results of measuring student comprehension, with a calculated F value of 17.636 and a significance level of  $0.03 < 0.05$  which means that there is a relationship between the results of measuring the readability of the SMOG formula with reading comprehension of 0.688. This positive correlation indicates that the higher the SMOG score, the lower the students' comprehension. The comparison of students' reading literacy measurement results in the three elementary schools showed some similarities and differences. This shows that students' literacy is not only influenced by individual abilities, but also influenced by the readability of reading materials.

Based on the questionnaire to find out the habituation of literacy, it is known that the habituation of literacy carried out at SDN Rajagaluh Kidul II, SD Al-Irsyad Al-Islamiyyah Kota Cirebon, and MI Miftahul Ulum has differences and similarities. The difference in students' reading habits is that students of SDN Rajagaluh Kidul II always read every day, but students of SD Al-Irsyad Al-Islamiyyah Kota Cirebon and

MI Miftahul Ulum do not always read. This shows that students have the habit of reading every day even though the level of consistency varies. Students of SDN Rajagaluh Kidul II and SD Al-Irsyad Al-Islamiyyah Kota Cirebon prefer adventure topics in reading, while MI Miftahul Ulum students prefer knowledge topics. This shows that the variation in students' interests and preferences for reading types varies. The similarity of students' reading habits in the three elementary schools is that they like to read during quiet situations, which shows that a quiet environment can help improve concentration and understanding of reading. Students only read one book a day and read immediately when they have a new book. Students are more interested in reading in libraries or bookstores which shows that an organized reading environment can increase interest in reading. This reflects the variation in reading resources chosen and preferences and the important role of the learning environment in shaping students' reading interests and habits.

Students of Al-Irsyad Al-Islamiyyah Elementary School in Cirebon City in answering the questionnaire instrument of the story text showed good results, among other things because students had an understanding of the contents of the story text. In literacy habituation, students are interested in reading, especially when they get new reading material, so students look enthusiastic in reading. On the other hand, students of SD Negeri Rajagaluh Kidul II have low comprehension, so they need improvement in reading literacy habituation. From the research, it is known that students' interests tend to prefer reading materials with adventure topics, so it needs teachers' attention in paying attention to students' interests and needs in reading literacy learning.

From the results of measuring readability using the SMOG formula, it is known that the readability level of Bahasa Indonesia textbooks written by Nukman Y. Eva and C. Erni Setyowati published in 2021 and the IPAS textbook written by Amalia Fitri, et al published in 2021 are classified as high. However, based on the results of measuring reading comprehension by elementary school students, it is known to have low comprehension. Thus, the results of measuring the readability of SMOG which shows a high readability index will result in low student comprehension. On the other hand, readability is one of the aspects considered in the assessment of textbooks by the Center for Curriculum and Bookkeeping, Kemdikbud. The readability aspect is related to terminology, language clarity, and language suitability for children's development [19]. Texts or teaching materials whose readability level is not or less in accordance with the level of student cognition, will affect students' ability to understand the message or information contained in the text. Moreover, if the index of the readability level of the text or teaching material is far above the level of readability that should have an impact on the low interest and motivation of students in reading.

## 6. Conclusions

Based on the results of the analysis and discussion above, it can be concluded as follows:

Reading materials that have a high readability index based on the results of the SMOG (*Simple Measure of Goobledygook*) formula measurement have low reading comprehension. Therefore, elementary school teachers must be able to choose reading materials for text materials that are appropriate for the age of elementary school level. One of the formulas that can be chosen by teachers is the measurement of the readability index based on the SMOG formula.

The results of the readability index measurement using the SMOG Formula have a correlation with the results of the reading comprehension measurement. The higher the readability index of a text, the lower the comprehensibility of the text. Therefore, if a reading material has a high readability index, it should not be used for elementary school students in learning. From the results of the reading comprehension measurement, it is known that students who managed to get high scores because they were able to understand the contents of the story well. Meanwhile, most of the students who got low scores, because they were not able to understand the content of the story well.

Habituation of students' reading literacy needs to be done because the interest in reading topics, the habit of reading different books, and the frequency of reading books every day differ from one student to another. This shows that the school and learning environment play an important role in shaping students' reading literacy interests and habits. Therefore, further efforts need to be made by teachers and schools to improve comprehension of story text content in order to encourage better reading habits among students.

## Abbreviations

SMOG	Simple Measure of Goobledygook
SD	Sekolah Dasar (Elementary School)
SDN	Sekolah Dasar Negeri (State Elementary School)
MI	Madrasah Ibtidaiyah (School at the Basic Education Level Equivalent to Basic Education Within the Ministry of Religious Affairs of the Republic of Indonesia)
LKS	Lembar Kerja Siswa (Student Worksheet)

## Author Contributions

**Nida Azhari Dalillah:** Conceptualization, Data curation, Funding acquisition, Methodology, Project administration, Software, Visualization, Writing – original draft

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**Suherli Kusmana:** Conceptualization, Formal Analysis, Investigation, Resources, Software, Supervision, Validation, Writing – review & editing

**Ira Rahayu:** Conceptualization, Formal Analysis, Supervision, Writing – review & editing

## Conflicts of Interest

The authors declare no conflicts of interest.

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