The Nexus between Reading Science Informative and Science Fiction Text in Secondary High School

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Abstract

Minimum Competence Assessment resembling PISA and Characters Survey replace National Examination in 2021. However, the Indonesian students' score in PISA is still left behind the international average scores. This study aims to find out the extent of the relationship between science informative text and science fiction text skills in secondary school. This research is a quantitative correlational study carried out by distributing online tests of science informative texts and science fiction texts. The participants of this study were 133 students of grade ten at 4th Pematangsiantar Senior High School and they were selected using simple random sampling technique. A bivariate correlation test with the Pearson Product Moment method was implemented to analyze the data. The result found that the value of the correlation coefficient was0.96 (r = 0.96) meaning that the alternative hypothesis is accepted. In other words, there is a very strong positive correlation between the students' reading skills in fiction text with the students' reading skills in informative text. In short, the result indicates that when the students' ability to read science fiction text increases, their ability to read science informative text will also increase.

Keywords: Minimum Competence Assessment, Reading**,** Science Literacy, Informative Text, Fiction Text

1. Introduction

The development of the 21st century requires everyone to be able to master and apply literacy skills especially those in school age. Literacy does not only require students to be able to read and write in the general sense but must also be able to read visual and non-visual texts. This literacy skill has been realized in the form of an international scale assessment or also called PISA and TIMSS. In Indonesia, this assessment will be held in a policy called the Minimum Competence Assessment (MCA). PISA's result in 2018 showed a low level of literacy in Indonesia compared to countries in the world. Indonesia

ranked 74 out of totally 79 countries surveyed with the score decrease in reading part (Erma Yulia Saputri, 2019). This indicates the weakness of students in Indonesia in solving literacy-based problems that require them not only to read and memorize, but also to understand, reason critically, draw conclusions based on evidence. Critical thinking is defined as the ability to think that is able to produce a process of understanding, analyzing, and synthesizing ideas that people can believe in(Kusumaningrum, 2015).

Most students in Indonesia only read five to nine books annually (Saputri, Sundari, & Arifin, 2019) and this lack of interest in reading has an impact on Indonesia's rank in PISA. These weaknesses in literacy later became the focus of the government of Indonesia. In 2021, National Examination will be replaced with Minimum Competence Assessment, Characters Survey, and Learning Environment Survey Character has values that must be developed in students in an institutional education so that the purpose of education runs smoothly (Evananda, Bafadal, & Sobri, 2018). Minimum Competence Assessment, Characters Survey, and Learning-Environment Surveys are designed specifically to map and improve the quality of national education (Kemendikbud, 2019). Until 2015, the Ministry of Education and Culture issued a policy named the National Literacy Campaign (NLC) as a way to address the issue of students' improvement in six basics literacy. The researchers limit on one of the six basic literacy types namely science literacy specified into science text. The researchers focus on the type of text used for science informative and science fiction text. The rank of students' literacy is reported to be at a low level when compared to other countries as is shown in Table 1.

Table 1.Students' Literacy Score of Indonesia in PISA Assessment

No	Year	Indonesia's Average Score	International's Average Score	Position	Number of Participating countries
1	2000	393	500	38	41
2	2003	395	500	38	40
3	2006	393	500	53	60
4	2009	383	500	57	65
5	2012	382	500	64	65
6	2015	403	493	62	70

(Rusilowati, 2018)

Table 1 shows that the Indonesian literacy score on PISA is still far away from the average international score. Based on the data above, the researchers assume that the low score is caused by the low activity of students' literacy in Indonesia. In addition, it is

necessary to worry that this will also have an impact on students' difficulties in facing Minimum Competence Assessment in 2021.

The term 21stcentury kills can be interpreted as a comprehensive description of skills, knowledge, and also the provisions that are considered to be able to succeed someone in the world of work as a whole in the future (Germaine, Richards, Koeller, & Schubert-Irastorza, 2016). The development from 21stcentury education in Indonesia is intensified given the technological, social and environmental disruption that is happening globally. In addition, technology disruption will affect all sectors including education. The 21stcentury learning verifies the integration of technology with teaching (Wulansari & Kusumaningrum, 2020).Disruption will cause the education system, which initially has a monologue-based class to become a discussion-based class(Putra, 2018). Education actually has a very important role in national life and having a state, namely in the effort to create quality human resources (Coring & Nafiah, 2019). Moreover, to overcome this, students are asked to be able to think critically and critical thinking is one of the higher-order thinking ability (Sholehawati &Wahyudin, 2018).Developing critical thinking is not that easy. It needs a lot of efforts and time for both the students and the teachers. The students and the teachers must be committed to produce good academic journal (Indriani, 2019). At present there are two major international assessments assessing students' mathematical and scientific abilities, namely TIMSS and PISA (Johar, 2012). There are six basic skills in literacy needed in the 21stcentury, namely literacy, numeracy, scientific literacy, ICT literacy, financial literacy, and cultural and civic literacy (Forum, 2015) there. The six basic literacies are really needed by students to balance the developments in the 21stcentury. In science literacy, students are asked to solve problems and draw conclusions based on the problem. This awareness is related to the way science creates a natural, intellectual, cultural environment as well as the willingness to be able to take part and care about matters related to science (OECD, 2016). Science literacy can be very good if it is implemented properly in real life, for example, such as capturing waste water, not burying plastic waste and so on(Suryanti, Ibrahim, & Lede, 2018). To improve students' science literacy skills, informative and fiction media can be used as the learning aids. Informative media usually contains visual information obtained through the sense of sight, while fiction media contains information that is already in the reader's mind. Since each reader has a different experience to interpret visual information in reading, the content of the text will change according to the experience of interpretation (Sulistyaningrum, 2016)

The theoretical benefit of this research is useful to widen the insight of the importance of critical reasoning to improve basic literacy skills. Practically the result of this study is expected to be beneficial for the readers especially for the students, so that they get the picture of their ability about science literacy that exist in the Minimum Competence Assessment. This study gives the illustration for the teachers to prepare themselves and

their students in facing Minimum Competence Assessment, particularly in science literacy. To commence this study, a research question is raised: "To what extent is the correlation between the ability to read science informative text and science fiction text at grade ten 4th Pematangsiantar Senior High School?" This study purposes to find out the extent of the correlation between students' ability to read science informative text and science fiction text. The researchers formulate two hypotheses. The first one is there is a correlation between the students' ability to read science informative text with science fiction text. The alternative hypothesis is there is no correlation between the students' ability to read science informative text with science fiction text.

2. Method

2.1. Research Design

In this study, researchers implemented a quantitative approach. The quantitative approach focuses on changing scores; indicates of improvement, stagnation, or loss, rather than the whole temporal process of life events. The real changes that transpire in whole communities occur qualitatively, in more complex ways than can be placed on a measurement scale or averaged in a statistic (Glenwick, 2016). This means that the quantitative approach focuses on statistical procedures, and in the quantitative approach, it uses instruments in the form of tests, questionnaires, interviews, and observations. In this case, the researchers implemented a descriptive correlation research method. This method intends to find the relationship between two variables. A correlational research is a study to find out the relationship and the level of relationship between two or more variables without any effort to influence (Mulyati, 2014).

This study focuses on seeing whether there is a positive and significant relationship between students' ability to read science informative text and science fiction text. In this research, the independent variable (X) is the ability to read science fiction texts and the dependent variable (Y) is the ability of reading science informative text.

2.2. Population and Sample

A population is a collection of objects or individuals that divide a particular object, which is actually a whole group and interesting to study(Shayib, 2018). The population of the study was all students of grade ten in 4th Pematangsiantar Senior High School, consisting of 10 classes. Therefore, the total population was 200 students. They were selected as the population in this study as they were considered as the preparative facing Minimum Competence Assessment in 2021.

Simple random sampling is used as the most widely known sampling technique in this study. A simple random sampling step that is often implemented by assigning a number to each element in the sampling frame and using a process like a random

number generator to select from the frames (Dattalo, 2008). Slovin's Formula was implemented to determine samples with a degree of confidence of 95% and the sampling resulted in 133 students.

2.3. Technique of Collecting Data

Data collection techniques are procedures or methods used by researchers to collect data. In this study, researchers collected data by distributing multiple-choice tests to the participants. A multiple choice question is that there will be a list of answers but the respondent is asked to choose only one best answer (Santhanavijayan, Balasundaram, Ngarayanan, Kumar, & Prasad, 2017). The first multiple choice test contained science informative text and the second one contained science fiction text. The tests were used to measure the students' ability in both types of texts. Before the test was distributed, the researcher of course checked the validity and reliability of each item. Validity is about truthfulness and a measure shows validity if it actually measures what it claims (or is intended) to measure (Vanderstoep & Jhonston, 2009). Then, in this study researchers used a formula from Karl Pearson to determine the validity of each item with the help of Ms. Excel (= PEARSON). As for the question item reliability, researchers used a Cronbach's alpha technique to measure the level of consistency of the test. It is the most common way to assess the reliability of self –report items(Vanderstoep & Jhonston, 2009)

2.4. Data Analysis

The data analysis technique used in this study is a Bivariate Correlation. It measures the degree of relationship between two variables through the calculation of different correlation coefficients. The relationship between the two variables has two distinctive aspects, which are strength and direction, denoted by the absolute value and sign of the correlation coefficient, respectively (Perinetti, 2019). In this study, researcher used the Karl Pearson's formula to determine the correlation coefficient using Ms. Excel's formula (=CORREL).

The degree of the correlation value (r) ranges from 1 to -1. If the correlation value approaches 1, it means that the relationship between the two variables is strong, as well as if the correlation value approaches -1. On the contrary, if the value is close to 0 it means that the relationship between the two variables is weak.

3. Results

This research was carried out from the end of January to the beginning of February 2020 in 4th Pematangsiantar Senior High School. With the number of samples that is N = 133 at a significant level of 5% and $r_{correlation}$ = 0.143, all items or questions were considered valid since r_{count} is larger than $r_{correlation}$. In this study, the science informative

text test consisted of 10 questions, the value of r_{count} for each item is larger than 0.30. This means that each item in the visual text test was valid. The similar result was obtained in science fiction tests, where the r_{count} for each item was greater than 0.40. This indicated that each item in the science fiction test text was valid. In brief, all items in both tests were valid and the results of the validity of the questions can be seen in Table 2.

Table 2. Validity Test Result

Number of item test	r_{count}		$r_{correlation}$	Description
	Visual Text Test	Non-Visual Text test		
1	0.834	0.865	0.143	Valid
2	0.630	0.676	0.143	Valid
3	0.434	0.488	0.143	Valid
4	0.825	0.685	0.143	Valid
5	0.820	0.876	0.143	Valid
6	0.787	0.872	0.143	Valid
7	0.584	0.880	0.143	Valid
8	0.355	0.480	0.143	Valid
9	0.472	0.659	0.143	Valid
10	0.663	0.887	0.143	Valid

The reliability test is used to determine the level of consistency of an instrument. Based on the calculation of reliability using the Cronbach Alpha formula, the reliability coefficient obtained was $r = 0.76$. When the coefficient is greater than 0.70, then the questions on science informative text test were considered as highly reliable. Similar to that, then for the reliability coefficient in science fiction test was 0.82. When the coefficient is greater than 0.80, this means that the reliability level of the questions was also highly reliable. Overall, both coefficients obtained for science informative text and science fiction texts were similarly highly reliable.

The Product Moment Correlation Formula by Karl Pearson was used to test the hypotheses which was carried out through Ms. Excel.

Table 3. Correlation Test

	Science Informative Text	Science Fiction Text
Science Informative Text	1	
Science Fiction Text	0.962939128	1

From Table 3, it was found that the value of *r* or the correlation coefficient between the ability to read science informative text of students compared to their ability to read science fiction text students was 0.962. Both dependent and the independent variables have a very strong positive relationship. All in all, the alternative hypothesis was accepted.

The result of correlation test indicates that the higher the students' score in reading science fiction text, the higher their grade in reading science informative text. The correlation between the students' ability to read science informative text and science fiction text is shown in Figure 1.
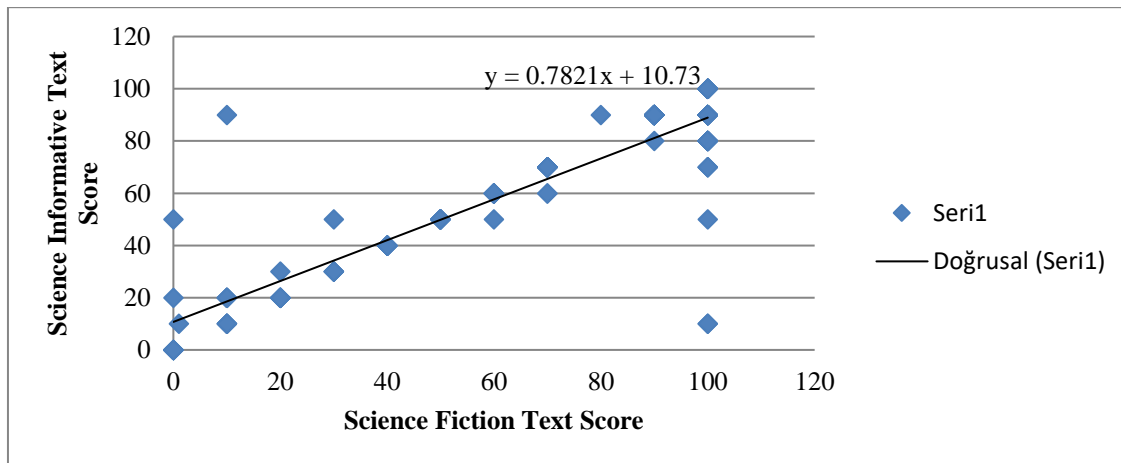

Figure 1. Scattered Diagram of the Students' Score

The scattered diagram above shows the relationship between the students' science fiction text reading skills and students' science informative text reading skills. The scattered plots shown in the diagram above illustrates the strong relationship between the dependent and the independent variables. The closer plots to the line support the correlation test as is shown in Figure 1.

Table4. Descriptive Statistics 1

Variable	Test of Science fiction text (X)	Test of Science informative text (Y)
Min	0	0
Max	100	100
Average	65	61
STDEV	35	31

Table5. Descriptive Statistics 2

Ability	Number of Students in Science Fiction Test	Number of Students in Science Informative Test
High	42	12
Average	34	60
Low	57	61
Total	133	133

From Table 4, it is seen that the average score for each text is 65 and 61 respectively. Both average scores are used as the passing grade for science informative text and science fiction test. When referring to Table 4, it is clear that the number of students achieving low ability dominates both science informative and science fiction tests. In other words, almost half of the students have low ability in reading literacy. The most interesting thing in shown in Table 4 is that only 10% of the students obtained the highest ability in reading science informative text.

4. Discussion

This phenomenon is due to the format of the text which includes many objects such as illustrations, graphics, and tables. This has a relationship with the type of Higher-Order Thinking Skills (HOTS) questions in which the students have to reason and relate the illustration, graphs, and tables to the questions following. In addition, the students never

had experience how to solve the problem in HOTS questions. They were always served with non-visual texts which contains only words. When referring to the National Curriculum 2013, the use of HOTS questions is strongly implemented in teaching and learning processes (Djami & Kuswandono, 2020).

Reading science fiction text affects the students' ability to read science informative text. If reading science visual and science fiction texts is always implemented intensively, it is not impossible for students in Indonesia to comprehend science literacy and they are ready to face the Minimum Competence Assessment which is planned to administer in 2021. However, the students' preparation is inseparable from the role of the teacher who should transform themselves into the facilitator of problem solver, not as a tutor who transfer knowledge without letting their students find their own way to solve their problem.

The result of this study indicates that there is a positive relationship between students' reading skills in science fiction text with their skill in reading science informative text. This supports the finding which states the use of textbooks can improve students' science literacy skills, although in this case the use of textbooks is developed using multimode (Zakiya, Sinaga, & Hamida, 2017). Students will be motivated in reading various natural phenomena that can be observed in daily life. The students who have often read something related to science will increasingly care about the surrounding environment and its sustainability (Saefuddin, Malik, Maulidah, Chusni, Salahudin, & Carlian, 2019). In the future, the use of plain text media may no longer be finding due to disruption in the world of education. Thus, as the educators who are ready to face disruption must be able to prepare more media as a form of improvement in the world of education.

In this study, researchers also revealed the relationship between science fiction text reading skills and science informative text reading skills. This means that reading skills are really required to develop students' science literacy skills in getting information in science field. Reading infusion has a positive impact on the development of Shiva's science literacy (Fang & Wei, 2010). The increases of science literacy skills are suggested to focus on future learning. This activity can also be extended to other introductory science lessons which can then be adapted to emphasize scientific literacy skills in the news media and scientific literature(Majetic & Pallegrino, 2018). The use of different media as a form of improving students' science literacy skills is indeed very good. Especially if students are free to look for their own learning media, then they will definitely be able to improve their scientific literacy skills. This is due to the disruption of education that frees students from getting knowledge from anywhere, meaning that they are not only getting knowledge from classroom linkups but also from outside the classroom.

The use of visual stimulation in text was found to improve students' reading abilities (Diana & Tuti, Peningkatan Kemampuan Membaca anak Melalui Stimulasi Visual, 2019). Students are definitely more interested in reading text that has visual media such as graphics or tables, especially in science literacy text. By using media in science learning is expected to help students, especially in understanding abstract concepts (Jannati, Setiawan, Siahaan, & Rochman, 2018).The media referred to in this case are those contained in text which is also referred to as visual text. The use of informative text can be realized as a form of educator preparation in facing disruption in the world of education. The presence of developments in information technology actually disrupts industry 4.0 including education(Samani, 2018). The use of visual media both as a medium of learning and as a form of testing the students' ability will also have a good impact on disruption that does not only occur in the world of education but also in technology. Thus, if students understand and master how to read science informative texts, the disruption in the education and learning can be diminished. The use of graphics, images in science informative text is also related to students' understanding of technology, especially in the field of science literacy.

As is revealed by the investigation on this study, science literacy as measured by, and the students' knowledge are still low (Atta, Vlorensius, Aras, & Ikhasnudin, 2019). Then, science literacy has an effect on students' science achievement (Rukayah, Indrayu, & Mintasih, 2018).Science literacy is gained through some influencing factors such as the motivation to top achievement, the skill of critical thinking, and the skills required in reading comprehension. Science literacy is the part of the Minimum Competence Assessment and it is a concern of educators and the students. In classroom routines, the teachers are expected to give the students the big picture of how Minimum Competency Assessment is administered. There are about six different types of questions such as single answer multiple choice, multiple answer multiple choice question, cloze test, matching, and essay. Teachers should recreate the forms of this questions into daily assignments, weekly assessments or summative tests. Then, the literacy programs at school and at home should be modified to be fun activities leading the students to find out and reformulate the way how then gain knowledge with their family. To sum up, the learning process is not only administered at school but also involving parents and society environment where the students live.

5. Conclusions

Minimum Competence Assessment and Characters Survey will be administered in 2021 to replace the National Examination in Indonesia. The type of questions in Minimum Competence Assessment resembles those listed in PISA. One of the sections tested in Minimum Competence Assessment is science literacy whether in the form of reading literacy or numeric literacy. This study illustrates how reading in science literacy

were carried out by 133 students of Grade ten at 4th Pematangsiantar Senior High School. The reading text was divided into two types which were science fiction text and science informative text. The result shows that there is a strong relationship between the ability to read science fiction text and science informative text. Almost 50% of the participants failed to achieve the passing grade in science informative text and only 10% passed the test. The remaining stayed at the average level which indicated average to low science literacy mastery.

There are two recommendations based on the conclusion discussed above. First, the type of questions in daily test, mid-term test, and final test in secondary school should be converted into PISA or Minimum Competence Assessment model. This aims to habituate educators to create HOTS-modeled questions and for students to solve the questions. Second, the educators must be given periodical training about how to create questions related to PISA or Minimum Competence Assessment. This purposes to avoid anxiety by the educators in distinguishing between difficult question and reasoning-modeled questions. The main issue in creating PISA-like question is in the syntax level of thinking and reasoning and not in the level of the question difficulties.

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