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Comparison of the Contents of Class IV Mathematics Textbooks in Indonesia and Singapore in Terms of Mathematical Literacy

Umi Salma Fauziyah[1], Siti Fatonah[2]
[1,2]Universitas Islam Negeri Sunan Kalijaga

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ABSTRACT

Abstract: This research is a literature study research, the primary data source of this research is a mathematics textbook published by the Indonesian Ministry of Education and Culture and Marshall Cavendish, the collection techniques used are observation and documentation, the analysis in this study uses quantitative and qualitative descriptive techniques. The results showed that the presentation of material in the Indonesia Ministry of Education and Culture book facilitated the development of mathematical literacy by 31%, while the Marshall Cavendish book was 26%, in presenting the material for the Indonesia Ministry of Education and Culture book it was superior by a difference of 5%. The sample questions section of the Indonesia Ministry of Education and Culture book facilitates the development of mathematical literacy by 20%, while Marshall Cavendish book is 26%, in the example questions Marshall Cavendish book is superior by a difference of 6%. The practice questions section in the Indonesia Ministry of Education and Culture book facilitates the development of mathematical literacy by 21%, while the Marshall Cavendish book by 20%, in the practice questions the Indonesia Ministry of Education and Culture book is superior by a difference of 1%. These results indicate that the two books analyzed have the potential to develop students' mathematical literacy, with the same average percentage of 25%.

Correspondence Address:

Umi Salma Fauziyah
Universitas Islam Negeri Sunan Kalijaga
Jalan Laksda Adisucipto, Sleman-DIY
E-mail: umisalmafauziyah@gmail.com

The quality of human resources is an important point for a country to develop for the better or not, because these human resources will ultimately become the managers of the life components of a country, for example the economy, infrastructure, technology, food and so on. Therefore, these human resources need to be given more attention by various parties. In addition, there is a shift from the conventional era to the era of technology or commonly called the era of disruption, making various jobs begin to be taken over by technology. The era of disruption is also understood as a time of advances in science and technology make people easier to obtain information and establish communication quickly. This era requires collaboration, sharing to solve problems, and creating a more flexible and efficient atmosphere (Fatonah & Assingkily, 2020). This change leaves jobs based on knowledge, innovation, creativity, and higher-order thinking skills. Things like this can at least be pursued through quality education. As we all know, the key to quality human resources lies in education. Therefore, quality education can of course also produce quality human resources, examples like this can be seen in developed countries. Developed countries with a good quality of life often also have a good quality of education. For example, Japan, South Korea, or Singapore, these countries have limited natural resources, but have superior quality human resources, this is because these countries prioritize the quality of education. These countries are well aware that good quality education can improve existing human resources, and in the end can improve other sectors of life. In addition, education can be a means of training for a person to be ready to face life in a constantly changing world.

Unfortunately, the quality of education in Indonesia is still not good, one of which is mastery of mathematics. This is supported by several survey results regarding students' mathematical literacy skills, including the AKSI (Indonesian Student Competency Assessment) study conducted by the Education Assessment Center, Balitbang, Ministry of Education and Culture of the Republic of Indonesia in 2019, the study showed that the majority of junior high school students' mathematical competence was at a poor level. The details are that around 79.44% of junior high school students in Indonesia are at a poor level, 18.98% of junior high school students in Indonesia are at an adequate level, and 1.58% of junior high school students in Indonesia are at a good level (Kementerian Pendidikan dan Kebudayaan Republik Indonesia, 2019).

In addition to the study conducted by the Indonesia Ministry of Education and Culture, there was also a survey conducted in the Yogyakarta area regarding students' mathematical literacy skills, namely a survey of junior high school students in the Bantul area, Yogyakarta. The survey results showed that only 6 out of 484 students or 1% of students were in the

very high category, 12% of the students were in the high category, 37% of the students were in the medium category, 35% of the students were in the low category, and 15% of the students were in the very low category (Rifai & Wutsqa, 2017). Another survey conducted regarding students' literacy skills was also held on 813 high school students in Yogyakarta, the output of the review showed that 0% of understudies in the exceptionally high category, 1.97% of students in the high category, 8.86% of students in the medium category, 24, 23% of students in the low category, and 64.94% of students in the very low category (Sari & Wijaya, 2017).

At present and in the future, skills in thinking and reasoning will be indispensable. The NRC (National Research Council) revealed that in the present and in the future, in the era of communication and high technology, smart workers are needed more than hard workers. More workers are needed who are able to absorb and apply new ideas, can adapt to existing changes, can overcome uncertainty, can create harmony, and can solve problems that are not commonly encountered.

One of the fields of study that facilitates the development of these skills is mathematics. School mathematics plays a special role, one of which refers to the theory of human capital which shows arithmetic and quantitative thinking have become important professional skills in a technologically advanced society (National Academy of Sciences, 2007). Therefore, employers are looking for mathematically competent employees. In addition, mathematics is being emphasized by higher education institutions to teach essential skills that are increasingly needed in a modern science-based economy. Learning mathematics is also an important place for students to learn to think systematically. In addition, workers unconsciously apply mathematics in carrying out their work such as using a problem-solving approach (Douglas & Attewell, 2017).

Some of the abilities that according to De Lange need to be mastered in the mathematics learning process in order to achieve the above skills include managing thinking skills, reasoning, solving problems, communicating, connecting mathematical concepts with real life, besides being able to use and utilize technology. NCTM (National Council of Teachers of Mathematics) also expressed the same thing, where mathematics standards in schools include content standards and process standards. Process standards include problem solving, reasoning and proof, linkage, communication, and representation (Shadiq, 2014).

In addition, mastery of this aspect of mathematics is also important for someone, because mathematics will be used as part of life, both in simple and complex ways. According to Gravemeijer et al. for example, arguing about the role of mathematics in a digital society, it can now be observed that mathematics is everywhere and invisible. Since mathematics is at the core of what computers do, the role of mathematics itself is growing along with the role of technology. (Gravemeijer, Stephan, Julie, Lin, & Ohtani, 2017). This opens our eyes that besides mathematics can train reasoning, problem solving, and critical thinking skills, mathematics is also an important aspect that can support us to participate in technology development.

Mathematics assessment in a broad scope is carried out by the OECD (Organization for Economic Co-operation and Development) through an assessment called PISA (Program for International Student Assessment) besides that there is also the IEA (International Association for the Evaluation of Education Achievment) with a TIMSS assessment. (Trends in International Mathematics and Science Study). Based on the assessment carried out by TIMSS and PISA, the mathematical ability of students in Indonesia is still relatively low, this result can be seen in the PISA and TIMSS assessments in recent years.

In the results of the 2015 PISA assessment, the mathematical ability of students in Indonesia was ranked 63 out of a total of 69 survey participating countries, the score obtained by Indonesia was 386 while the PISA standard was at a value of 490. Furthermore, in the 2018 PISA assessment, the mathematics ranking of students in Indonesia showed a decline ranked 72 out of a total of 78 countries that took part in the PISA assessment, the score obtained by Indonesia in 2018 was 379 (Schleicher, 2018). In addition, in the 2016 TIMSS assessment, Indonesia ranks 46th out of a total of 51 countries, the score obtained by Indonesia is 397 (Mullis, Martin, Foy, & Hooper, 2015). Although the assessments from PISA and TIMSS do not necessarily serve as the main benchmark for the quality of a country's education, at least from the results of this assessment it can be seen that there are things that still need to be addressed, especially in the field of education.

The score obtained by Indonesia is still below the average of other ASEAN countries, one of which is Singapore. Singapore itself ranks second in PISA 2018 with a score of 569. Since its participation in PISA in 2009, Singapore has consistently shown improvements in the quality of several aspects of PISA assessment, one of which is mathematics. This good achievement from Singapore can at least be an example for Indonesia on how education is managed in that country, including learning how to build synergies from various parties for the success of its educational aspects.

One of the important aspects that support the mastery of mathematics in schools is the textbook which is used as a learning reference. This textbook is a general study guide for students because this book contains a description of the curriculum applied in a country and is easy to carry. Textbooks are the main carriers of the curriculum, book play an important role in all subjects in school. The strength of a textbook lies in its capability to give an organized scheme of ideas, manage teaching and learning, and allows the development of thinking and understanding of the subject. Textbooks are intended to be utilized by teachers and students and are the essential resource for teaching and learning (Hadar, 2017).

Patrick revealed that the books used in school, especially textbooks, became an instructional tool that played a major role in the classroom. After all, textbooks are an important element in educational institutions, be they formal or non-formal educational institutions (Supriadi, 2000, p. 46). Textbooks are provided and used by students to support their learning with appropriate class content and activities so that students can engage both individually and in groups.

This makes textbooks as one of the important elements that support the quality of student information acceptance, which then becomes one of the determinants of whether these students will receive sufficient information or not. Innovative textbooks can improve student performance by engaging in daily classroom practice and well-structured co-learning (Behnke, 2018). The textbook itself presents material that will be delivered to students, one of which is mathematics.

In relation to learning mathematics, the selection of books is important because the mathematics books provided need to facilitate the development of students' abilities. Ham and Heinze stated that the textbook selected by the teacher had a significant impact on students' mathematical achievement (van den Ham & Heinze, 2018). In mathematics education, mathematics textbooks have a very important role in assisting teachers to design and describe learning topics to be discussed in class (Chang & Silalahi, 2017). Furthermore, textbooks are also one of the tools that help teachers to convey mathematical concepts and present practice questions. Based on the description above, it can be understood that the textbook is a component that has an important role for learning activities.

Regarding the comparative study of mathematics books between Indonesia and Singapore, at least Mariana Ramelan and Ariyadi Wijaya have conducted a study entitled "Komparasi Muatan Buku Matematika SMP Indonesia dan Singapura Ditinjau dari Kemampuan Berpikir Kritis dan Kreativitas Matematis". This study discusses the content of Indonesian and Singapore junior high school mathematics books in terms of critical thinking skills and mathematical creativity. While the object under study is the presentation of the material, sample questions, and practice questions in terms of critical thinking skills and mathematical creativity. The discussion in this study focuses on measuring the development of critical thinking skills and mathematical creativity in mathematics books, not yet discussing the development of aspects of mathematical literacy as a whole.

As for the study of mathematical literacy in mathematics textbooks, one of which has been carried out by Erik Suharyono and R. Rosnawati, with the title "Analisis Buku Teks Pelajaran Matematika SMP Ditinjau dari Literasi Matematika". This study discusses the questions contained in the mathematics textbooks for class VII SMP in the second semester of the 2013 curriculum in terms of mathematical literacy. While the object being studied is the practice questions contained in the mathematics textbooks for class VII SMP in the second semester of the 2013 curriculum. The discussion in this study is still focused on analyzing questions in mathematics books in terms of mathematical literacy competence, not yet analyzing the contents of the book as a whole such as the presentation of the material. and sample questions.

The low literacy scores of Indonesian students at the international level survey and the absence of research that discusses the comparison of Indonesian and Singaporean mathematics textbooks related to mathematical literacy, especially grade IV are strong reasons that motivate researchers to carry out this research.

METHOD

The approach used by researchers in this study is a qualitative approach. This qualitative approach is used to obtain detailed and meaningful research data, through this study the author will conduct an in-depth study of the research object (Sugiyono, 2010, p. 35). The qualitative research itself aims to present a detailed, detailed and thorough description of the comparative study of mathematics textbooks used in fourth grade in Indonesia and Singapore in terms of mathematical literacy. In this study, the researcher will use the type of library research, this type of research was chosen because the primary data source of this research is a textbook and a written document, besides that the answers to the problems posed are in written documents.

As an effort to collect research data, there are two data sources used by researchers, namely primary data sources and secondary data sources. In this study, the primary data source is mathematics books for grade 4 semesters 1 and 2 which are used in learning in Indonesia and Singapore. The mathematics textbook from Indonesia that was selected is a mathematics textbook published by the Ministry of Education and Culture of the Republic of Indonesia with the title “Senang Belajar Matematika untuk SD/MI Kelas IV” published in 2018 and compiled by Hobri, et al. It is the only one book published in the official catalog of textbooks on the website of the Ministry of Education and Culture of the Republic of Indonesia and has been approved for use in fourth grade elementary and equivalent schools. Meanwhile, the mathematics textbook from Singapore that was selected was a textbook published by Marshall Cavendish Education Pte Ltd. with the title “My Pals Are Here! Pupil’s Book Maths 4A and 4B (3rd Edition)” published in 2016 and compiled by Fong Ho Kheong, Chelvi Ramakrishnan Naidu, and Gan Kee Soon. The reason for choosing this book is because it is one of the fourth grade textbooks that are included in the Approved Book List or textbooks that have been approved for use by the Ministry of Education of Singapore. While the secondary data used in this study consisted of books, journal articles, final assignments, published documents, and documents from the ministry.

Related to research data collection techniques, researchers used two techniques, namely through observation and documentation. Through this observation technique the author will collect the main data sourced from fourth grade mathematics textbooks in Indonesia and Singapore. In addition to the observation technique, the author also uses documentation techniques, documentation techniques are used by researchers to collect documents such as snippets of material presentation images, sample questions, and practice questions contained in the two books.

In this study, the validity of the data is based on the validity of expert judgment, stability reliability, and reproducibility reliability. Sugiyono explained that validity is the degree of conformity between the data contained in the object of research and the data submitted by the researcher (Sugiyono, 2012). Meanwhile, expert judgment is an attempt to ask for consideration from experts related to the research theme. So, the researcher will ask for consideration from the weighing expert to provide input and considerations related to the analysis instrument for grade fourth mathematics textbooks in terms of their mathematical literacy competence. In this study, there are two categories of validators, namely expert researchers consisting of two people and peers consisting of three people.

In addition to the validity of the experts, researchers also carried out reliability tests, in this study used stability and reproducibility reliability. Kripendorff suggests that stability reliability is achieved by re-examining the available data sources repeatedly to get a consistent understanding of the data related to the aspects studied (Krippendorf, 2013). The recording and examination of the research data was carried out 3 times. This is done to obtain consistent data regarding the literacy competencies contained in the book. Reproducibility reliability is achieved through discussion and confirmation with colleagues. The peer in question is a person who has knowledge related to this research. This is carried out to check the correctness of the interpretations made in research on language and material aspects.

After the data related to the research discussion were collected, the researcher then conducted an analysis of the data that had been obtained. Because the data collected from this research is sourced from the contents of the textbook, the data analysis used is the type of content analysis. Furthermore, the data that has been obtained by the author will be analyzed by means of descriptive quantitative and descriptive qualitative. The research data analyzed is part of the mathematics textbook, namely the presentation of material, sample questions, and practice questions.

Quantitative descriptive analysis itself is used to determine the percentage of mathematical literacy components contained in mathematics textbooks. Several stages of this descriptive analysis are (1) coding the aspects of mathematical literacy that are the research material; (2) input data on the presentation of the material, sample questions, and practice questions that are analyzed; (3) determine aspects of mathematical literacy contained in the presentation of material, sample questions, and practice questions; (4) calculate the aspects that emerge from the results of the analysis; (5) calculate the total percentage of each aspect and as a whole. Meanwhile, qualitative descriptive analysis is used to describe aspects of mathematical literacy found in mathematics textbooks. The stages carried out by the researcher are (1) displaying examples of images from the presentation of material, sample questions, or practice questions that present aspects of mathematical literacy; (2) provide a description of the example of the presentation of the material, sample questions, or practice questions that are presented.

RESULTS

There are two math textbooks of fourth grade that are the object of this research, namely grade fourth math textbooks used in Indonesia and Singapore. Mathematics textbook from Indonesia, namely "Senang Belajar Matematika untuk SD/MI Kelas IV" which was officially issued by the Center for Curriculum and Books, Balitbang, Ministry of Education and Culture of Republic of Indonesia. Meanwhile, the mathematics textbook from Singapore is “My Pals Are Here! Pupil's Book Maths 4A and 4B (3rd Edition)” published by Marshall Cavendish Education. The contents of the books of the two books were analyzed based on their ability to facilitate the development of students' mathematical literacy.

The content of the mathematics books analyzed included presentation of material, sample questions, and practice questions. The presentation of the analyzed material is in the form of a summary of the material or information about the material in the book and student activities. Examples of questions that are analyzed are in the form of sample questions accompanied by how to solve them. Practice questions analyzed in the form of practice questions contained in each sub-chapter of material and practice questions at the end of the chapter. The material analyzed is taken from material that has similarities from the two books that are the object of research.

Based on the observations in the two books, there are six similar materials in the two textbooks, namely Fractions, Factors and Multiples of Numbers, Rounding, Flat Shapes, Statistics, and Angle Measurement. Therefore, the analysis of the book will focus on these materials. All book content from these six materials was analyzed using an analytical instrument sheet based on mathematical literacy competence.

Data analysis results from this study will be presented from two perspectives, namely horizontal and vertical analysis (Wijaya, Heuvel-Panhuizen, & Doorman, 2015). Horizontal analysis includes physical characteristics and the number of books analyzed, while vertical analysis includes the proportion of book content in terms of the mathematical literacy competence of each analyzed mathematics textbook.

Results of Analysis of Physical Characteristics of Mathematics Textbooks

Several things that will be the focus of the analysis of the physical characteristics of mathematics textbooks include the size of the book, the number of pages of the material being analyzed, and the surface area of the book. This study also calculates the amount of book content including the presentation of material, sample questions, and practice questions from each of the analyzed materials. The following are the results of the physical characteristics and the number of book contents presented from each of the analyzed mathematics textbooks.

Table 1. Physical Characteristics and Loads of Mathematics Textbooks

	Math Textbook	
	Indonesia Ministry of Education and Culture	**Marshall Cavendish**
Physical characteristics		
Book size/page	300 x 210	275 x 210
Total pages[a]	122	112
Surface area of the book/page[b]	768	647
Number of content analyzed		
Number of material presentation	23	39
Number of sample questions	59	72
Number of practice questions	234	287

[a] only the total pages of the analyzed material
[b] multiply the area of the book by the number of pages

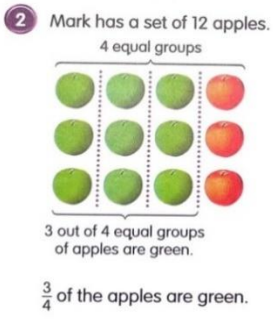
This research on content analysis of mathematics textbooks from the Indonesia Ministry of Education and Culture and Marshall Cavendish is viewed from mathematical literacy competence which consists of three components, namely mathematical processes, mathematical content, and life contexts. In relation to the mathematical process, there are several aspects of the mathematical process to be analyzed, namely oral communication, written communication, mathematising, representation, reasoning and argument, devising strategies for solving problems, using operations and symbolic language, formal language, and technical language, the last is the using mathematics tools. In relation to mathematical content, there are several contents to be analyzed, namely the content of change and relationship, the content of space and form, the content of numbers, the last is the content of probability and uncertainty. Regarding the context of life, there are several contexts to be analyzed, namely personal, work, societal contexts, and scientific ones.

The picture above is an example of presenting material from Marshall Cavendish's mathematics textbook. Based on this example, data related to mathematical literacy can be obtained including the material that facilitates several aspects, namely the "written communication" aspect, because children are taught to write fractions through writing; aspects of "mathematising", because the fractional material presented is associated with something familiar to children; the "representation" aspect, because the material presented uses images as a medium for conveying concepts to children.

As for the aspect of "oral communication", aspects of "reasoning and giving reasons", "strategies to solve problems", "use of operations and symbol language, formal language, and technical language", and "use of mathematical tools" are not seen in the presentation of this material. Regarding mathematical content, this material includes fractional material which is included in the “change and relationship” content, and for the context of life this material is associated with a “personal” context because the material takes Mark as an individual in the material.

Content Analysis of the Mathematics Books

Results of Analysis of Material Presentation in Mathematics Books



Marshall Cavendish book page 26

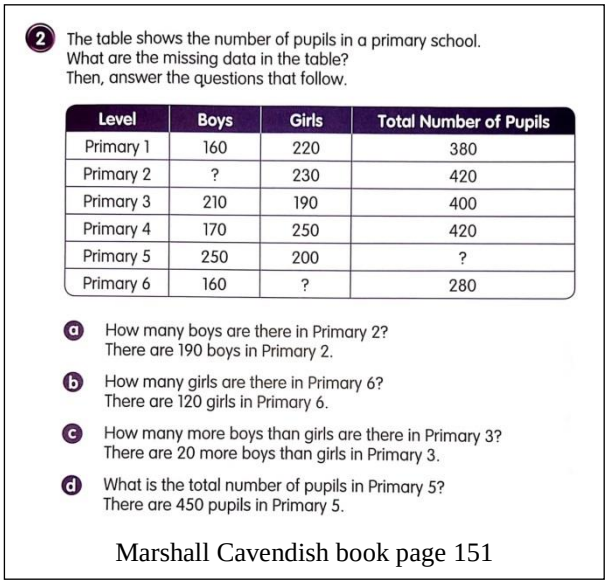
Figure 1. Example of material presentation for Marshall Cavendish's math book

Table 2. Details of Mathematical Literacy on Material Presentation

Indonesia Ministry of Education and Culture Textbook			Marshall Cavendish Textbook		
Average Mathematical Literacy Percentage	**Aspects of Mathematical Literacy**	**Details of Aspects of Mathematical Literacy**	**Average Mathematical Literacy Percentage**	**Aspects of Mathematical Literacy**	**Details of Aspects of Mathematical Literacy**
The percentage of mathematical literacy in the presentation of the material (31%)	Mathematical process aspect (48%)	Verbal communication (22%)	The percentage of mathematical literacy in the presentation of the material (26%)	Mathematical process aspect (41%)	Verbal communication (23%)
		Written communication (96%)			Written communication (87%)
		Mathematising (87%)			Mathematising (26%)
		Representation (91%)			Representation (72%)
		Reasoning and argument (48%)			Reasoning and argument (49%)
		Devising strategies for solving problems (0%)			Devising strategies for solving problems (0%)
		Using symbolic, formal and technical language and operations (30%)			Using symbolic, formal and technical language and operations (51%)
		Using mathematics tools (13%)			Using mathematics tools (21%)
	Mathematical content aspect (25%)	Change and relationship (22%)		Mathematical content aspect (25%)	Change and relationship (36%)
		Space and shape (35%)			Space and shape (36%)
		Number (30%)			Number (15%)
		Probability and uncertainty (13%)			Probability and uncertainty (13%)
	Aspects of life context (20%)	Personal (52%)		Aspects of life context (12%)	Personal (33%)
		Occupational (4%)			Occupational (3%)
		Societal (17%)			Societal (5%)
		Scientific (4%)			Scientific (8%)

The table above is the result of the analysis of the material presentation of the two books. Presentation of material in the Indonesia Ministry of Education and Culture's mathematics textbooks facilitates the development of mathematical literacy by an average of 31% with details of 48% for mathematical processes, 25% for mathematical content, and 20% for life contexts. Meanwhile, the presentation of material in Marshall Cavendish's mathematics textbook facilitates the development of mathematical literacy by an average of 26% with details of 41% for mathematical processes, 25% for mathematical content, and 12% for life context.

Results of Analysis of Sample Questions in Mathematics Books



2 The table shows the number of pupils in a primary school.
What are the missing data in the table?
Then, answer the questions that follow.

Level	Boys	Girls	Total Number of Pupils
Primary 1	160	220	380
Primary 2	?	230	420
Primary 3	210	190	400
Primary 4	170	250	420
Primary 5	250	200	?
Primary 6	160	?	280

a How many boys are there in Primary 2?
There are 190 boys in Primary 2.

b How many girls are there in Primary 6?
There are 120 girls in Primary 6.

c How many more boys than girls are there in Primary 3?
There are 20 more boys than girls in Primary 3.

d What is the total number of pupils in Primary 5?
There are 450 pupils in Primary 5.

Marshall Cavendish book page 151

Figure 2. Example of sample questions for Marshall Cavendish's math book

The picture above is an example of a problem from Marshall Cavendish's math textbook. Based on this example, data related to mathematical literacy can be taken including the example questions that facilitate several aspects, namely the "oral communication" aspect, because the practice questions train children to express answers orally; aspects of "written communication", because children are taught to write answers in writing; aspects of "mathematising", because the examples of questions presented are related to something familiar to children, namely the number of students in an elementary school; the "representation" aspect, because the examples of questions presented use tables as data presentation media.

As for the aspects of "reasoning and giving reasons", "strategies to solve problems", "use of operations and symbol language, formal language, and technical language", and "use of mathematical tools" are not seen in this example problem. Regarding mathematical content, this sample question includes tables and line graphs which are included in the "probability and uncertainty" content, and for the context of life, this sample problem is related to the context of "society or group" because there is data on a group of children in an elementary school in the example.

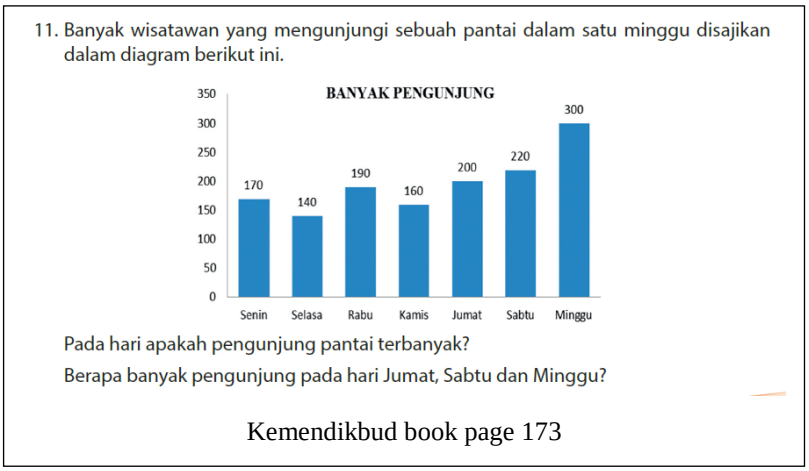
Table 3. Details of Mathematical Literacy on Example Questions

Indonesia Ministry of Education and Culture Textbook			**Marshall Cavendish Textbook**		
Average Mathematical Literacy Percentage	**Aspects of Mathematical Literacy**	**Details of Aspects of Mathematical Literacy**	**Average Mathematical Literacy Percentage**	**Aspects of Mathematical Literacy**	**Details of Aspects of Mathematical Literacy**
The percentage of mathematical literacy in the presentation of the material (20%)	Mathematical process aspect (30%)	Verbal communication (14%) Written communication (100%) Mathematising (10%) Representation (24%) Reasoning and argument (36%) Devising strategies for solving problems (10%) Using symbolic, formal and technical language and operations (39%) Using mathematics	The percentage of mathematical literacy in the presentation of the material (26%)	Mathematical process aspect (44%)	Verbal communication (4%) Written communication (100%) Mathematising (32%) Representation (79%) Reasoning and argument (64%) Devising strategies for solving problems (4%) Using symbolic, formal and technical language and operations (67%) Using mathematics

		tools (7%) Change and relationship (41%) Space and shape (31%) Number (27%) Probability and uncertainty (2%)		tools (1%) Change and relationship (50%) Space and shape (11%) Number (35%) Probability and uncertainty (4%)
	Mathematical content aspect (25%)		Mathematical content aspect (25%)	
	Aspects of life context (4%)	Personal (12%) Occupational (2%) Societal (2%) Scientific (0%)	Aspects of life context (8%)	Personal (17%) Occupational (1%) Societal (4%) Scientific (8%)

The table above is the result of the analysis of sample questions from the two books. The sample questions section of the Ministry of Education and Culture's mathematics textbook facilitates the development of mathematical literacy by an average of 20% with details of 30% for mathematical processes, 25% for mathematical content, and 4% for life context. While the sample questions in Marshall Cavendish's mathematics textbook facilitate the development of mathematical literacy by an average of 26% with details of 44% for mathematical processes, 25% for mathematical content, and 8% for life context.

Results of Analysis of Practice Questions in Mathematics Books



Kemendikbud book page 173

Figure 3. Example of practice questions for Marshall Cavendish's math book

The image above is an example of practice questions from the Indonesia Ministry of Education and Culture mathematics textbook. Based on these examples, data related to mathematical literacy can be taken including the practice questions that facilitate several aspects, namely the "oral communication" aspect, because the practice questions train children to express answers verbally; aspects of “written communication”, because children are taught to write answers in writing; the "mathematising" aspect, because the practice questions presented are related to something familiar to children, namely visitors at a tourist place.

As for the "representation" aspect, the "reasoning and argument" aspect, "problem solving strategy", "the use of operations and symbol language, formal language, and technical language", and "the use of mathematical tools" are not seen in this exercise. Regarding mathematical content, this practice question includes statistical material which is included in the content of "probability and uncertainty", and for the context of life this material is associated with the context of "society or group" because there is data from a group of visitors on the question.

The table above is the data from the analysis of practice questions from the two books. The practice section of the Indonesia Ministry of Education and Culture mathematics textbook facilitates the development of mathematical literacy by an average of 21% with details of 33% for mathematical processes, 25% for mathematical content, and 7% for life context. While the practice questions in Marshall Cavendish's mathematics textbook facilitated the development of mathematical literacy by an average of 20% with details of 32% for mathematical processes, 25% for mathematical content, and 5% for life context.

Table 4. Details of Mathematical Literacy in Practice Questions

Indonesia Ministry of Education and Culture Textbook			Marshall Cavendish Textbook		
Average Mathematical Literacy Percentage	**Aspects of Mathematical Literacy**	**Details of Aspects of Mathematical Literacy**	**Average Mathematical Literacy Percentage**	**Aspects of Mathematical Literacy**	**Details of Aspects of Mathematical Literacy**
The percentage of mathematical literacy in the presentation of the material (21%)	Mathematical process aspect (33%)	Verbal communication (5%) Written communication (99%) Mathematising (35%) Representation (18%) Reasoning and argument (13%) Devising strategies for solving problems (15%) Using symbolic, formal and technical language and operations (58%) Using mathematics tools (19%)	The percentage of mathematical literacy in the presentation of the material (20%)	Mathematical process aspect (32%)	Verbal communication (12%) Written communication (100%) Mathematising (22%) Representation (10%) Reasoning and argument (21%) Devising strategies for solving problems (16%) Using symbolic, formal and technical language and operations (66%) Using mathematics tools (6%)
	Mathematical content aspect (25%)	Change and relationship (21%) Space and shape (42%) Number (26%) Probability and uncertainty (10%)		Mathematical content aspect (25%)	Change and relationship (39%) Space and shape (19%) Number (30%) Probability and uncertainty (11%)
	Aspects of life context (7%)	Personal (16%) Occupational (2%) Societal (7%) Scientific (1%)		Aspects of life context (5%)	Personal (12%) Occupational (2%) Societal (3%) Scientific (2%)

DISCUSSION

The discussion in this section contains a study of the results of the analysis of mathematics textbooks used in grade fourth published by the Indonesia Ministry of Education and Culture and published by Marshall Cavendish with reference to related theories. The discussion below will describe the content of mathematics textbooks published by the Indonesia Ministry of Education and Culture and Marshall Cavendish which consists of presenting material, sample questions, and practice questions in terms of the three components of mathematical literacy.

Mathematics textbooks from the Ministry of Education and Culture and Marshall Cavendish were analyzed using three components of mathematical literacy that contain various aspects. In PISA there are three identified components of mathematical literacy, namely mathematical ability/process, mathematical content, and situation and context (OECD, 2017b).

First is the mathematical process, the basic abilities that underlie the mathematical process are communicaton, mathematising, representation, reasoning and argument, devising strategies for solving problems, using operations and symbolic language, formal language, and technical language, using mathematical tools (Abidin, Mulyati, & Yunansah, 2018, p. 108).

The second is the component of mathematical content, the content is divided into four parts, namely changes and relationships related to the subject of algebra, space and shape related to the subject of geometry, numbers relating to number relationships and number patterns, probability and uncertainty related to statistics and probability (Hayat & Yusuf, 2010, p. 213). The third is the context component, the context component describes problem situation in everyday life. There are four contexts in this component, namely the personal, societal, occupational, and scientific context (OECD, 2017b).

The overall results of the study indicate that the two books analyzed, both the Indonesia Ministry of Education and Culture mathematics textbook and the Marshall Cavendish mathematics textbook, have the potential to develop students' mathematical literacy, with the same average percentage of 25%. Based on the results of the analysis of the three components of mathematical literacy, for the presentation of material that is superior is the Indonesia Ministry of Education and Culture mathematics textbook with a difference of 5%, for example questions that are superior are the Marshall Cavendish mathematics textbook with a difference of 6%, and for practice questions that are superior are books of the Indonesia Ministry of Education and Culture mathematics text with a difference of 1%.

Presentation of Material in Mathematics Textbooks

Regarding the results of the analysis of the presentation of the material in general, the advantages of the Indonesia Ministry of Education and Culture mathematics textbook when compared to Marshall Cavendish mathematics textbooks include the presentation of the "mathematising" aspect and the "reasoning and argument" aspect which is part of the components of the mathematising process. In addition to these two aspects, there are also other advantages, namely the context that is more presented in the material, especially in three contexts, namely the "personal" context, the "occupational" context, and the "societal" context.

The high percentage of the "mathematising" aspect in the presentation of this material is because the Indonesia Ministry of Education and Culture mathematics textbooks relate a lot of material to real-world problems, many materials from the Indonesia Ministry of Education and Culture mathematics textbooks also directly apply the concepts of the material learned to real life. Meanwhile, the reason for the high percentage of "reasoning and argument" aspects comes from the presentation of material that is directly applied to the problem, to understand a material, children are taught to understand a material concept through reasoning and giving reasons.

As mentioned above, the advantages of presenting the material for the Indonesia Ministry of Education and Culture mathematics textbook compared to Marshall Cavendish's mathematics textbook, apart from the mathematical process, are also found in the context associated with the existing material. This is directly proportional to the high percentage of the "mathematising" aspect contained in the material, it can be seen that the Indonesia Ministry of Education and Culture mathematics textbook tries to link the concepts of the material studied directly with the context of life, whether it is personal, occupational, or societal contexts.

According to Fauzana et al. there are differences in the improvement of mathematical literacy skills between students who study with Realistic Mathematics Education (RME) and students who learn using conventional learning (Fauzana, Dahlan, & Jupri, 2020). Similar to Realistic Mathematics Education (RME), mathematising is defined as the transformation of problems defined in the real world into problems in the form of mathematics or interpreting mathematical results or mathematical models in relation to the original problem (OECD, 2017b). So Realistic Mathematics Education (RME) and mathematising have the same goal, namely to link mathematics learning with real-world contexts.

The high aspect of reasoning is related to the presentation of material associated with a scientific approach, where one of the stages is reasoning. The application of a scientific approach to the presentation of the Indonesia Ministry of Education and Culture mathematics textbook material can be seen from the activities of "Ayo Mengamati", "Ayo Menanya", "Ayo Menalar", "Ayo Mencoba", and "Ayo Mengkomunikasikan". The existence of the "Ayo Menalar" activity is one of the reasons for the high percentage of the "reasoning and argument" aspect in the Indonesia Ministry of Education and Culture mathematics textbooks. Meanwhile, in Marshall Cavendish's mathematics textbook, the concept of material is presented through a context-based task. This is also the reason the material and sample questions are interrelated, because to understand the concept of the material provided, students need to complete several sample questions contained in the book.

The results of the analysis show that Marshall Cavendish's mathematics textbook does not relate much material to the context of life, one of the reasons is that Marshall Cavendish's mathematics textbook refers to the objectives of learning mathematics at the elementary school level in the Singapore curriculum. One of the goals of the curriculum for learning mathematics at the elementary school level in Singapore is for students to be able to build self-confidence and foster an interest in mathematics. In addition, the material in Marshall Cavendish's mathematics textbooks is informative and student activities, unlike the Ministry of Education and Culture's mathematics textbooks which are more about applying concepts to life (Ministry of Education Singapore, 2013).

Examples Questions in Mathematics Textbooks

Based on the results of the analysis, sample questions in the Indonesia Ministry of Education and Culture mathematics textbook and Marshall Cavendish mathematics textbook have facilitated the development of students' mathematical literacy competencies with various percentages. Based on the average results of the analysis of sample questions related to the three components of mathematical literacy, it can be seen that Marshall Cavendish's mathematics textbook is superior to the Ministry of Education and Culture's mathematics textbook by a difference of 6%.

The advantages of Marshall Cavendish's sample questions of mathematics textbook that are not found in the Indonesia Ministry of Education and Culture mathematics textbooks come from the three components of mathematical literacy, namely mathematical processes, mathematical content, and life contexts. Regarding the mathematical process, there are four aspects that appear to be superior in the example of Marshall Cavendish's mathematics textbook questions, namely the "mathematising" aspect, the "representation" aspect, the "reasoning and argument" aspect, and the "operational and symbolic language, formal and technical" aspect. Furthermore, for mathematical content, there are three content that is superior to Marshall Cavendish's example of mathematics textbook questions, namely "change and relationship" content, "numbers" content, and "probability and uncertainty" content. In the component of the context of life, there are also three aspects that are superior, namely the "personal" context, the "societal" context, and the "scientific" context.

Slightly different from the presentation of informative material, the sample questions in Marshall Cavendish's mathematics textbook are more applicable. Marshall Cavendish's mathematics textbook applies more concepts learned directly to sample questions than in presenting the material. It can be seen that Marshall Cavendish's mathematics textbook wants to apply the mathematical concepts learned directly to sample questions so that students better understand how to apply concepts and how to solve problems related to these concepts. This is in line with the concept used by Marshall Cavendish's mathematics textbook, namely the concept of context-based task. The use of this concept can be seen in the introduction to Marshall Cavendish's mathematics textbook. According to Brown and Redmond, teaching mathematics using a context-based approach can be used by teachers to encourage student engagement in mathematics (Brown & Redmond, 2017).

Furthermore, to support students' understanding of the application of mathematical concepts learned in sample questions, Marshall Cavendish's mathematics textbook provides many representations or modeling to help make it easier for students to solve a problem contained in the problem. In addition, this representation also familiarizes students with making models or illustrations so that problems are easier to understand and questions can be more easily worked on. Visual representations can be used as a tool or strategy for understanding (e.g., organizing information, identifying quantitative patterns and relationships) and solving mathematical problems (e.g., identifying the number of [calculation] steps and operations required to solve a problem) (van Garderen, Scheuermann, Poch, & Murray, 2018). This is the reason for the higher "representation" aspect in the example of Marshall Cavendish's mathematics textbook questions.

NCTM explains that, students in grades 3-5 need to develop and use various representations of mathematical ideas. These representations are needed to model the situation in question, to understand mathematical relationships, and support or refute assumptions. Informal representations such as pictures should be used to emphasize the various features of the problem. To express and understand ideas like multiplication and location values, they need to use a physical model. They also need to learn how to model and solve problems using equations, charts, and graphs. This representations serves as a tool for thinking and solving problems. It also helps students share their thoughts with others (National Council of Teachers of Mathematics, 2000).

In addition to the two aspects that are the advantages of Marshall Cavendish's example of mathematics textbooks from the Ministry of Education and Culture's mathematics textbooks, there is also the aspect of "reasoning and argument" which are the advantages of Marshall Cavendish's mathematics textbooks. The reason for the high aspect of “reasoning and argument” in Marshall Cavendish mathematics textbooks refers to one of the goals of elementary school mathematics learning at Marshall Cavendish which is to develop thinking, reasoning, communication, application, and metacognitive skills (Ministry of Education Singapore, 2013). Thinking and reasoning abilities are more emphasized on sample questions so that students can immediately understand how to solve problems in questions related to a material concept.

Reasoning and argument at the elementary school level is intended to develop students' abilities to be able to generalize mathematical phenomena and/or find out mathematical relationships and defend reasons using logically valid reasoning (Bieda, Ji, Drwencke, & Picard, 2014). Through reasoning and argument they can also learn to describe relationships that exist in various examples, and to develop or defend arguments about why these relationships can be generalized (National Council of Teachers of Mathematics, 2000). Simply reasoning and giving reasons trains children to explore and connect problem elements so that a conclusion emerges, checks the justification given, or provides justification for a statement or solution to a problem (OECD, 2017a).

The final advantage of the example problems in Marshall Cavendish's mathematics textbook related to mathematical processes is in the aspects of "using symbolic, formal and technical operations and language". The high aspect of "using symbolic, formal and technical operations and language" in the sample questions shows that Marshall Cavendish's mathematics textbook tries to teach students to understand how to solve problems or problems that require arithmetic operations. This is expected to be able to make children accustomed to meeting questions that require solving with arithmetic operations. In addition, this book also tries to familiarize children with using symbolic language in mathematics. The use of language and symbolic, formal and technical operations trains students to understand, interpret, manipulate, and use symbolic expressions in mathematical contexts (including arithmetic expressions and operations) that are managed by existing conventions and rules for formulating, solving, or interpreting mathematics (OECD, 2017a).

The next literacy component in Marshall Cavendish's mathematics textbook which also has advantages is the component of mathematical content, especially in three aspects, namely the content of "change and relationship", the content of "numbers", and the content of "probability and uncertainty". The high percentage of "change and relationship" content comes from the many examples of "fractions" material presented in Marshall Cavendish's mathematics textbook, while the "numbers" content comes from the many examples of "factors and multiples of numbers" and "rounding" material. excellence in the content of "probability and uncertainty" is also for the same reason, namely the many examples of questions related to the material "statistics". The results of the analysis also show that the number of sample questions presented in Marshall Cavendish's mathematics textbook is more than that of Indonesian mathematics textbooks with a difference of 16 sample questions.

In addition to the superiority of the sample questions in Marshall Cavendish's mathematics textbook on the components of mathematical processes and mathematical content, another advantage also comes from the high percentage of life context presented in the sample questions. The results of the analysis show that there are quite a number of examples of questions related to the context of life, especially three aspects of context, namely the “personal” context, the “societal” context, and the “scientific” context, in line with the high percentage of the “mathematising” aspect in the sample questions of Marshall Cavendish mathematics textbook.

Another advantage of Marshall Cavendish's example of mathematics textbook problems that are not found in Indonesia Ministry of Education and Culture mathematics textbooks also lies in the examples of questions that use problem-solving models such as the Polya problem-solving model. According to Polya's problem-solving model, there are several stages that students need to carry out to find an answer to a problem or question, namely understanding the problem, designing strategies, implementing strategies, and making conclusions or re-examining answers (Polya, 2004).

Practice Questions in Mathematics Textbooks

The results of the analysis of practice questions in the Indonesia Ministry of Education and Culture mathematics textbook and Marshall Cavendish mathematics textbook show that the two books have facilitated the development of students' mathematical literacy with varying percentages. The average result of the analysis of practice questions from the two books related to the three components of mathematical literacy shows that the Indonesia Ministry of Education and Culture mathematics textbooks are superior to Marshall Cavendish's mathematics textbooks by a difference of 1%.

The advantages of the Indonesia Ministry of Education and Culture mathematics textbook practice questions from Marshall Cavendish's mathematics textbooks lie in several aspects of the mathematical literacy component. In the mathematical process component, there are three aspects that are the advantages of the Indonesia Ministry of Education and Culture mathematics textbook, namely the "mathematising" aspect, the "representation" aspect, and the "use of mathematical tools" aspect. In the mathematical content component, there is one aspect that is the advantage of the Indonesia Ministry of Education and Culture mathematics textbook, namely the "space and form" content. Meanwhile, in the context of mathematics, there are two aspects that are the advantages of Indonesian mathematics textbooks, namely the "personal" context and the "societal" context.

Based on the analysis of practice questions in the Indonesia Ministry of Education and Culture mathematics textbook, it can be seen that the advantage lies in the "mathematising" aspect. The high aspect of "mathematising" in this book is because the practice questions presented are related to real-life contexts as well as the presentation of the material in this book. In addition to the advantages in the "mathematising" aspect, there are other advantages of this book, namely the "representation" aspect. The results of the analysis show that there are quite a number of practice questions that require students to present answers in the form of pictures, tables, or diagrams. The last advantage related to mathematical processes lies in the aspect of "using mathematical tools". The Indonesia Ministry of Education and Culture mathematics textbooks provide quite a lot of practice questions that ask students to use mathematical tools to solve problems, such as rulers and protractors.

The next advantage of the Indonesia Ministry of Education and Culture mathematics textbook practice questions lies in the components of the mathematical content, especially the “space and shape” content. The practice questions in mathematics textbooks present quite a lot of practice questions related to "space and shape" content such as "area and circumference" or "angle" material. The last advantage of the practice questions from the Indonesia Ministry of Education and Culture mathematics textbook lies in the components of the life context, especially in the "personal" context and the "societal" context.

General Comparison of Mathematics Textbooks

When viewed in general, the results of the analysis of material presentation, sample questions, and practice questions are related to the development of students' mathematical literacy, the advantages of the Indonesia Ministry of Education and Culture mathematics textbook from Marshall Cavendish's mathematics textbook include the components of the mathematical process, especially the "mathematising" aspect and the "using mathematical tools" aspects, for the component part of mathematical content lies in the content of “space and shape”, the last advantages lies in the context of life, especially the context of “personal” and the context of “societal”.

In addition to the advantages discussed above, there are also other advantages of the Indonesia Ministry of Education and Culture mathematics textbook that are not found in Marshall Cavendish's mathematics textbook, one of which the author finds that this book presents material using a scientific approach with several stages, namely observing, asking questions, gathering information, associate/reason, and communicate (Rhosalia, 2017). Based on Fitriani and Cecilia's research, the scientific approach has a positive influence on students' mathematical literacy skills, the resulting R squared is 0.171 or 17.1% (Fitriani & Salsinha, 2021). In addition, there is also a summary of the material presented at the end of the chapter before the practice questions. The following figure is an example of an image summary of the material contained in the Indonesia Ministry of Education and Culture mathematics textbook.

Ayo Merangkum

Buatlah rangkuman terkait dengan pengukuran sudut, tulis dengan kalimatmu sendiri di buku tulismu.

Di bawah ini contoh rangkuman pengukuran sudut.

1. Pengukuran sudut dalam satuan baku merupakan pengukuran sudut yang hasilnya sesuai dengan menggunakan busur derajat. Satuan sudut adalah derajat.
2. Langkah-langkah yang harus dilakukan untuk mengukur sudut satuan baku dengan menggunakan busur derajat sebagi berikut:
   a. Letakkan titik pusat busur pada titik sudut yang akan diukur.
   b. Impitkan garis dasar busur dengan salah satu kaki sudut.
   c. Lihat garis sudut yang lain.
   d. Angka pada busur yang berimpit dengan kaki sudut menunjukkan ukuran sudut.
3. Jumlah sudut pada bangun datar sebagai berikut:
   a. Jumlah sudut segitiga adalah 180°
   b. Jumlah sudut segi empat adalah 360°
   c. Jumlah sudut segi lima adalah 540°

Figure 4. Summary of material in the Indonesia Ministry of Education and Culture mathematics textbook

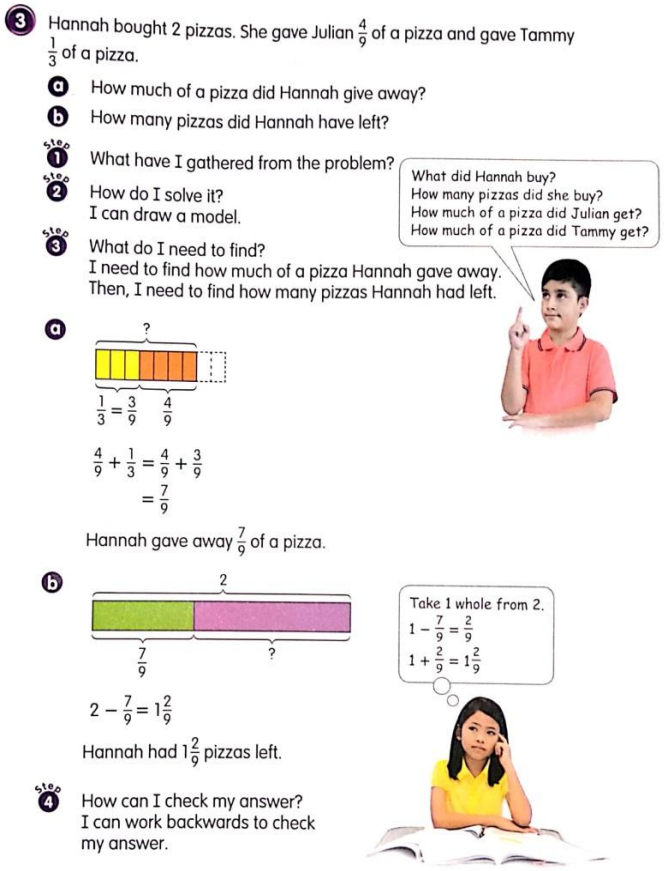


Figure 5. Examples of problem solving method questions in Marshall Cavendish's math textbook

Meanwhile, the general advantage of presenting material, sample questions, and practice questions related to the development of students' mathematical literacy found in Marshall Cavendish's mathematics textbook lies in the three components of mathematical literacy. The advantages of the mathematical process lie in the "representation" aspect, the "reasoning and argumentation" aspect, and the "operational and symbolic language" aspect. Furthermore, the superiority of the mathematical content component lies in the content of “change and relationship”, content of “numbers”, and content of “probability and uncertainty”. The last advantage comes from the components of the context of life, especially the "scientific" context.

In addition to the advantages discussed above, there are also other advantages of Marshall Cavendish mathematics textbooks compared to Indonesia Ministry of Education and Culture mathematics textbooks. These advantages include mathematics textbooks compiled using a mathematical problem solving framework reference (Ministry of Education Singapore, 2013), this later became one of the reasons for the presentation of a special sub-chapter that discusses how to solve problems with problem solving methods including presented sample questions and practice questions. Pillai revealed that solving math problems will help students apply everyday skills (Pillai, Galloway, & Adu, 2017). Based on the findings, the mathematical literacy ability of students in the group that used the collaborative Realistic Mathematics Education (RME) method and the DAPIC problem-solving process was higher than the group that did not use the collaborative method (Sumirattana, Makanong, & Thipkong, 2017). Below are pictures of sub-chapters and sample questions that present problem solving methods to solve problems from Marshall Cavendish's math textbook.

Furthermore, the number of sample questions and practice questions contained in Marshall Cavendish's mathematics textbook is more than that of the Indonesia Ministry of Education and Culture mathematics textbooks, for example, the difference is 13 questions, while the difference in practice questions is 53. In addition to presenting more sample questions and practice questions, Marshall Cavendish's mathematics textbook also provides more material than the Indonesia Ministry of Education and Culture mathematics textbooks. Some of the materials presented by Marshall Cavendish's mathematics textbooks that are not included in the Indonesia Ministry of Education and Culture mathematics textbooks are "Numbers to 100 000" material, "Multiplication and Division of Whole Numbers" material, "Whole Numbers: Word Problems" material, "Symmetry" material, "Decimals" material, "The Four Operations of Decimals" material, "Decimals: Word Problems" material, and "Time" material.

The last advantage found in Marshall Cavendish's mathematics textbook is that it is found in the presentation of activities related to the mathematical material being studied, this activity is intended so that students better understand the concept of the material presented because in this section students carry out activities directly related to a material, this activity entitled "hands-on activity". Foley and Mcphee noted that students in 'hands on' classes had better attitudes towards science than students in pure textbook-based classes (Foley & McPhee, 2008).

Based on the analysis of the presentation of material, sample questions, and practice questions in the Indonesia Ministry of Education and Culture mathematics textbook and Marshall Cavendish mathematics textbook, the researcher can state that both books have the same great potential to develop students' mathematical literacy skills with their respective advantages and disadvantages. Even so, the mathematics textbooks used to study both in Indonesia and in Singapore cannot be used as the only determining factor for the high and low scores obtained by Indonesia and Singapore in the PISA test, because of course there are other factors that affect the acquisition of these scores.

CONCLUSIONS

The results showed that the two books analyzed, both the Indonesia Ministry of Education and Culture mathematics textbook and the Marshall Cavendish mathematics textbook, had the potential to develop students' mathematical literacy skills, with the same average percentage of 25%. Based on the results of the analysis of the three components of mathematical literacy, for the presentation of material that is superior is the Indonesia Ministry of Education and Culture mathematics textbook with a difference of 5%, for example questions that are superior are the Singaporean mathematics textbook with a difference of 6%, and for practice questions that are superior are textbooks Indonesia Ministry of Education and Culture mathematics with a difference of 1%. It is hoped that the results of this analysis can be used as evaluation material to improve and develop mathematics textbooks to become better.

Teachers and schools are expected to be more selective in choosing mathematics textbooks, so that the mathematics textbooks used can develop students' abilities to the maximum. It is hoped that the book compiler team will further improve the quality of the book so that the mathematics textbooks used can develop students' abilities to the maximum. The Ministry of Education of the Republic of Indonesia is expected to further improve standards in the preparation and selection process for mathematics textbooks so that the books distributed and used are the best books that can improve students' abilities. It is hoped that future researchers will use the results of this study as a reference and be able to develop further research related to this theme in the future.

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