Errors Analysis of Grade VII SMP/MTs Mathematics Textbooks on Material Ratios and Alternative Improvements

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Abstract. The purpose of this study was to analyze errors in mathematics textbook class VII SMP/MTs on the ratio of material contained in chapter three of the book and provide alternative improvements. The results of this study can be used as material for consideration in improving textbooks. This is descriptive-analytic research, in which a problem is described and the results are analyzed to draw conclusions. The results of the study showed that there were still some errors in mathematics textbooks for class VII SMP/MTs on the material ratio. These errors include conceptual errors, computational errors, drawing errors, and writing errors. Each of these errors is then given an alternative fix that allows for further book development.

Keyword. Analysis, Book error, Ratio

1. Introduction

The existence of learning loss in Indonesia, which was worsened by the COVID-19 pandemic, affected the achievement of student competencies [1]. In the context of recovering from the learning lag, the government redesigned the curriculum using the diversification principle, namely adjusting the conditions of the education unit, regional potential and students, one of which is the Independent Curriculum. The Merdeka Curriculum is a complementary and simplified version of the 2013 Curriculum [2].

The Merdeka Curriculum regulates teaching devices, which are various teaching materials used by educators in learning, and one of its types is textbooks. Textbooks are educational books that serve the purpose of making it easier for students to learn material at school or at home [3]. Another function of textbooks is to assist educators in delivering modules and to assist students in supporting modules that are informed by educators [4].

Textbooks are divided into main textbooks and companion textbooks. The main textbooks are those that must be used in learning based on the applicable curriculum and are provided by the central government free of charge. In the context of learning, the main textbooks consist of student books, which are handbooks for students, and teacher manuals, which are guides for educators to carry out learning based on student books.

Flexible and contextual main textbooks can be printed or digital, and the general public can download them from the https://buku.kemdikbud.go.id/katalog page. One of the main textbooks that can be downloaded is the “Matematika untuk SMP/MTs Kelas VII” textbook by author Dicky Susanto, et al., which was printed in its first printing in 2022 and published online in January 2023. Mathematics textbooks can help students build their understanding of mathematics and represent mathematics [5,6].

So that the existence of mathematics textbooks can support the achievement of competencies that must be mastered by students according to their class level [7].
The quality of textbooks is one of the factors that influences the effectiveness of a lesson [7]. To obtain good quality, the main text books used in learning have been evaluated periodically as a basis for revision and re-defined by the head of the main unit in charge of curriculum, assessment, and bookkeeping before being distributed to the public. Not only that, but a good textbook is a book that has references in its preparation [3]. The references used in the preparation of the primary textbooks for "Matematika untuk SMP/MTs Kelas VII" by author Dicky Susanto, et al. are guidelines for implementing the curriculum and learning outcomes, so that the attached presentations have been designed in the form of various learning activities to achieve competence in the learning outcomes. Appropriate presentation and sequencing of material will make it easier for students to study it at home before it is presented by the teacher in class. The book has explained ratio material that is in line with student learning outcomes in Phase D.
The results of periodic textbook evaluations do not rule out the possibility of errors occurring in the main textbooks that have been published. Several studies have shown that there are errors that still occur in several previous main textbooks [3,4,8]. Errors in books are usually considered normal, but if they are not corrected more thoroughly, the errors will usually recur [3]. One of the reasons for the existence of errors in the main textbooks is the incompatibility of the textbooks with the references used. Other studies explain that errors in textbooks often occur in concepts, computations, images, and writing [9]. This fact shows that the main textbooks used in the teaching and learning process still need to be evaluated for their feasibility in the learning process. This is important considering that the main textbook in learning is a source of learning to support learning, which is the implementation of the curriculum used. For this reason, the researcher is interested in further analyzing errors in "Matematika untuk SMP/MTs Kelas VII" textbooks with the author, Dicky Susanto, et al., which is the latest published book on ratio material by the Ministry of Education and Culture.

2. Method Study

The study's method of research is qualitative with a descriptive approach. The subject taken is the latest published mathematics textbook, namely "Matematika untuk SMP/MTs Kelas VII" written by Dicky Susanto, et al. This book is the newest book published online on the website and have followed the new rules of the Merdeka Curriculum. The material taken is the ratio material presented in the third chapter of the book, with a total number of pages in the entire chapter of 30 pages. The data were obtained by reading, researching, observing, and analyzing every page listed in chapter three, namely the ratio chapter, in the mathematics book. If you find an error, it will be written down on the data card, followed by categorizing the sources based on the classification presented in Table 1 [9,10].

Table 1. Classification of Error Types and Indicators

Types of errors	Understanding	Indicator
Concept error	Error reasoning from previous truth.	If a reasoning error is found from the previous truth.
Computing error	Calculation errors in solving math problems.	If a calculation error is found in solving the problem.
Image error	Errors in describing concepts and pictures.	If an object is found that is not in accordance with the concept.
Writing mistake	Errors in the preparation of symbols include the placement, dimensions, and consistency of the use of symbols, as well as deficiencies or excesses in writing symbols.	If a symbol is found to be improperly used with the concept or function. If there are advantages or disadvantages to the use of symbols.

The main instrument in this study was the researcher himself, with a supporting instrument, namely data cards. The data analysis used in this study followed the Miles and Huberman technique, which consists of three steps: data reduction, data display, and conclusion [11]. The data reduction stage involves

selecting, focusing, and simplifying the raw data in the data card records. The data display stage is to describe the data in the form of text and images to provide an understanding of the data. After data reduction and data display are complete, conclusions can be drawn [12].

3. Research Results

A textbook is an educational book that aims to make it easier for students to learn the material at school or at home. Not only that, the textbook can assist educators in conveying modules and students in supporting these modules. In order for the learning process to be effective and efficient, textbooks must meet the standards of good book assessment. But sometimes, this feasibility cannot be maximized because of errors that appear in textbooks. One of the newest books uploaded on the website https://buku.kemdikbud.go.id/katalog is book “Matematika untuk SMP/MTs Kelas VII” written by Dicky Susanto et al. and is a textbook that refers to the Merdeka Curriculum.

3.1. Description of Mathematics Textbook

The book text "Matematika untuk SMP/MTs Kelas VII" written by Dicky Susanto et al. and accessible via the page https://buku.kemdikbud.go.id/katalog, was used as the source of data. This book is the latest published textbook on the website and was uploaded in January 2023. The material studied is ratio material with sub-materials according to the achievements of learning mathematics, namely the notions of ratio, scale, proportion, and rate of change. The following is a description of the mathematics textbooks examined in this study:

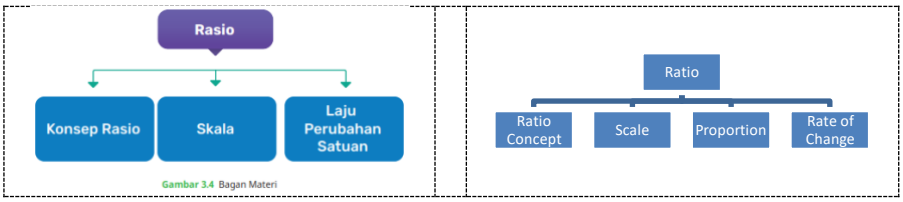
Title	:	Matematika untuk SMP/MTs Kelas VII
Writer	:	Dicky Susanto, et al
Publisher	:	Book Center Agency for Education Standards, Curriculum and Assessment Ministry of Education, Culture, Research and Technology
City rises	:	South Jakarta
Publication Year	:	2022

3.2. Description of Research Results

Based on the results of the analysis of the source data, we found some mistakes in the book mathematics text by Dicky et al. The errors include conceptual errors, computational errors, drawing errors, and writing errors. The details will be discussed as follows.

3.2.1. Concept Error

The first conceptual error is found in the material chart (Figure 1a) on page 87. The concept map made is not in line with the reference, namely the learning outcomes, which include ratio, scale, proportion, and rate of change. The concept map is also inconsistent with the words "ratio and proportion" which are listed on page 117, in the reflection section. Therefore, an alternative improvement that can be made is to add proportion points to the material chart (Figure 1b) and present the proportions as submatter in Chapter 3.



Picture 1a. Picture error in the book.	**Picture 1b.** Alternative fix.

The second conceptual error is a conceptual error in the use of images for each case, which is described on pages 92 and 93. In each case, from case 1 to case 4, the relationship between the image and the desired directive sentence in the book is not explained (Figure 2a). An alternative improvement that can be made is to add one or two sentences stating the relationship with the desired directive sentence (Figure 2b).

Kasus 2 Gambar 3.10 Dua Minuman Susu Cokelat dengan Kepekatan Berbeda a. Pada setiap gelas ditambahkan satu sendok takar cokelat bubuk. b. Pada setiap gelas ditambahkan satu gelas kecil susu. c. Pada gelas C ditambahkan satu sendok takar susu bubuk dan gelas D ditambahkan satu sendok takar cokelat bubuk.	Kasus 2 Gambar 3.10 Dua Minuman Susu Cokelat dengan Kepekatan Berbeda Disediakan dua minuman susu cokelat dengan kepekatan berbeda, yakni pada gelas C dan gelas D seperti pada gambar 3.10 a. Pada setiap gelas ditambahkan satu sendok takar cokelat bubuk. b. Pada setiap gelas ditambahkan satu gelas kecil susu. c. Pada gelas C ditambahkan satu sendok takar susu bubuk dan gelas D ditambahkan satu sendok takar cokelat bubuk.
Picture 2a. Error in the book.	**Picture 2b.** Alternative fix.

The third conceptual error is on page 103, namely in the word "scale factor" (Figure 3). Neither before nor after the word was raised, it was not explained what the scale factor meant. An alternative improvement that can be made is to provide an explanation of the meaning of the word "scale factor" after the word appears.

Perbesaran gambar C adalah 1,5 kali gambar A karena panjang diperbesar 1,5 kali demikian juga lebar diperbesar 1,5 kali. Jadi, dapat dikatakan faktor skala adalah 1,5.
Picture 3. Error in the book.

The fourth conceptual error is found on page 104. This error relates to the simplification of division. It can be seen in Figure 4a, that the author includes the word "minimized". In division, there is no minimized system, there is a simplified system, so an alternative fix for this error is to replace the word "minimized" with "simplified" (Figure 4b).

Cara kedua: Rasio 12 : 16 dikecilkan dahulu $\frac{12}{16} = \frac{3}{4}$	**Cara kedua:** Rasio 12 : 16 disederhanakan dahulu $\frac{12}{16} = \frac{3}{4}$
Picture 4a. Error in the book.	**Picture 4b.** Alternative fix.

The fifth conceptual error is to directly compare a number as a representation of a number with a caption (Figure 5a). Before comparing the numbers with the information you are looking for, first compare the information you are looking for with the information that is known. An alternative fix is to insert a comparison between the known information and the information being sought (Figure 5b). This error was found on several pages, namely pages 104 and 105.

$\frac{1}{60} = \frac{5}{banyak\ makanan}$ Banyak makanan = 5 x 60 = 300 gram	$\frac{\text{banyaknya kelinci gambar kanan}}{\text{banyaknya makanan gambar kanan}} = \frac{\text{banyaknya kelinci gambar kiri}}{\text{banyaknya makanan gambar kiri}}$ $\frac{1}{60} = \frac{5}{banyak\ makanan}$ Banyak makanan = 5 x 60 = 300 gram
Picture 5a. Error in the book on page 105.	**Picture 5b.** Alternative fix.

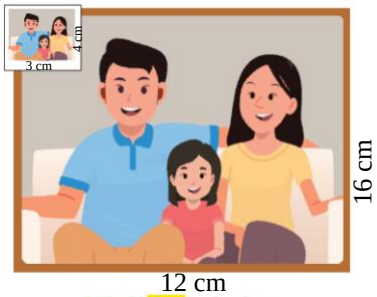
3.2.2. Computing Error

The first computational error is found on page 104. In this computation, the complete flow has not been described and only includes the initial calculation and results (Figure 6a). The flow involved in carrying out the calculation should be described in full. An alternative improvement that can be made is to complete the flow of calculations (Figure 6b).

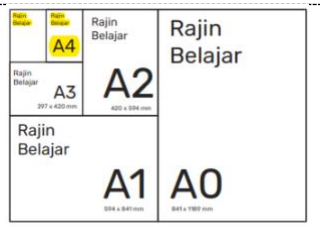
Cara kedua: Rasio 12 : 16 dikecilkan dahulu $\frac{12}{16} = \frac{3}{4}$ Rasio ini digunakan lagi $\frac{3}{4} = \frac{lebar}{32}$ Lebar = 24	**Cara kedua:** Rasio 12 : 16 dikecilkan dahulu $\frac{12}{16} = \frac{3}{4}$ Rasio ini digunakan lagi $\frac{3}{4} = \frac{lebar}{32}$ Lebar = 3/4 x 32 Lebar = 24
Picture 6a. Error in the book.	**Picture 6b.** Alternative fix.

3.2.3. Image Error

The first image error found is in the introduction to the chapter on page 84, which is about images triggering students' interest in the material (Figure 7a). The size of the photo and painting are details about the image displayed. According to KBBI, the word "size" is a noun with the meaning of a number that indicates the unit size of an object. However, the pictures in the book do not show the size in question. An alternative fix for this problem is to add a number that represents the size of the photo and paint it in the image (Figure 7b).

 Gambar 3.1 Ukuran Foto dan Lukisan	 Gambar 3.1 Ukuran Foto dan Lukisan
Picture 7a. Error in the book.	**Picture 7b.** Alternative fix.

The second image error found on pages 85 and 111 is about several sizes of copy paper (Figure 8a). The A4 size does not explain how much it is in millimeters or does not show a symbol stating that the length of A4 is half the length of A3. An alternative fix is to include the length and width of A4 in millimeters (Figure 8b), or you can provide a code indicating that the length of A4 is half the length of A3 (Figure 8c).

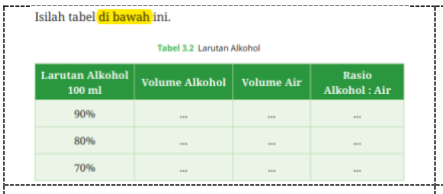
 Gambar 3.2 Beberapa Ukuran Kertas Fotokopi	 Gambar 3.2 Beberapa Ukuran Kertas Fotokopi	 Gambar 3.2 Beberapa Ukuran Kertas Fotokopi
Picture 8a. Picture error in the book.	**Picture 8b.** Alternative fix.	**Picture 8c.** Alternative fix.

The third drawing error is located on page 109. The map of Indonesia presented in the book (Figure 9) does not include a point indicating a city, while the question asks about the length of the map from Jakarta-Jayapura, Jakarta-Medan, and Jakarta-Palangkaraya. This can cause the length measured by students to vary. An alternative improvement that can be made is to provide a point in the desired city so that when measuring the desired distance, it does not vary between one student and another.

Picture 9. Error in the book.

3.2.4. Writing mistake

The writing errors that were found consisted of three categories: reference writing errors, mistakes in using marks at the end of sentences, and errors in writing unnecessary letters or numbers. Errors in writing references occur when the words "under", "above" and "following" are used with the aim of referring to a reference without mentioning what reference is meant (Figure 10a). This error is encountered on page 85 for the word "above", on pages 89, 95, 97, 105, 106, 108, 110, 115, 117, 118, and 119 for the word "under" and on pages 84, 87, 90, 100, and 101 for the word "next" This error can be given an alternative fix by adding clear references as shown in Figure 10b, which is listed on page 110.


Isilah tabel di bawah ini.

Tabel 3.2 Larutan Alkohol

Larutan Alkohol 100 ml	Volume Alkohol	Volume Air	Rasio Alkohol : Air
90%	...	...	...
80%	...	...	...
70%	...	...	...

Picture 10a. Error in the book.

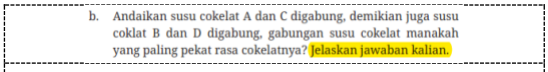
Perhatikan Tabel 3.10 di bawah ini.

Tabel 3.10 Resep Kue

	Telur	Terigu	Gula	Porsi
Bolu Kukus	6	500	500	10 orang
Kue Pisang	2	250	200	5 orang
Kue Cokelat	3	180	150	5 orang

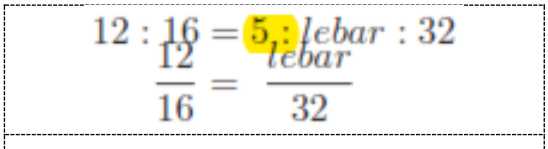
Picture 10b. Alternative fix.

The mistake of using a sign at the end of a sentence is an error when the writer writes a command sentence but the mark used is not an exclamation point "!" (Figure 11). This error is found on pages 89, 90, 91, 95-100, 108-111, and 113-120.


b. Andaikan susu cokelat A dan C digabung, demikian juga susu coklat B dan D digabung, gabungan susu cokelat manakah yang paling pekat rasa cokelatnya? Jelaskan jawaban kalian.

Picture 11. Error in the book page 114.

The last writing error, namely writing errors or unnecessary letters, is on page 104 (Figure 12). An alternative fix that can be done is to delete those that are not needed.


$$12 : 16 = 5 : lebar : 32$$
$$\frac{12}{16} = \frac{lebar}{32}$$

Picture 12. Error in the book.

4. Conclusions and recommendations

The results showed that the “Matematika untuk SMP/MTs Kelas VII” textbooks written by Dicky Susanto et al. with the subject of ratios in Chapter 3 needed revision because there were still some errors found. These errors are concept errors, computational errors, drawing errors, and writing errors. Conceptual errors in textbooks were found in as many as five places. Computing errors discovered up to one error. Three image errors were discovered. Writing errors were found in three categories, with a total of 38 errors in writing. Further revision is needed to correct the errors that have been found in this study.

5. Bibliography

[1] Kemendikbud 2022 *Kepmendikbudristek Nomor 56 Tahun 2022 Tentang Pedoman Penerapan Kurikulum Dalam Rangka Pemulihan Pembelajaran* (Jakarta: Kemendikbudristek)

[2] Hidayati V N, Dani F R, Wati M S and Putri M Y 2022 Pengaruh Pelaksanaan Kurikulum Merdeka Belajar Terhadap Motivasi Siswa Kelas X Di Sman 1 Payung Sekaki *JES* **9** 707–16
[3] Fitriana W 2016 Analisis Kesalahan Buku Matematika pada Topik Segitiga dan Segiempat Kelas VII Semester II Serta Alternanit Pemecahannya *PRISMA* Prosiding Seminar Nasional Matematika vol IX (Semarang: Jurusan Matematika FMIPA UNNES) pp 145–9
[4] Rohim A 2020 Analisis Kesalahan Buku Matematika Materi Relasi dan Fungsi Kelas VIII Serta Alternatif Penyelesaiannya *JE* **6** 259–68
[5] Weinberg A and Wiesner E 2011 Understanding mathematics textbooks through reader-oriented theory *Educ Stud Math* **76** 49–63
[6] Shield M and Dole S 2013 Assessing the potential of mathematics textbooks to promote deep learning *Educ Stud Math* **82** 183–99
[7] Ramda A H 2017 Analisis kesesuaian materi buku teks Kemendikbud matematika kelas VII dengan Kurikulum 2013 *Pythagoras* **12** 12–22
[8] Mayangsari A D, Labulan P M and Rusdiana R 2021 Analisis Kesalahan Buku Teks Matematika Kelas XI SMA/MA Kurikulum 2013 *Jumadika* **3** 79–84
[9] Rohim A 2021 Analisis Kesalahan Buku Matematika Materi Persamaan Garis Lurus Kelas VII SMP Serta Alternatif Penyelesaiannya *Inspiramatika* **7** 34–45
[10] Pranyoto E B and Sujadi A A 2015 Analisis Kesalahan Buku Pelajaran Matematika SMP Kelas VII Kurikulum 2013 Terbitan Kementerian Pendidikan dan Kebudayaan Republik Indonesia 2013 *Union J. Ilm. Pendidik. Mat.* **3** 207–16
[11] Putri V W and Gazali F 2021 Studi Literatur Model Pembelajaran POGIL untuk Meningkatkan Hasil Belajar Peserta Didik pada Pembelajaran Kimia *RRJ* **3** 61–6
[12] Sari M and Asmendri A 2020 Penelitian Kepustakaan (Library Research) dalam Penelitian Pendidikan IPA *NSc* **6** 41–53