P18 turnitin

by P18 Darmawijoyo

Submission date: 24-Jun-2023 04:11PM (UTC+0700)
Submission ID: 2121800457
File name: P18.pdf (803.46K)
Word count: 3177
Character count: 17704

The 6th grade students' view in understanding mathematics through reading mathematics textbook

IOP Conf. Series: Journal of Physics: Conf. Series **1480** (2020) 012061 doi:10.1088/1742-6596/1480/1/012061

The 6th grade students' view in understanding mathematics through reading mathematics textbook

A Turidho[1*], Y Maharani[1] and Darmawijoyo[1]

[1]Mathematics Education Department, Universitas Sriwijaya, Palembang, South Sumatra, Indonesia

[*]Corresponding author's email: 06081281520073@student.unsri.ac.id

Abstract. This research aims to describe students' views in understanding mathematics by reading a mathematics textbook. The subjects of this research were 6 students on grade VI at Singapore International School (SIS) Palembang. This is descriptive research. The research instruments were interviews and questionnaires. Based on the results, 50% of students read a mathematics textbook by reading definitions or rules, learning examples of the problems and doing exercises. And 50% of students read a mathematics textbook by learning examples of the problems, reading definitions or rules and doing exercises. In understanding mathematics, 16.7% of students felt understood mathematics textbook after understood the definitions or rules, 33.3% of students felt understood mathematics textbook after doing the mathematics problems, 33.3% of students felt understood mathematics textbook after doing exercises and 16.7% of students felt understood mathematics textbook after doing mathematics problems and understanding definitions or rules.

1. Introduction

One of the components that can support mathematical learning is understanding mathematics [1]. Understanding mathematics is very important because it can support mathematical abilities such as communication, representation, reasoning and problem solving [2]. Mathematical textbook can help students understand mathematics because mathematics textbook is a source of knowledge in mathematical topics and can help define school subjects [3, 4]. Reading mathematics textbook can be one of alternative in understanding mathematics [5].

Reading mathematics textbooks certainly has benefits for students. Reading mathematics textbook can provide opportunities for students to learn mathematics because it can improve understanding of concepts and make students explore the properties of a mathematical object [6, 7]. In addition, Butler [8] states that reading mathematics textbook can make students explore their own concepts, improve mathematical communication skills, the ability to interpret information and allow one to think critically. NCTM [9] states that reading mathematics enables students learn to communicate mathematically.

However, it is unfortunate that Indonesian students' understanding mathematics is still below expectations. It can be shown from large-scale mathematics assessments such as TIMSS and PISA. In PISA 2015 and 2018 results, Indonesian students' scores on mathematics domain decreased from 386 to 379 [10, 11]. Meanwhile, the results of the TIMSS 2015 grade 4 Indonesian students only ranked 44 out of 49 countries with 397 scores [12].

Therefore, it is necessary to know if it is caused of poor reading comprehension were that influences students' understanding mathematics. There were so many researches about reading comprehension. One of them are: Salihu, Aro &Räsänen [13] have researched that students' reading

comprehension influences students' difficulties in learning mathematics, Weinberg & Wiesner [5] found that mathematics textbook could increase reading comprehension and Sheperd & Sande [14] found that student had different strategies in reading and students' read more meanings than reading word symbols verbatim and there are readers who work by learning the examples of problems. However, there is no research that find out students' steps in reading mathematics and students' view in understanding mathematics textbook. Even though, that are important because to find out students' mathematical understanding. Thus, the authors raised the title "Thesixth-grade students' view in understanding mathematics by reading mathematics textbook".

2. Method

This is descriptive research. It aims to describe students' views in understanding mathematics by reading a mathematics textbook. The subjects of this research were 6 students of grade VI SIS Palembang that were chosen based on recommendations from mathematics teachers in that class. The stages of this research are preliminary stage, data collection stage, and analysis stage. In the preliminary stage, the author prepared research permits and instruments, choosing a subject with mathematics teachers in that school, etc. Data collection techniques were interviews and questionnaires taken directly together. So, the subjects were interviewed while filling out directly on the questionnaire sheet. The data was taken in the 2nd-floor lobby of the SIS Palembang on Monday, 18 November 2019 at 08:30 a.m. until completion. In the analysis stage, Data are analyzed and explained in the sub-topic'result and discussion'.

3. Result and Discussion

The authors identified how to read mathematics textbooks as well as the subject's view of understanding mathematics. In identifying how to read mathematics textbooks, it was identified which steps doing the subjects in order from reading definitions or rules, learning examples of the problems and doing exercises. While on the subjects' view about understanding mathematics, authors identified when students felt understood in reading mathematics textbooks. The results of the analysis are illustrated in Table 1.

Table 1. Analysis results of students' steps in reading mathematics textbook and students' view in understanding mathematics textbook

Subject	Students' steps of reading mathematics textbook	Students' view in understanding mathematics textbook
SVW	2, 1, 3	3
MK	1, 2, 3	2
WRT	2, 1, 3	1 & 2
AIB	1, 2, 3	2
RE	1, 2, 3	3
AJH	2, 1, 3	1

Table 1 shows MK, AIB, and RE read a mathematics textbook by reading definitions or rules, learning examples of the problems and doing exercises. Whereas SVW, WRT, and AJH read a mathematics textbook by learning examples of the problems, reading definitions or rules and doing exercises. SVW and RE felt they understood a mathematics textbook when they can do exercises. MK and AIB felt they understood a mathematics textbook when they understood the examples of the problems. AJH felt he understood a mathematics textbook when he understood the definitions or rules. WRT felt he understood mathematics textbook when he understood the examples of the problems and definitions or rules. The following diagrams show the students' steps in mathematics textbook reading consist of (1) read definition or rules, (2) learn examples of the problems, and (3) do exercise in Figure 1. And the students' view in understanding mathematics textbooks consist of 1. understand the definition or rules, 2. understand the example problems, and 3. can do exercises in Figure 2.

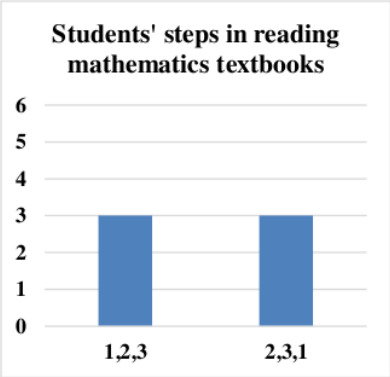

Figure 1. Students' steps in reading mathematics textbooks.

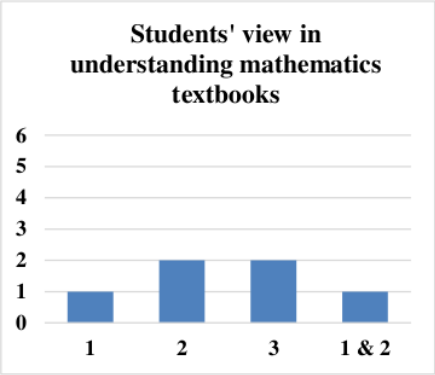

Figure 2. Students' view in understanding mathematics textbook.

Figure 1 shows it is known that in the steps of reading mathematics textbooks, 50% of subjects read a mathematics textbook by reading definitions or rules, learning examples of the problems and doing exercises. Whereas the other 50% of subjects read mathematics textbooks by learning examples of the problems, reading definitions or rules and doing exercises.

Figure 2 shows it is known that 16.7% of subjects felt they understood mathematics textbook was read when they understood the definitions or rules, 33.3% of them felt they understood mathematics textbook was read when they understood the examples of the problems, 33.3% of them felt they understood mathematics textbook that was read when they can do the exercises and 16.7% of them felt they have understood mathematics textbook that was read when they understood the examples of the problems and definitions or rules

3.1. Student's steps of reading mathematics textbook

There are 3 subjects whose steps of reading mathematics textbook as follows: reading definitions or rules, learning examples of problems and doing exercises. One of them is MK. Through interviews, the court explained the process of reading a mathematics textbook that he did that is listed in the following fragment of the interview:

MK : For examples about the ratio like that or what you see first what is this ratio like this continues, for examples, there is like this and there is a problem because later there are exercises
A : Are you doing those exercises?
MK : Yes

This is in accordance with Sheperd, Selden & Selden [15] which states that the approach in reading a book consists of 5 steps namely reading mathematical concepts and procedures (reading definitions or rules), working through examples of the problems, working on problems similar to example of the problems, reviewing return to completion and doing the exercises in the final chapter. The five approaches can be briefly summarized into reading definitions or rules, learning examples of the problems and doing exercises such as the steps of the constitutional court.In addition, there is a MURDER strategy (Mood, Understand, Recall, Ditect & Digest, Expend and Review & Respond) from which the six strategies can be concluded in reading stages, namely reading definitions or rules, learning examples of the problems and doing exercises [16].

There are 3 subjects whose steps of reading mathematics textbook as follows: learning examples of the problems, reading definitions or rules (formulas and properties first) and doing exercises. One of

them is AJH. That is according to Ali & Reid [17] that student usually summarizes mathematical ideas through a procedure (looking at examples of problems) and symbolic representations (whereas in solutions of example problems there will be a symbolic representation) and then the concept (reading definitions or rules) and applications (doing exercises).

3.2 Students' view in understanding mathematics textbook

There are 2 subjects who felt understood mathematics textbook that were read when they understood the examples of problems. One of them is MK. In interviews questionnaire, he stated that he felt that he understood the mathematics textbook that he/she read when he understood the examples of the problems. He explained in the interview that in the examples of the problems there were a solution and he already understood when he saw the solution.

MK	*:*	*(Fill in the questionnaire sheet, check the sample questions)*
A	*:*	*Does this mean that if you have already understood the examples of the problems?*
MK	*:*	*Yes*

Students concentrate more on the problems and find examples that are similar to the problems given in the text [15]. Thus, students who focus on examples of the problems will feel understood when they have understood the examples of problems. In the ability to understand mathematics, focusing on examples of the problems is included in procedural knowledge because through solutions of the examples it can be seen how definitions or rules are applied that have the potential to build procedural fluency [18, 19].

There are 2 subjects who felt understood mathematics textbook that were read when they could do the exercises. One of them is RE. Based on the ability to understand mathematics, understanding textbooks by doing exercises is included in procedural fluency due to carrying out procedures by applying definitions or rules through do exercises [19, 20].

There is only one subject who felt understood mathematics textbook that as read when he understood definitions or rules. That subject is AJH. AJH thinks that when he understands the definitions or rules, it will be easier for him to do the exercises in any form. This can be seen in the following fragment of the interview:

A	*:*	*Ok, continue the second question. When do you feel like you really understand the contents of the textbook? When passing through which stage?*
AJH	*:*	*Definition (designating definition)*
A	*:*	*Really understand? Can you check?*
AJH	*:*	*(ticks the selection)*
A	*:*	*Can you tell it? For example, why do you feel you have already understood the contents of mathematics textbook if you have understood the definitions or understood examples of the problems…?*
AJH	*:*	*Hm ... understood the definition (check the definition too)*
A	*:*	*Can you tell it? For example, why do you feel you have already understood the contents of mathematics textbook if you the definitions or understood examples of the problems…?*
AJH	*:*	*Because it will be easier to do it (do the exercise)*

Focusing on definitions or rules in understanding mathematics including conceptual understanding [19, 20]. Meanwhile, according to Turns & Meter [18] focus on understanding definitions and rules including declarative knowledge which is excellent support for knowledge to be used in solving mathematical problems.

There is only one subject who felt understood mathematics textbook that was read when he understood the examples of the problems and then understood the definitions or rules. That subject is WRT. In the interview, it was seen that WRT considered the two things are related because when he understood the examples of the problems, he felt that the examples of the problems would lead him to understand the definitions. This can be seen in the following fragment of the interview:

A	:	*That's it, so if you have already understood the example of a meaningful problem*
WRT	:	*Hm ... look for the definition (It means understanding the definition through understanding the example problems)*
A	:	*From understanding the examples of the problems, it means that if you have already understood the examples of the problems, you have already understood the material*
WRT	:	*Not really like that*
A	:	*Not until it becomes so you already feels right to understand what you're doing*
WRT	:	*Hm ... understand the definition (check the definition too)*
A	:	*Does this means that if you have already understoodd the examples of the problems and understood the definitions or rules you already feel understood?*
WRT	:	*Yes*

This is in line with Doerr & Temple [21] which states that learning examples of the problems is able to build understanding of mathematics textbook that have been read (definitions or rules). Although WRT had an understanding mathematics textbook focusing on the understanding examples of the problems and understanding definitions or rules, the focus is on the examples of the problems first so that this includes procedural knowledge which then leads WRT to understanding concepts [19, 20]. Students more often use examples to help them understand concepts [8].

4. Conclusion

From 6 subjects research, 50% of students read a mathematics textbook by reading definitions or rules, learning examples of the problems and doing exercises. Whereas the other 50% of students read a mathematics textbook by learning examples of the problems, reading definitions or rules and doing exercises. From 6 subjects, 16.7% of students felt they understood mathematics textbook that was read when they understood the definitions or rules, 33.3% of students felt they understood mathematics textbook that was read when they understood the examples of the problems, 33.3% of students felt they understood mathematics textbook that was read when they can do exercises and 16.7% of students felt they have already understood mathematics textbook that was read when they understood the examples of problems and definitions or rules because the examples of the problems can lead to understanding definitions. It is recommended for other researchers to continue this research by investigating the effect of students' understanding of reading mathematics textbooks on students' mathematics learning outcomes.

5. Acknowledgments

The authors want to express gratitude to the principal of Singapore International School (SIS) Palembang, the sixth grade mathematics teacher of SIS Palembang and subjects in this research.

6. References

[1] Allsopp D H, Lovin L H and Ingen S V 2018 *Teaching Mathematics Meaningfully Solutions for Reaching Struggling Learners (2nd Eds.)* (Baltimore, MD: Paul H. Brookes Publishing Co.,Inc.) p 3
[2] Lambertus 2016 *International Journal of Education and Research* **4** 315
[3] Berger M 2017 *International Journal of Science and Mathematics Education* **17** 385

[4] Valverde G A, Bianchi L J, Wolfe R G, Schimidt W H and Houang R T 2002 *According to the book: Using TIMSS to investigate the translation of policy into practice through the world of textbooks* (New York, NY: Springer Science + Business Media, LLC)
[5] Imam O A 2016 *Journal of Education and Learning* **10** 177
[6] Weinberg A and Wiesner E 2010 *Educational Studies in Mathematics* **76** 49
[7] Korn J 2014 *Thesis* (Lynchburg, VA: Liberty University)
[8] Butler M 2019 *Journal of Humanistic Mathematics* **9** 158
[9] NCTM 2000 *Principles and Standards for School Mathematics* (Reston, VA: The NationalCouncil of Teachers of Mathematics, Inc.)
[10] OECD 2016 *PISA 2015 Results (Volume I)*: *Excellence and Equity in Education* online: http://www.oecd.org/education/pisa-2015-results-volume-i-9789264266490-en.htm
[11] OECD 2019 *PISA 2018: Insights and Interpretations* online: https://www.oecd.org/pisa/PISA%202018%20Insights%20and%20Interpretations%20FINAL%20PDF.pdf
[12] IEA 2015 *TIMSS 2015 International Results in Mathematics* online: http://timssandpirls.bc.edu/timss2015/internationalresults/wpcontent/uploads/filebase/full%20pdfs/T15-International-Results-in-Mathematics.pdf
[13] Salihu L, Aro M and Räsänen P 2018 *Issues in Educational Research* **28** 1024
[14] Shepherd M D and Sande C C V 2014 *The Journal of Mathematical Behavior* **35** 74
[15] Sheperd M D, Selden A and Selden J 2009 *Difficulties First-year University Students Havein Reading Their Mathematics Textbook* online https://files.eric.ed.gov/fulltext/ED518599.pdf
[16] Behzadi M H, Lotfi F H and Mahboudi N 2014 *Mathematics Education Trends and Research* **2014** 1
[17] Ali A A and Reid N 2012 *European Journal of Educational Research* **1** 283
[18] Turns S R and Meter P N V 2011 *Applying Knowledge from Educational Psychology and Cognitive Science to A First Course in Thermo dynamics* online: https://peer.asee.org/applying-knowledge-from-educational-psychology-and-cognitive-science-to-a-first-course-in-thermodynamics.pdf
[19] Đokić O 2013 *Mathematical Exercises as A Basis for Pupils' Mathematical Thinking Development*,ed Radovanić I and Zaclona, Z (Nowy Sacz, Poland: University of Belgrade)
[20] Walle J A V, Lovin L H., Karp K S and Williams J M B 2014 *Teaching Student-Centered Mathematics: Developmentally Appropriate Instruction for Grades Pre-K-2 (Volume I) (2nd Eds.)* (USA: Pearson Education) p 2
[21] Doerr H M. and Temple C 2016 *Journal of Literacy Research* **48** 5

P18 turnitin

ORIGINALITY REPORT

10%	9%	6%	5%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

MATCH ALL SOURCES (ONLY SELECTED SOURCE PRINTED)

4%

★ www.coursehero.com

Internet Source

Exclude quotes	On	Exclude matches	< 1%
Exclude bibliography	On		