Formatif: Jurnal Ilmiah Pendidikan MIPA, March 2025, 15 (1), 331-344
http://dx.doi.org/10.30998/formatif.v15i1.26853
p-ISSN: 2088-351X e-ISSN: 2502-5457
Accredited (S2) by Ministry of Research and Technology of Indonesia No. 148/M/KPT/2020
Available online at https://journal.lppmunindra.ac.id/index.php/Formatif/index

Exploring Teachers' Insights on Teaching Students Reading to Learn Mathematics

Khairani Idris*) & Setiawan
IAIN Lhokseumawe, Indonesia

Abstract

The ability to read to learn mathematics is prominent for students not only for them to become independent learners but also to develop their mathematical literacy skills. This is a phenomenography study conducted to describe mathematics teachers' perspectives on teaching mathematics reading, teaching strategies of mathematics reading they applied in classes, and their perspectives on high-quality mathematics textbooks. The study involved 20 mathematics teachers from 8 high schools in Aceh Province as participants. Data were obtained from semi-structured interviews and an open-ended questionnaire that was subsequently analysed using the content analysis technique. The results showed that there were three different perspectives on teaching mathematics reading, i.e., important and effective, important but less effective, and important but ineffective. The teachers in the first category tended to use teaching strategies that involved both teachers' and students' activities, while they preferred textbooks that provided complete and detailed discussions of contents. The teachers in the second category tended to use strategies that mostly involved teachers' activities, while they did not show a specific preference for textbook characteristics. The teachers in the last category stated that they had never applied reading mathematics strategies in their classes. They preferred mathematics textbooks that discuss contents briefly and provide many exercises.

Keywords: Reading to learn math, teaching math reading, high school teachers' perspective, math reading teaching strategies

(*) Corresponding Author: khairiani.idris1@gmail.com

How to Cite: Idris, K. & Setiawan. (2025). Exploring teachers' insights on teaching students reading to learn mathematics. *Formatif: Jurnal Ilmiah Pendidikan MIPA, 15* (1), 331-344. http://dx.doi.org/10.30998/formatif.v15i1.26853

INTRODUCTION

Reading is a fundamental skill for acquiring knowledge, including in the context of learning mathematics. Research has shown that reading comprehension skills are critical in influencing students' mathematical problem-solving abilities (Laily, 2014; Öztürk et al., 2020), the development of mathematical literacy (Guo, 2021; Žakelj et al., 2019), and are positively correlated with students' mathematical modelling capabilities (Ding & Homer, 202 C.E.). When students develop strong reading skills in mathematics, they are able to decipher mathematical language, which enhances their ability to become independent learners, absorb new information, and engage in higher-order thinking processes (Guo, 2021).

However, the act of reading to learn mathematics differs significantly from reading in other subjects, such as language or history (Barton et al., 2002). Reading in mathematics is particularly challenging because it involves not only understanding written text but also interpreting and processing numbers, symbols, and specialised mathematical notation (Adams et al., 2015; Adams, 2003). As students engage with mathematical texts, they must be able to interpret mathematical terms and concepts in addition to the ordinary language

used in the text. This requires a unique set of cognitive and interpretive skills that combine linguistic and mathematical literacy (Carter & Dean, 2006).

Mathematics education often requires students to engage with complex problem-solving tasks that involve abstract concepts, symbols, and formulas. Therefore, teaching students how to read mathematical texts effectively is crucial for improving their understanding and ability to solve problems independently. To support this, teachers need a deep understanding of their students' reading abilities in mathematics to adapt teaching strategies accordingly (Beaudine, 2018). While some educators have recognised the importance of teaching mathematics through reading, many still focus predominantly on problem-solving methods, assuming that these practices alone can help students master mathematical content. This trend can be seen in many classrooms, particularly in Indonesia, where the emphasis is often on preparing students for exams through rote memorisation and step-by-step problem-solving methods (Wijaya et al., 2019; Zulfikar, 2010).

This gap highlights the need for teachers to shift their focus toward developing students' reading skills in mathematics. In this study, we aim to investigate teachers' perspectives on teaching students reading to learn math. More particularly, we aimed to explore (1) how mathematics teachers view the importance of teaching math reading, (2) the strategies they use to encourage reading in mathematics, and (3) their perspectives on the quality of math textbooks. Understanding teachers' perspectives is crucial for designing effective professional development programs and improving mathematics education overall. By gaining insights into the teachers' approaches, we can help bridge the gap between the importance of reading in mathematics and its practical application in classrooms, particularly in regions like Aceh Province, where educational practices may differ from the central educational system.

METHODS

This qualitative research of the phenomenography type (Marton, 1986) is aimed at examining and describing the differences in perspectives of a group of secondary school teachers in Aceh Province related to teaching mathematics reading. The perspective of the teachers studied includes the importance of teaching mathematics reading, the mathematics reading learning strategies that they have applied, and their views on the criteria for quality mathematics textbooks.

This study involved 20 mathematics teachers (5 males and 15 females) from six schools in Aceh Province. Teacher demographic data is shown in Table 1. These teachers had quite varied teaching experience, ranging from 3 to 17 years, with an average of 9.3 years. Their age also varied between 27 to 50 years old, with an average age of 37 years. Almost all teachers involved were from public schools, and only one was from private schools. All of these teachers had received educator certificates. Three teachers were graduates with bachelor's degrees in mathematics science, 2 had master's degrees in mathematics education, and the other 15 were graduates of bachelor's degrees in mathematics education from several universities in Sumatra. All teachers had participated in at least one teacher professional development program implemented by both the private sector and the local and central government.

Because Indonesia's centralised education system can cause differences in several regions, the profiles of the teachers involved in this study may not be representative of Indonesian teachers. They can be representative of teachers in regions outside Java Island, especially in the western region of Indonesia.

Table 1. Demographic data of 20 teachers participating in the study

	Education level		Type of school		Teaching Experience	
	Bachelor	Master	Public	Private	< 10 years	> 10 years
Male	5	0	4	1	3	2
Female	14	1	15	0	10	5
Total	**19**	**1**	**19**	**1**	**13**	**7**

To ensure flexibility and accommodate the availability of the participating teachers, different data collection methods were applied, including interviews and open-ended questionnaires. The open-ended questionnaire was administered to teachers directly or in the form of an online form through *Google Forms*. This questionnaire consisted of 8 (eight) main questions aimed at finding out the teacher's views on teaching math reading, strategies for teaching math reading, as well as their opinion about quality textbooks. These questions are shown in Table 2. On the other hand, interviews were conducted using semi-structured interview techniques through either face-to-face or online platforms.

Table 2. Interview guidelines

Research Objectives	**Purpose of the Question**	**Key Questions**
1. Perspectives on Reading to learn math	1.1 Teachers' opinions about reading to learn math in general	Based on your experience in learning mathematics, do you think that learning by reading is useful? Why?
	1.2 Teachers' opinions on teaching math reading	Based on your experience in teaching mathematics, do you think teaching students to read is useful and effective? Why?
2 Teaching Strategies	2.1 The use of textbooks by teachers in teaching math reading	Do you use/modify materials from textbooks to help students learn by reading the topics taught? Why?
		Do you use/modify materials from textbooks to help students read to learn the topics being taught? Why?
	2.2 Teachers' strategies in teaching math reading	How do you use/modify materials from textbooks to help students learn math by reading?
	2.3 Teachers' opinions on reading to learn math for students	What do you think about the effectiveness of reading strategies for students learning math?
3 Perspectives on Quality Textbooks	3.1 Opinions on the mathematics textbooks used	As a teacher, what do you think about the math textbooks you use?
		If you were a student, what do you think about math textbooks?
	3.2 Opinions on the characteristics of a quality textbook	What do you think should be the function of a math textbook?
		What do you think are the characteristics of a quality mathematics textbook?

Two teachers were interviewed through internet media and filled out an online questionnaire; one teacher answered the questionnaire online without an interview, while 11 teachers completed the open-ended questionnaire and submitted it directly to them. The other five teachers were interviewed face-to-face at their schools after a time agreement and with permission from the school. This approach allowed for a balance between convenience for participants and the need for in-depth qualitative insights, ensuring that data collection was both practical and comprehensive.

Content analysis was applied to analyse the research data, considering that the technique provides a systematic and objective way to interpret and quantify the meanings within textual data. (Elo et al., 2014). The analysis was done in three steps. In the first step, two researchers read the interview transcript data from each teacher repeatedly until they fully understood the content of the transcripts and were able to capture the characteristics of each teacher, which were then identified and summarised. The second step was identifying keywords from each of the characteristics that have been summarised in the previous step. These keywords were marked to accurately represent all the characteristics that emerged from the data and were grouped into three groups based on the research objectives mentioned earlier. To ensure that all information was interpreted correctly, re-checking the interview transcripts and follow-up interviews were conducted with several teachers when ambiguous information was found that required further clarification. The third stage was classifying keywords from each group into several categories based on the characteristics that emerged. Each category was then labelled with simpler terms to facilitate subsequent analysis, which explored the relationship between teachers' perceptions of teaching reading math materials, their teaching strategies, and quality math textbooks.

To analyse the relationship, the teachers involved were first tagged into T1 to T20 and then divided into appropriate group categories. Two contingency tables were then created to show distribution patterns that could give an idea of the relationship sought, followed by further analysis and discussion by the two researchers about the findings.

RESULTS & DISCUSSION

Results

Teachers' opinions on teaching reading math texts

From the analysis conducted on interview transcripts and written responses, we found three categories of teachers' perceptions about teaching reading mathematics material, namely: (1) important and effective (I-E), (2) important but less effective (I-LE), and (3) important but ineffective (I-IE). The keywords and descriptions of each of these categories are shown in Table 3.

In the first category, teachers appreciated the importance of teaching students to learn math by reading because they believed that when students were more skilled in reading to learn math, then they would be ready to become independent learners. Although there might be some difficulties, teachers in this category considered teaching mathematics material effective because, through reading, students would be better prepared to learn in class, which would help achieve learning goals more optimally.

> *"... Students will certainly be confused in some parts, such as notation, but we can clarify. Asking students to read the material before the class meeting will also make*

them more prepared for the discussion activities. Thus, learning objectives will be optimally achieved" (T12)

Table 3. Categories of teachers' perceptions of teaching reading mathematics

Category	Keywords	Description	Sample Interview Quotes
1. Important and Effective **(I-E)**	Skilled in reading; Independent learners, more responsive, more knowledgeable	Teaching how to learn math by reading will make students independent, more responsive in class, and gain more knowledge	*Asking students to read the material before studying in class will make them more responsive in discussions* (T12) *More knowledge can be gained by reading than just listening to the teacher's explanation* (T2)
2. Important but Less Effective **(I-LE)**	Obstacles from students; requires hard work; Curriculum targets are not met	It takes longer time and harder effort from teachers due to several negative factors from students (e.g. negative attitudes towards reading math, lack of basic knowledge, etc.), which has an impact on not being covered by some materials in the curriculum.	*Teachers must provide motivation and encouragement at all times to make them want to read* (T7)
3. Important but Ineffective **(I-IE)**	Practice problem-solving; Teacher's explanation	Students need to be able to read, but it is even more important to give examples of problems and practice solving problems because it is impossible to understand math material just by reading	*Students will not get a good understanding of the material just by reading in learning mathematics because mathematics is a subject with many symbols, numbers, and theorems* (T9)

The difference in the level of understanding that may appear in some students can be another challenge in teaching reading math material. However, a teacher in this category stated that students would benefit from their reading activities in the form of more knowledge than students who only listen to the teacher's explanations.

> *"Teachers need to pay attention to the fact that students often face difficulties when reading and understanding symbols... Different levels of comprehension may also arise from the same reading material... However, by teaching them how to read math material, they can learn the material themselves from textbooks by reading sample problems and discussing them... I am sure that more knowledge can be gained by reading than just listening to the teacher's explanation."* (T2)

Teachers in the second category perceived the importance of teaching students how to learn mathematics by reading, but less effectively applied in the classroom. For example, one teacher mentioned:

> *"... Yes, it is important for students to gain a better understanding of the material that will be discussed in class [by having them read before class]. However, it is not easy because my students generally do not like to read... Not all of them want to read without the teacher's explanation. Teachers need to provide motivation and encouragement at all times to make them want to read."* (T7)

The teachers in the third category had almost the same perception as those in the second category. Still, they were convinced that what students needed was a teacher's explanation of the material and more sample problems, as well as sufficient problem-solving exercises. They were confident that students could not understand new material just by reading on their own, especially material consisting of symbols, theorems, and numbers.

> *"By reading textbooks, students will gain initial understanding, and teachers can focus more on parts they do not understand. However, students will not get a good understanding of the material if they only use reading strategies. There is even a possibility that they have misconceptions. Mathematics is a subject that consists of many symbols, numbers, theorems... The teacher's explanation is more important to make them understand the lesson."* (T9)

In this category, teachers assumed that math focuses on problem-solving, so it would be ineffective if students learned it by reading textbooks. Teachers' interventions were significant in learning the subject.

Teachers' strategies in teaching reading math material

In this study, teachers were also asked to name several teaching strategies they used in the classroom to encourage students to learn mathematics by reading. Based on their responses, activities used by those teachers in teaching reading mathematics could be categorised into two types: Teacher Activities and Student Activities (Figure 1). The term activity in this study is limited to physical and observable activities related to reading mathematical materials.

Teacher activities include strategies in which teachers play a leading role in these activities, either in facilitating, guiding, or evaluating student reading activities. Student activities are strategies where students are involved as the main actors in these activities, either before, during, or after reading. For example, a teacher stated that in order to guide students as they read, he would explain the difficult terms that students encountered when reading, so this activity was divided into two parts, namely: the student identified the difficult terms (student activity), and the teacher explained them (teacher activity). So, for these activities, students had a main role in identifying difficult terms, and teachers had a main role in explaining difficult terms.

The activities of teachers and students presented in Figure 1 are not necessarily interrelated. For instance, activities designed to promote student reading may not always correspond to before-reading activities, and vice versa. This is due to the fact that not all strategies outlined by teachers can be distinctly categorised as teacher-student interactions. For example, the teacher's activity of presenting learning objectives is considered solely a teacher activity, as no student engagement occurs during this time. While it could be conceptualised as a student activity (i.e., "students understand the learning objectives presented by the teacher"), it is not included in the analysis, as such activities are not observable physical actions. The fact that not all activities are interdependent, some teacher activities, such as presenting learning objectives that occurred in isolation without direct student interaction, highlight the complexity of defining reading strategies within

mathematics instruction and the need for intentional design in implementing reading-supportive teaching methods. Recognising and refining these strategies can contribute to more effective instructional approaches, ensuring that students not only read mathematical texts but also integrate reading into their overall problem-solving processes.

Teacher Activities
1. Facilitate students to read *Example*: - Teachers tell learning objectives - Teachers provide guidance questions to direct students toward reading goals 2. Guiding students to read *Example:* - The teacher explains the difficult terms that students encounter when reading the material 3. Evaluating student reading *Example:* - The teacher asks some related questions verbally - The teacher facilitates class discussions about the reading material
Student Activities
1. Before reading *Example:* - Students read the guide questions 2. During reading *Example:* - Students identify difficult terms and ask the teacher 3. After reading *Example:* - Students summarise the material and repeat it - Students answer the teacher's questions

Figure 1. Strategies used by teachers to encourage reading mathematics materials in the classroom

Teachers' perspectives on quality math textbooks

Teachers' perspective data on quality mathematics textbooks was obtained by asking three main questions, namely their evaluation of the textbooks they had been using, their expectations for the function of textbooks, and the characteristics of quality mathematics textbooks, in their opinion. Based on the results of the analysis of the teachers' responses, it was found that three main parts of the textbook became the focus of the discussion, namely the exposure of the content of the material, pictures, and assignments (including sample questions and exercises). A description of each characteristic is shown in Table 4.

Table 4. Characteristics of a quality textbook in the opinion of a teacher

Book Elements	Characteristic	Description
A. Exposure to Material Content	Concise and clear	The discussion of the material is not too long and confusing, but it provides important parts concisely and clearly
	Complete, detailed, and inappropriate language	The discussion of the material is presented in a complete and detailed manner supported by simple language that suits the level of students
	Ordered	The topics of the material are arranged according to the standard order of the curriculum
B. Image Function	Accommodating material	Images are provided to help readers understand the material
	Motivating reading	Pictures are given to grab students' attention and motivate them to read
C. Assignments (Sample Questions and Exercises)	Adequate, relevant, and ordered	Various tasks are given in sufficient portions, relevant, and arranged according to the level of difficulty of the questions
	Follow national exam standards	Assignments are assigned in accordance with national exam standards

Regarding the presentation of the content of the material, the teacher's responses were divided into three, i.e., concise and clear, complete and detailed with appropriate language, and ordered. The first two categories are clearly different in terms of the way the material is supposed to be discussed. For the concise and clear category, teachers expected that textbooks should provide a brief discussion by showing only the important parts that were necessary for problem-solving.

On the other hand, teachers in the complete and detailed category with appropriate language paid attention to a more detailed and complete discussion of the material, which students could refer to by reading it. So, they suggested that the language used in textbooks needs to consider the (mathematical) literacy level of students.

The other category is ordered, which is that a textbook must follow curriculum topics in a standard order. In this category, teachers also considered the need for clear learning objectives for each topic, which are explicitly mentioned in textbooks.

The variation in teachers' perspectives on content exposure suggests that an effective textbook should strike a balance between being concise and clear while also providing complete and detailed explanations in appropriate language. This indicates the need for textbooks to cater to different instructional approaches and student literacy levels. Furthermore, the logical sequencing of topics following the curriculum standard is essential to ensure coherence and clarity in learning progressions. Teachers also emphasise the role of images not only as visual aids for comprehension but also as motivational tools to engage students in reading. In terms of assignments, teachers expect exercises to be adequately varied, relevant, and structured according to difficulty levels while aligning with national exam standards. These insights underscore the necessity for textbook developers to design materials that are both pedagogically sound and student-friendly, ensuring accessibility, engagement, and alignment with educational objectives.

The relationship between the perspective of teaching math reading and teaching strategies of reading math

To examine the relationship between teachers' views on teaching math reading and the strategies they apply in teaching reading, two contingency tables were created and identified by teachers in each cell. The results are presented in Table 5.

The four teachers in the I-E category believe that teaching math reading is important and effective in applying the activities of teachers and students in their classrooms. Among the nine teachers in the I-LE category, six were identified as focusing on teacher activities only, while the other three teachers were spread across one of the other three lines. The strategy used by the teachers is consistent with how they view teaching math reading, which requires hard work from teachers to make the reading activity effective in math lessons. Meanwhile, for the I-IE category, six teachers did not apply any reading strategies in their classes. However, there is one teacher who claims that he will ask students to conclude the material they have read, but only on certain topics that are considered less difficult for students.

Table 5 Relationship between perspectives on teaching math reading and strategies for teaching math reading

Perspective / **Strategy**	**I-E**	**I-LE**	**I-IE**
None	-	T5	T4; T6; T9; T10; T18; T19
Teacher Activities	-	T3; T8; T11; T12; T13; T17	-
Student Activities	-	T20	
Teacher and Student Activities	T2; T14; T15; T16	T7	-

The findings highlight a strong relationship between teachers' perspectives on teaching math reading and the strategies they employ in their classrooms. Teachers who perceive math reading as important and effective (I-E category) consistently integrate both teacher and student activities to support reading in mathematics instruction. Meanwhile, among teachers who acknowledge the importance of math reading but consider it less effective (I-LE category), a majority rely primarily on teacher-led activities, indicating a more controlled instructional approach. This suggests that while they recognise the value of reading in mathematics, they may struggle to implement student-centred strategies effectively. A notable contrast was found in the I-IE category, where most teachers do not incorporate reading strategies at all, demonstrating a gap between their beliefs and classroom practices. However, one teacher in this category indicated a selective use of student-driven reading activities, particularly for less complex topics. These insights suggest that while teachers recognise the role of reading in mathematics, their strategies for integrating it vary based on perceived effectiveness, instructional preferences, and challenges in implementation. Addressing these variations through professional development and resource support may help bridge the gap between perception and practice, ultimately fostering a more effective approach to teaching math reading.

The relationship between the perspective of teaching math reading and quality textbooks

The distribution of teachers based on their views on the characteristics of quality math textbooks for each category of views on teaching math reading is shown in Table 6. For the presentation of the material, teachers in the I-E category were more concerned with a complete and detailed discussion of the material with the appropriate language level to help students read. This was somewhat in contrast to the teachers in the I-IE category, where six teachers expected the discussion of textbook material to be concise, clear and orderly because they believed that a concise and structured presentation would support students' learning, particularly in problem-solving. Additionally, teachers in this category placed less emphasis on students' reading activities within mathematics learning, which may explain why they did not prioritise the inclusion of images intended to encourage reading engagement.

Different perspectives are also clearly seen between teachers in the I-IE category and teachers in the I-E category regarding the characteristics of assignments in quality textbooks. In contrast to teachers in other categories, teachers in the I-IE category are very concerned about exam standards for exercises in textbooks. Meanwhile, for teachers in the I-E category, sufficient, relevant, and ordered tasks are more important. On the other hand, the distribution of teachers in the I-LE category is almost evenly distributed across three lines; there is no particular tendency that can reflect their character based on their perspective on quality textbooks.

Table 6. The relationship between the perspective of teaching mathematics reading and the characteristics of quality textbooks

Characteristics of the Book \ Perspective		I-E	P-LE	I-IE
Fill:	Concise, clear and orderly	-	3; 5; 7; 12; 17	1, 4, 6, 9; 18;
	Complete, detailed and appropriate language	2; 14; 15; 16	5; 8; 13; 20	19; 10
Picture:	To support the material	16	5, 7, 8; 17	9; 18
	To motivate reading	2	5; 20	-
Practice Questions:	Adequate, relevant and sorted	15; 16	17	4; 6; 9
	Follow national exam standards	3; 5, 7; 8, 11; 12; 13; 20	9; 19	19

The findings indicated a clear relationship between teachers' perspectives on teaching math reading and their expectations for quality mathematics textbooks. Teachers in the I-E category, who strongly believed in the importance and effectiveness of teaching math reading, emphasised the need for textbooks with complete and detailed explanations using language appropriate to student's reading levels. They also consider images to be valuable, both for supporting material comprehension and for motivating students to read. In contrast, teachers in the I-IE category, who did not prioritise teaching math reading, prefer concise, clear, and systematically structured material to aid problem-solving rather than fostering reading comprehension. They also showed little concern for the inclusion of images to encourage reading. Furthermore, teachers in the I-E category valued assignments that were sufficient, relevant, and arranged in a structured manner. In contrast, those in the I-IE category were more focused on ensuring that textbook exercises aligned with national

exam standards. The distribution of teachers in the I-LE category who recognised the importance of reading but found it less effective was more varied, showing no strong preference for any specific textbook characteristic. These findings suggest that teachers' expectations of textbook quality were closely tied to their instructional priorities, with those who emphasise reading preferring more comprehensive materials and those less concerned with reading favouring brevity and exam-focused content.

Discussion

The findings of this study reveal three distinct categories of teachers' perspectives on the importance and effectiveness of teaching mathematics through reading. These categories—Important and Effective (I-E), Important but Less Effective (I-LE), and Important but Ineffective (I-IE)—underscore the variation in how educators approach reading instruction in the mathematics classroom.

It is clear from the results that all participating teachers acknowledged the importance of teaching math reading, but their perceptions about its effectiveness varied. Teachers who categorised reading as both important and effective (I-E) perceived that teaching students how to read mathematics texts could significantly enhance their independence as learners. This perception aligns with previous research by Guo (2021), which highlights the role of reading in fostering mathematical thinking skills and self-regulated learning. Teachers in this category not only emphasised the role of reading in preparing students for class discussions but also believed that reading provided a deeper understanding of mathematical concepts. As one teacher stated, reading the material before class prepared students for more meaningful discussions and led to better overall achievement.

These teachers employed strategies that actively involved both the teacher and students in the learning process. They used methods such as guided reading, where the teacher explains difficult terms, and anticipation guides to prompt students to think critically about the material before reading. These strategies, which are known to facilitate comprehension in mathematics, have been shown to improve students' understanding when applied effectively (Adams et al., 2015; Carter & Dean, 2006). While these strategies are relatively simple, they are highly effective when implemented consistently, as they provide scaffolding for students to engage deeply with the text.

On the other hand, teachers who perceived teaching math reading as important but less effective (I-LE) attributed their concerns to students' negative attitudes toward reading. These teachers acknowledged the importance of reading but found that it required extra effort to motivate students who were less inclined to engage with the material. This finding is consistent with research that suggests students' reluctance to read math texts often stems from a lack of familiarity with mathematical vocabulary and the complex nature of the material (Riyadi & Daswa, 2018). For these teachers, incorporating reading strategies was challenging because of time constraints and curriculum demands. As one teacher noted, despite the importance of reading, the practical application of these strategies often conflicted with the need to cover all the curriculum content.

Teachers in the third category, those who viewed teaching math reading as ineffective (I-IE), expressed concerns that reading alone could not provide sufficient understanding of mathematical concepts. These teachers believed that students needed direct explanations from the teacher and hands-on problem-solving practice. This perspective reflects a common belief that mathematics learning is best achieved through direct instruction and problem-solving exercises rather than through reading. These teachers tended to focus on solving problems in class, using textbooks primarily as sources of exercises rather than as tools for conceptual understanding. As noted by McNeill and

Krajcik (2008), this focus on problem-solving activities can shape students' learning behaviours, reinforcing the idea that understanding comes primarily from practice rather than theoretical reading.

This study also examined the relationship between teachers' perspectives on teaching math reading and the types of strategies they employed in the classroom. Teachers in the I-E category were more likely to use a combination of teacher and student-centred strategies, such as guiding students to identify key concepts and facilitating discussions. Conversely, teachers in the I-LE category primarily used strategies dominated by teacher-centered activities, such as explaining terms and concepts to students. Interestingly, teachers in the I-IE category did not employ reading strategies at all and focused solely on solving problems in class. This underscores the challenge of integrating reading into mathematics instruction, particularly when teachers feel that reading does not directly contribute to students' success in problem-solving.

Regarding the quality of textbooks, teachers in the I-E category emphasised the need for comprehensive and clear explanations in textbooks alongside relevant exercises that would help students practice the concepts they had learned. Teachers who considered math reading ineffective, however, preferred textbooks that presented information concisely, with a focus on problem-solving exercises and limited theoretical explanations. This preference for concise textbooks reflects a broader trend in many educational contexts where textbooks are seen as tools primarily for practice rather than for developing conceptual understanding (Sukino, 2016).

In conclusion, the results of this study demonstrate that while all teachers recognise the importance of teaching math reading, their perceptions about its effectiveness are shaped by their teaching strategies, their students' attitudes, and their understanding of the role of reading in mathematical learning. Teachers who see the value of reading in math teaching tend to employ more active and engaged teaching strategies, while those who find it less effective focus more on problem-solving. These findings have important implications for teacher training and curriculum development, particularly in regions where math education still heavily emphasises rote learning and exam preparation.

CONCLUSION

This study provides a comprehensive understanding of how mathematics teachers perceived the role of reading in mathematics instruction, the strategies they employed to support students' reading activities, and their expectations regarding quality mathematics textbooks. The findings reveal that teachers hold varying perspectives on the effectiveness of teaching math reading, which directly influences their classroom strategies and textbook preferences. While some teachers believe that fostering reading skills in mathematics enables students to become independent learners and better prepared for discussions, others perceive significant challenges, such as students' lack of motivation and the difficulty of integrating reading within the constraints of the curriculum. Some teachers place greater emphasis on problem-solving activities and teacher explanations, considering them more effective than reading strategies. These differing views suggest that enhancing teachers' pedagogical skills in integrating reading into mathematics instruction could help bridge the gap between recognising the importance of reading and effectively implementing it in practice. The study also identifies a strong relationship between teachers' instructional approaches and the strategies they adopt to encourage reading in mathematics. Teachers who see reading as an effective learning tool actively incorporate both teacher-led and student-centred activities, such as guiding questions, vocabulary explanations, and structured discussions. In contrast, those who view reading as less effective tend to rely

primarily on direct instruction, with little emphasis on independent reading activities. These insights contribute to the growing discussion on the role of literacy in mathematics education, highlighting the need for professional development programs that equip teachers with effective reading strategies tailored to mathematical texts. Strengthening these instructional approaches could help students develop better comprehension skills and engage more deeply with mathematical concepts.

Furthermore, teachers' perspectives on the quality of mathematics textbooks reflect their instructional priorities. Those who emphasise reading value textbooks that present complete and detailed explanations in appropriate language, ensuring that students can independently navigate mathematical concepts. Conversely, teachers who prioritise problem-solving prefer concise and structured content that aids efficiency rather than fostering deep reading comprehension. The function of images in textbooks is also debated, with some teachers valuing their role in motivating reading while others see them as secondary to problem-solving content. Similarly, assignments in textbooks are expected to be both structured and relevant, though some teachers place more emphasis on alignment with national exam standards. These findings contribute to discussions on curriculum and textbook development by emphasising the need for learning materials that accommodate diverse instructional preferences, ensuring both depth and clarity while supporting different levels of student engagement. By examining the intersection of teacher beliefs, instructional strategies, and textbook expectations, this study offers practical implications for improving mathematics education. It underscores the importance of integrating literacy-focused approaches into math instruction while ensuring that teachers receive adequate support in implementing effective reading strategies. Additionally, curriculum designers and textbook developers can benefit from these insights by designing materials that balance detailed explanations with structured, problem-solving-oriented content. Future research could further explore the impact of these instructional differences on student learning outcomes, providing a more comprehensive perspective on the role of reading in mathematics education.

CONFLICT OF INTEREST

The authors declare no conflict of interest regarding the publication of this manuscript.

REFERENCES

Adams, A. E., Pegg, J., & Case, M. (2015). Anticipation guides: Reading for mathematics understanding. *The Mathematics Teacher*, *108*(7), 498–504.

Adams, T. L. (2003). Reading mathematics: More than words can say. *The Reading Teacher*, *56*(8), 786–795.

Barton, M. L., Heidema, C., & Jordan, D. (2002). Teaching Reading in Mathematics and Science. *Educational Leadership*, *60*(3), 24.

Beaudine, G. (2018). From mathematical reading to mathematical literacy. *Mathematics Teaching in the Middle School*, *23*(6), 318–323.

Carter, T. A., & Dean, E. O. (2006). Mathematics intervention for grades 5–11: Teaching mathematics, reading, or both? *Reading Psychology*, *27*(2–3), 127–146.

Ding, H., & Homer, M. (202 C.E.). Interpreting mathematics performance in PISA: Taking account of reading performance—ScienceDirect. *International Journal of Educational Research*, *102*, 101566.

Elo, S., Kääriäinen, M., Kanste, O., Pölkki, T., Utriainen, K., & Kyngäs, H. (2014). Qualitative content analysis: A focus on trustworthiness. *SAGE Open*, *4*(1), 2158244014522633. https://doi.org/10.1177/2158244014522633

Guo, J. (2021). The Analysis of the Status Quo and Promotion Strategies of Mathematical Reading of Lower Grade Students. *Science Insights Education Frontiers*, *10*(S1), 24–24.

Laily, I. F. (2014). Hubungan kemampuan membaca pemahaman dengan kemampuan memahami soal cerita matematika sekolah dasar. *Eduma: Mathematics Education Learning and Teaching*, *3*(1).

Marton, F. (1986). Phenomenography—A research approach to investigating different understandings of reality. *Journal of Thought*, 28–49.

McNeill, K. L., & Krajcik, J. (2008). Scientific explanations: Characterizing and evaluating the effects of teachers' instructional practices on student learning. *Journal of Research in Science Teaching: The Official Journal of the National Association for Research in Science Teaching*, *45*(1), 53–78.

Öztürk, M., Akkan, Y., & Kaplan, A. (2020). Reading comprehension, Mathematics self-efficacy perception, and Mathematics attitude as correlates of students' non-routine Mathematics problem-solving skills in Turkey. *International Journal of Mathematical Education in Science and Technology*, *51*(7), 1042–1058.

Riyadi, M., & Daswa, D. (2018). Pengembangan Anticipation Guides Berdasarkan Framework Membaca Penjelasan dalam Membaca Buku Teks Matematika. *Prosiding Seminar Nasional Matematika Dan Pendidikan Matematika (SNMPM)*, *2*(1), 380–388.

Sukino. (2016). *Buku Matematika Wajib SMA/MA Kelas X Semester I*. Erlangga.

Wijaya, A., Retnawati, H., Setyaningrum, W., & Aoyama, K. (2019). Diagnosing Students' Learning Difficulties in the Eyes of Indonesian Mathematics Teachers. *Journal on Mathematics Education*, *10*(3), 357–364.

Žakelj, A., Cotič, M., Felda, D., & Mešinović, S. (2019). The Importance of Reading Literacy in Learning Mathematics. In J. L. Vodopivec, L. Jančec, & T. Štemberger (Eds.), *Implicit Pedagogy for Optimized Learning in Contemporary Education* (pp. 205–223). IGI Global. https://doi.org/10.4018/978-1-5225-5799-9.ch011

Zulfikar, T. (2010). The making of Indonesian education: An overview on empowering Indonesian teachers. *Journal of Indonesian Social Sciences and Humanities*, *2*, 13–39.