MIREJ Multidisciplinary Innovation Research Journal
Volume 1 Issue 2 Year 2025 Pages 1-7 | e–ISSN 3089-4069| DOI: 10.70152
https://journal.akademimerdeka.com/ojs/index.php/mirej

Literature Review & Qualitative Study: Contextual Teaching Materials for Elementary School Students' Understanding of Fractions

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Abstract: This research employs a framework derived from rapid technological advances, which demand innovation and creativity in the learning process in the classroom so that the material presented is relevant and effective for students. Teachers are required to develop learning media that can support students' understanding optimally, one of which is through the use of textbooks as the main source of knowledge. This study used descriptive qualitative method with data collection through interviews, documentation, and literature review to examine the effectiveness of mathematics textbooks in fraction materials. Data analysis was conducted to understand the extent to which the textbook can help students understand the concept of fractions comprehensively. The results showed that the use of fraction-based math textbooks was considered appropriate and effective by both teachers and students in the classroom. Therefore, this textbook can serve as an alternative learning media that supports the improvement of students' understanding, especially in the subject of fractions, thus improving the learning process more effectively and efficiently.

Keywords: elementary school; fractions; mathematics; textbook

INTRODUCTION

Education that is in the technological advances in the 21st century has a major impact on various sectors of life, including education. Therefore, the learning process in schools is required to constantly adapt to the times in order to remain relevant and able to achieve optimal effectiveness(Sofwan, 2023). One important aspect that needs attention is the development of learning media. The existence of creative and innovative learning media has a strategic role in increasing active participation and learning motivation. This is due to the ability of innovative media to create a pleasant learning atmosphere. This view is reinforced by findings that show that learning media that utilize multimedia elements such as images, animations, sounds, and videos prove effective in stimulating students' curiosity. As a result, students show higher interest and enthusiasm to be actively involved in the learning process. The use of innovative learning media can be considered as a key factor in encouraging comprehensive student engagement, which in the end is expected to increase the achievement of maximum learning outcomes (Ma'iswati Hani et al., 2024).

Learning is an important aspect of education. Learning not only transfers knowledge, but also supports the professional development of educators through improved teaching and classroom management skills (Anjani et al., 2020). Among various subjects, mathematics is an essential field that must be taught from elementary school onwards because it plays an important role in shaping students' logical, analytical, and creative thinking skills.(Shakinah & Ika Fitri Apriani, 2024). Mathematics lessons are quite challenging. One of the most challenging topics in mathematics is fractions, which, despite their high relevance in everyday

life, are often difficult for students to understand due to their abstract nature and the lack of a contextual approach to learning.

Based on the findings, mathematics teaching materials for grade III elementary schools have generally been used optimally and show effectiveness in supporting the learning process. However, there are still some shortcomings, especially in the presentation of material in the textbook, especially on the topic of fractions. These deficiencies include unclear explanations of concepts, limited presentation of example problems, and exercise questions that are considered ineffective to help students' understanding. This condition results in some students having difficulty in understanding the concept of fractions thoroughly through the available teaching materials.

Thus, the focus of the problem in this literature review article is to analyze how the use of teaching materials can contribute to improving primary school students' understanding of fractions. The purpose of this study is to describe the form of teaching materials that have been applied and identify student competencies that can be developed through learning fractions, based on the analysis of previously published articles. The results of this study are expected to help educators to expand knowledge about the variety of teaching materials that can be used to create more interesting learning, reduce boredom, and encourage student activeness in the mathematics learning process.

METHODS

This research is a descriptive study with a qualitative approach combined with a systematic literature review. The main objective is to describe the effectiveness of using mathematics teaching materials on fractions in improving the understanding of third-grade elementary school students. This approach was chosen to obtain a contextual and in-depth understanding of the use of textbooks through empirical data collection and relevant literature review.

A systematic literature review was conducted by searching scientific journals published between 2018 and 2024 through Google Scholar. The selection criteria used included: (1) the topic discussed the development of fraction teaching materials in elementary schools, (2) the research used a development or evaluation approach, and (3) it was available in open access. The selected journals were then analyzed using a thematic content approach to identify patterns, themes, and the effectiveness of teaching materials.

In addition to literature review, field data was obtained through interviews and documentation. The research subjects consisted of a third-grade teacher, one high-achieving student, and one student with learning difficulties, who were purposively selected to represent the spectrum of student learning abilities. This technique aims to select subjects deliberately because they are considered to be able to provide the most relevant, in-depth, and contextual information to the focus of the research(Ames et al., 2019). The object of this study is the third-grade mathematics textbook actively used in the learning process at SDN 2 Setu Kulon, where this study was conducted in April 2025.

Data collection instruments included semi-structured interview guidelines and textbooks. Interviews were conducted in a free-flowing manner, allowing questions to be developed according to the context of the respondents. The data obtained were analyzed descriptively and qualitatively by interpreting the meaning and context of each finding. Source triangulation was performed by comparing data from teachers and two students with different characteristics. Meanwhile, technique triangulation was performed by combining the results of interviews and textbook documentation. The analysis procedure followed the steps of data reduction, data presentation, and conclusion drawing.

The first step in data reduction is the process of selecting, focusing, simplifying, and transforming data obtained from interviews and documentation. Attached is the following table.

Table 1. Data reduction

No	Data Source	Initial Findings	Data Reduction
1	Teacher	The textbook is appropriate for grade III students, but some questions are unclear.	Focus on the effectiveness of the textbook and the difficulty of understanding some questions.
2	High-Achieving Student	The textbook is easy to understand after the teacher's explanation; story problems can be solved well.	Focus on ease of learning with teacher support.
3	Low-Achieving Student	The textbook is quite difficult to understand independently; story problems are confusing.	Focus on the difficulty of independent learning and understanding story problems.

Second step, the data presentation organizes the reduced data into a systematic narrative. The teacher considers the textbook effective but requires revision on some unclear story problems. High achieving students find the textbook interesting and easy to understand after additional teacher explanations and Low achieving students have difficulty understanding the textbook, especially when solving story problems independently.

Last step, Conclusions are drawn based on similarities and differences in information from all data sources. The textbook is effective in supporting learning, but student comprehension highly depends on individual abilities and teacher assistance. The textbook requires improvement in the clarity of story problems to ensure accessibility for both high-achieving and low-achieving students and Adaptive approaches and additional learning media are needed to support students with varying abilities.

RESULT AND DISCUSSION

Table 2. Article Analysis based on the Effectiveness of Mathematics Textbooks on Fraction Materials in Elementary School

Researcher Name and Year of Publication	Title Name	Research Results
Dyah Tri Wahyuningtyas & Ester Pratama (2018)	Development of Simple Fractions Learning Module for Class Iii Elementary School with Contextual Teaching And Learning (Ctl) Approach	This research uses the 4-D development model. Based on the validation stages in the development process, the learning module prepared was declared valid. The practicality aspect of the module was shown

		through teacher activities in two meetings. Meanwhile, the effectiveness of the module can be seen from the students' activities in the first meeting and in the second meeting. In addition, students' positive response to the module. Based on these findings, it can be concluded that the developed mathematics learning module is suitable for use in the learning process at school.
Ahyansyh , Cholis Sa'dijah2 , Abd. Qohar (2020)	Development of Teaching Materials Based on Indonesian Realistic Mathematics Education (PMRI) to Support Fraction Calculation Problem Solving Ability	The development model applied in this research is the Plomp model, which consists of three main stages, namely (1) preliminary research phase, (2) prototype development phase, and (3) assessment phase. Based on the results of research and development, the teaching materials produced have met the criteria valid and feasible to use.
Sulaikhah (2020)	Development of Contextual-Based Lks (Student Worksheets) Teaching Materials to Improve Students' Understanding of Fractional Numbers Multiplication Calculation Operations in Grade V Elementary School.	This research developed a contextual-based Student Worksheet (LKS) to improve the understanding of the multiplication calculation operation of fractions in grade V students of SDN Kedungmutih using the Borg and Gall model. Positive responses from students and teachers were also high, indicating that this worksheet is feasible and effective as

		an alternative teaching material in schools.
Septy Nurfadhillah, Ragil Marcelino, et.al (2021)	Development of Audio Visual Based Teaching Materials on Student Learning Outcomes on the Material of Addition and Subtraction of Equivalent Fractions in Grade 3 Sdit Asdu	Based on the results of this study, it states that one of the proposed solutions is the utilization of audio-visual or video learning media that has an attractive visual display so that it can improve students' understanding of mathematics material and create a conducive and comfortable learning atmosphere. This research uses an interview method with one of the teachers at Anak Sholeh Dambaan Umat (ASDU) Islamic Elementary School, which is conducted directly (offline) by visiting the resource person.
Riskika Febriyandani, Kowiyah (2021)	Development of Comic Media in Learning Mathematics Fraction Materials for Grade IV Elementary School	This research uses a combination method or Research & Development (R&D) with the application of the ADDIE model. The research subjects were fourth grade students, with data collection techniques through observation and questionnaires. Comic media is categorized as feasible to use as a medium for learning mathematics in grade IV elementary school and is very effective in supporting the learning process.

Based on the article search and selection process, five relevant research articles were obtained and systematically reviewed. Details of each study are presented in a structured

manner in Table 1, which contains an analysis of the effectiveness of mathematics teaching materials on fractions in elementary schools.

Table 2 shows that the development of teaching materials on fractions consistently aims to improve student understanding through various innovative approaches. Although the development models used differ, such as 4-D, Plomp, Borg and Gall, and ADDIE, there is a common pattern among the five studies, namely that all teaching materials developed have been validated and proven to be practical and effective in supporting the learning process of students. From the synthesis results, several patterns and main themes emerged across all studies:

1. Contextual Approach, Studies conducted by (Wahyuningtyas & Pratama, 2018) and (Sulaikha, 2020) show that contextual-based teaching materials can enhance students' understanding by linking the material to real-life situations.
2. Utilization of Multimedia, emphasizing the importance of audio-visual learning media in increasing student engagement and creating a pleasant learning atmosphere (Nurfadhillah et al., 2021)
3. The use of comic media developed by (Febriyandani & Kowiyah, 2021) has proven to be an attractive and interactive alternative to conventional learning methods.

Based on this pattern, it can be concluded that the combination of contextual material and innovative learning media is a key factor in overcoming students' learning difficulties, especially in abstract mathematical material such as fractions. The results of interviews conducted at SDN 2 Setu Kulon provide significant support for these literature findings. Both teachers and students acknowledge the benefits of using mathematics textbooks to support learning, but there are still some practical obstacles. High-achieving students are able to understand the material well, especially after receiving additional explanations from the teacher. Conversely, underachieving students find it difficult to understand the contents of the book independently. A similar finding was observed in solving story problems, where high-achieving students were able to solve them well, while underachieving students experienced difficulties.

Data triangulation combining the results of literature studies and field interviews further strengthens the validity of the research findings. Both literature sources and field data found similarities in that mathematics textbooks are effective in supporting the learning process, but need to be adjusted to suit the needs of all students. Third-grade teachers also stated that some questions in the textbooks need to be improved, particularly regarding the clarity of sentences and the use of inappropriate units of measurement.

However, there are several limitations in the reviewed research. Most of the studies analyzed had limited scope with a small number of subjects, which may limit the generalization of the results. Potential bias may also occur, as the literature sources used were primarily obtained from Google Scholar within the timeframe of 2018–2024, meaning relevant studies outside this range may not have been included. Additionally, the lack of long-term studies limits the ability to assess the sustained effectiveness of instructional materials.

CONCLUSION

Based on the results of literature reviews and interviews can be concluded that the development of mathematics teaching materials on fractions in elementary schools is very influential in improving students' understanding. Teaching materials developed using a contextual approach, audio-visual media, and comic media have proven to be effective in helping students understand abstract fraction concepts and increasing their motivation to learn. However, the effectiveness of teaching materials is also influenced by the abilities of individual students, with high-achieving students finding it easier to understand the material

than those with lower abilities. This indicates that there is a need to develop teaching materials that can accommodate the diverse characteristics of students in the classroom.

Further research is recommended to develop teaching materials that are more adaptive and responsive to the diverse learning needs of students. Additionally, the use of technology-based learning media such as interactive applications or educational games can be an attractive alternative to increase student participation. Future researchers are also encouraged to involve a broader sample and conduct long-term testing to assess the sustained impact of teaching materials. Collaboration between teachers, curriculum developers, and media designers is crucial to ensure that the resulting teaching materials are truly effective and aligned with real-world learning conditions.

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