

## DEVELOPMENT OF MATH STOOK: AN EXPLORATION OF MATH STORIES FOR ELEMENTARY SCHOOL STUDENTS

Muhammad Ilman Nafi'an<sup>1</sup>, Gita Luthfiah Moraninda<sup>2</sup>, Aulia Rohmawati<sup>3</sup>

<sup>1, 2, 3</sup>Institut Agama Islam Negeri Kediri, Jl. Sunan Ampel 07, Ngronggo, Kediri, Jawa Timur, Indonesia  
Email: [ilman@iainkediri.ac.id](mailto:ilman@iainkediri.ac.id)

---

### Article History

Received: 01-06-2024

Revision: 09-06-2024

Accepted: 12-06-2024

Published: 20-06-2024

**Abstract.** Research on the development of math story books for elementary school students still needs to be conducted further. Studies on the appropriate design, effectiveness, and effects on students' mathematical understanding are still limited, so more needs to be done. This research aims to develop Math Stook (Math Story Book) as a math learning media for elementary school students. The research method used is the RnD or Research and Development method with the ADDIE research model which consists of 5 stages: Analysis, Design, Development, Implementation, and Evaluation. Data were collected through observation and interviews. The validity of Math Stook was evaluated by a group of validators, including media design experts, learning material experts, and pretest and posttest question experts. The results showed that Math Stook was rated as highly valid by the validators. In addition, this study measured the level of math comprehension of grade III students before and after using Math Stook, showing a significant increase. Although the N-Gain value fell into the "medium" category, this study concluded that Math Stook was effective in improving students' mathematical understanding. Recommendations for future research include further exploration of the effect of Math Stook on students' math skills, development of a version tailored to students' needs, as well as the use of a combined approach between quantitative and qualitative methods to explore its impact.

**Keywords:** Math Stook, Mathematics, Elementary School

**Abstrak.** Penelitian bertujuan untuk pengembangan *math stori book* untuk siswa sekolah dasar yang masih perlu dilakukan lebih lanjut. Selama ini penelitian mengenai desain yang sesuai, efektivitas, dan pengaruhnya terhadap pemahaman matematika siswa masih terbatas, sehingga masih perlu dilakukan. Penelitian ini bertujuan untuk mengembangkan Math Stook (*Math Story Book*) sebagai media pembelajaran matematika untuk siswa sekolah dasar. Metode penelitian yang digunakan adalah metode RnD atau Research and Development dengan model penelitian ADDIE yang terdiri dari 5 tahap: Analisis, Desain, Pengembangan, Implementasi, dan Evaluasi. Data dikumpulkan melalui observasi dan wawancara. Kevalidan Math Stook dievaluasi oleh sekelompok validator, termasuk ahli desain media, ahli materi pembelajaran, dan ahli soal pretest dan posttest. Hasil penelitian menunjukkan bahwa Math Stook dinilai sangat valid oleh para validator. Selain itu, penelitian ini mengukur tingkat pemahaman matematika siswa kelas III SD sebelum dan sesudah menggunakan Math Stook, yang menunjukkan peningkatan yang signifikan. Meskipun nilai N-Gain termasuk dalam kategori "sedang", penelitian ini menyimpulkan bahwa Math Stook efektif dalam meningkatkan pemahaman matematika siswa. Rekomendasi untuk penelitian selanjutnya adalah eksplorasi lebih lanjut mengenai pengaruh Math Stook terhadap kemampuan matematika siswa, pengembangan versi yang disesuaikan dengan kebutuhan siswa, serta penggunaan pendekatan gabungan antara metode kuantitatif dan kualitatif untuk mengeksplorasi dampaknya.

**Kata Kunci:** Math Story Book, Matematika, Siswa Sekolah Dasar

---

**How to Cite:** Nafi'an, M. I., Moraninda, G. L., & Rohmawati, A. (2024). Development of Math Stook: An Exploration of Math Stories for Elementary School Students. *Indo-MathEdu Intellectuals Journal*, 5 (3), 3163-3171. <http://doi.org/10.54373/imeij.v5i3.1188>

---

## INTRODUCTION

Research on the creation of math storybooks for elementary school students still needs to be conducted further. Studies on the appropriate design, effectiveness, and effects on students' understanding of mathematics are limited, although there are many math storybooks available for purchase. The appropriateness of the content to the math curriculum, the influence of graphic design and narration, the involvement of students in the creation of math storybooks, and students' understanding of math with different learning styles and abilities are some of the important elements that should be considered when looking for research gaps. One example of research in this area is Kaminski & Sloutsky (2013), who emphasized how irrelevant visual information can cause difficulties for students in learning mathematics. In addition, Nicolaidou and Philippou (2003) conducted research on the influence of literature on students' mathematical literacy levels.

Poladian and Baccaglini Frank (2017) also investigated how visual cues in math storybooks affect children's math skills. Sarama and Clements (2009) talk about the use of computer manipulatives in teaching mathematics, while Whitin (2002) shows how children's literature can be used to teach mathematics. This study provides an understanding of the different elements associated with the creation of mathematics storybooks and emphasizes the importance of further research on the role of mathematics storybooks in the mathematics learning of primary school students.

Based on the results of observations at SDIT Nurul huda kediri, it was found that in the learning book there was a long explanation that resulted in a lack of interest in students so that it caused a low understanding of students in mathematics subjects. The results of these observations are also corroborated by interviews that have been conducted with teachers, the results of the data state that students consider mixed arithmetic operation material to be difficult and boring material that affects students' understanding, so that suitable media are needed to overcome these problems. Studies such as those conducted by Nicolaidou and Philippou (2003) and Sarama and Clements (2009) also highlight the impact of mathematical literature and manipulatives in primary school students' learning. The results of these studies suggest that the use of mathematical stories and manipulatives can enrich students' learning experiences and improve their understanding of mathematical concepts. However, there is a need for further, more in-depth research on how the development of Math Story Book can be optimized to achieve more effective and enjoyable mathematics learning objectives for primary school students.

The purpose of developing math storybooks is to create an innovative and interesting learning tool that can help elementary school students understand math concepts better. Through stories that are interesting and relevant to everyday life, math storybooks aim to make math learning more fun and easy to understand for students. In addition, the purpose of this development also includes encouraging students to become more familiar with mathematics.

## **METHOD**

The researcher conducted this study at SD IT Nurul Huda in Kediri District. There were 24 grade III students involved. Researchers used the ADDIE development model to conduct their research. This model offers a systematic, flexible, and effective approach to learning media development. By following the model guidelines, learning designers can create high-quality and helpful learning products or media. In the research, the data collection tools are observation and interview. When researchers need to conduct a preliminary study to determine the problem to be studied and to gain a deeper understanding of a limited number of respondents (Noor, J, 20211). Sugiyono (2016) suggests that interviews be used as a data collection method.

## **RESULTS**

The result of this research is the development of Math Stook (Math Story Book) media for fifth grade students at SD IT Nurul Huda. This research has been carried out through stages in accordance with the research and development methodology, by applying the ADDIE development model. The research method used is the RnD or Research and Development method with the ADDIE research model which consists of 5 stages: Analysis, Design, Development, Implementation, and Evaluation.

### **Analysis**

Analysis of the results of the researcher's pre-research at SD IT Nurul Huda Kediri Regency is the first stage of this research. Researchers examined curriculum needs and student characteristics, especially how students learn math in grade III. Because students only use the textbooks and worksheets provided by the school, students are less interested in the lessons, which has an impact on students' understanding of mathematics. Based on the interview findings, the researcher decided to create a learning tool. The results of the analysis showed that class III at SD IT Nurul Huda Kediri Regency needed learning media in the classroom. This encouraged the researcher to create an interesting math storybook.

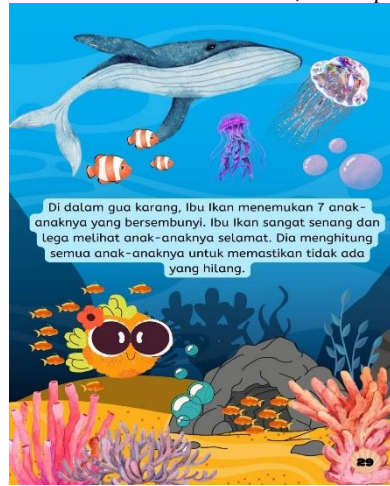
## Design

The second stage in the ADDIE development model is the planning or design stage, where researchers begin to design the media to be used and developed, such as Math Stook (Math Story Book) media. In this stage, the content structure of the Math Stook (Math Story Book) is systematically organized to ensure a structured and effective development. This framework includes several important components, ranging from an attractive cover to a bibliography that provides reference sources:

First, Math Stook (Math Story Book) begins with an attractive cover to capture the reader's interest. Then, it is followed by the product developer's profile, the preface, and the table of contents that help readers navigate the contents of the book easily. Core Competencies (KI) and Basic Competencies (KD) are clearly introduced, followed by instructions for using the book and the benefits of using Math Stook (Math Story Book) in learning. Furthermore, the Mixed Counting Operation material is presented in an easy-to-understand method, supported by a series of interesting story problems, such as “Rani's Adventure in the Sea” and “Sharing Food in the Kerrang Kingdom”. Math Stook also provides interactive educational games to strengthen students' math understanding. Finally, a bibliography is included as an additional reference for readers who want to explore the material further. With this systematic arrangement of contents, Math Stook (Math Story Book) is expected to be an effective tool in supporting fun and meaningful math learning for elementary school students.

## Devolepment

At the development stage, researchers continued from the design stage by changing the previous design into a product that could be seen, conducting product feasibility tests, and changing the product based on the validators' suggestions. The feasibility of Math Stook (Math Story Book) learning media products was evaluated by the validators. Media design experts I and II received a data recapitulation score of 80%, which means very valid; learning material experts received a score of 98.18% and 83.63%, which means very valid; and pretest and posttest question experts received a score of 96%, which means very valid. after the validators gave valid results.

**Figure 1.** Development outcome**Figure 2.** Development outcome

Based on the picture above, the media expert provides input to replace the initial change from the mother fish below and above there are several fish inhabiting the sea to a picture of the mother fish above facing the child as if looking for her lost child and removed the fish inhabiting the sea and 5 fish children in the cave and 2 fish children among the coral reefs.

**Tabel 1.** Descriptive Statistics

|                    | N  | Minimum | Maximum | Mean    | Std. Deviation |
|--------------------|----|---------|---------|---------|----------------|
| Ngain_Skor         | 24 | .00     | 1.00    | .4398   | .33983         |
| Ngainpersen        | 24 | .00     | 100.00  | 43.9782 | 33.98322       |
| Valid N (listwise) | 24 |         |         |         |                |

Based on the data exposure above, it is known that the N-Gain value has an average of 0.4398 so that based on the gain index formula, 0.4398 is less than 0.70 so that based on the N-Gain criteria, these results fall into the “moderate” category of improvement. So it can be concluded that the difference in mathematical understanding of grade III students in the mathematics subject of mixed arithmetic operations during the pretest and posttest has a moderate difference. Therefore, researchers can state that the Math Stook “Math Story Book” media developed can increase students' mathematical understanding.

Relevant theories such as those introduced by Clements, Poladian, and Kaminski can help in understanding the results of this study. Clements and Sarama (2009) highlighted the importance of using manipulatives and visual representations in mathematics learning to build deep understanding and strong conceptual abstraction. With Math Stook, which offers mathematical stories that evoke imagination as well as interesting visuals, students can respond better to the material and internalize mathematical concepts better. Poladian and Baccaglini-Frank (2017), in their study, found that the use of visuals in math storybooks can improve

students' mathematical understanding. This result is consistent with the research findings that show an increase in students' mathematical understanding after using Math Stook. In addition, research by Kaminski and Sloutsky (2013) highlighted the importance of paying attention to relevant visual factors in the learning process. Thus, Math Stook designed with a focus on visual aspects and an engaging narrative can make a significant contribution in improving elementary school students' mathematical understanding.

### **Implementation**

This implementation stage of the Math Stook (Math Story Book) media has gone through the revision stage, consisting of revision I and revision II which have received validation by expert validators in their fields, then this product is tested with the One Group pretest-posttest stage with saturated sampling of students from class III totaling 24 students who are taken as a whole. In May 2024 students were given a pretest question of 20 questions consisting of multiple choice questions with story problems which were to measure the mathematical understanding of students before being given the Math Stook (Math Story Book) media. The posttest was conducted in May 2024 at the time of research and posttest data collection, the number of questions given was 20 questions but different from the questions on the pretest questions, this was done to test students' understanding of mixed arithmetic operation material after the application of Math Stook (Math Story Book) media. After working on pretest questions before the application of the media and working on posttest questions after the application of the media, the results of the difference in the average value of the pretest and posttest. The average pretest score of class III was 71.304 After being given the treatment of Math Stook (Math Story Book) learning media, there was a significant increase with the results of the average posttest score of 83.958.

### **Evaluation**

At this evaluation stage is the final stage of the ADDIE model. Based on the data exposure above, it can be concluded that Math Stook (Math Story Book) mixed arithmetic operation material is able to increase the mathematical understanding of grade III students in mathematics subjects. After carrying out the research, the researchers found that there were advantages and disadvantages of the Math Stook (Math Story Book) media that had been developed.

The disadvantages of this Math Stook (Math Story Book) media are that it takes a long time to design and obtain materials that are in accordance with what is desired, namely using Glossy Laminated Art Paper material which when used can be erased again and requires a large

enough cost because it uses special paper, namely Glossy Laminated Art Paper which has the aim of being erasable or erasable using special markers. While the advantages of Math Stook (Math Story Book) media are that this media can be used many times because it is erasable or can be erased again when finished using it, the size that is suitable for carrying and storing is using A4 size paper, in the Math Stook (Math Story Book) media is attractively designed and the selection of colors that aim to make children not easily bored and feel happy when learning.

## DISCUSSION

Math Stook (Math Story Book) has been rated highly valid by validators, including media design experts, learning material experts, and pretest and posttest question experts. This high validity confirms that the visual and narrative design of Math Stook meets the standards required in mathematics learning. This is in line with Clements and Sarama's theory that highlights the importance of visual representation in mathematics learning, as well as Poladian and Baccaglini-Frank's theory that emphasizes the use of visuals in improving student understanding. Thus, Math Stook is recognized as an innovative and effective mathematics learning tool for primary school students, which can improve their understanding and interest in the subject (Nafi'an, 2023). It is shown from the data above that the average N-Gain score is 0.4398, which, based on the gain index formula, is less than 0.70. Therefore, based on the N-Gain criteria, this result falls into the "medium" category. Thus, it can be concluded that there is a moderate difference in the level of mathematical understanding of grade III students on mixed arithmetic operations when they are tested before and after the test. Therefore, the researcher can conclude that Math Stook media, or "Math Storybook", can help learners understand math better.

Relevant theories such as those introduced by Clements, Poladian, and Kaminski can help in understanding the results of this study. Clements and Sarama (2009) highlight the importance of using manipulatives and visual representations in mathematics learning to build deep understanding and strong conceptual abstraction. With Math Stook, which offers mathematical stories that evoke imagination as well as interesting visuals, students can respond better to the material and internalize mathematical concepts better. Poladian and Baccaglini-Frank (2017), in their study, found that the use of visuals in math storybooks can improve students' mathematical understanding. This result is consistent with the research findings that show an increase in students' mathematical understanding after using Math Stook. In addition, research by Kaminski and Sloutsky (2013) highlighted the importance of paying attention to relevant visual factors in the learning process. Thus, Math Stook designed with a focus on

visual aspects and an engaging narrative can make a significant contribution in improving elementary school students' mathematical understanding.

## CONCLUSION

Math Stook (Math Story Book) has been rated highly valid by the validators, showing its effectiveness in learning mathematics. With an average N-Gain value of 0.4398, the results of this study fall into the “medium” category. Although it did not reach the threshold of 0.70, there was a significant increase in the mathematical understanding of grade III students between the pretest and posttest. Relevant theories, such as those introduced by Clements, Poladian, and Kaminski, provide a strong foundation for these results. They emphasize the importance of visual representations and stories in mathematics learning. Math Stook makes a significant contribution in improving elementary school students' mathematical understanding. With an engaging visual and narrative design, and high validity according to validators, Math Stook is recognized as an innovative and effective mathematics learning tool. The results of this study provide empirical support for the effectiveness of Math Stook in improving students' mathematical understanding and reinforce the importance of using stories and visuals in the context of mathematics learning.

## RECOMMENDATIONS

For future research, it is recommended to explore the impact of Math Stook on various levels of students' mathematical abilities, as well as explore the factors that influence its effectiveness in more depth. Research can also focus on developing a version of Math Stook that is tailored to the needs and characteristics of students, as well as expanding its use in various mathematics learning contexts. The use of a combined approach between quantitative and qualitative methods is expected to provide a more holistic understanding of the contribution of Math Stook in improving students' mathematical understanding.

## REFERENCES

- Cahyadi, R. A. H. (2019). Pengembangan bahan ajar berbasis ADDIE model. *Halaqa: Islamic Education Journal*, 3(1), 35–42.
- Nafi'an, M. I. (2023). Development Of Numeracy Literacy Module On Measurement Material In Islamic Elementary School. *JP2M (Jurnal Pendidikan dan Pembelajaran Matematika)*, 9(1), 12-19.
- Hudojo, H. (1988). Mengajar dan belajar Matematika. *Jakarta: Departemen Pendidikan Dan Kebudayaan Direktorat Jendral Pendidikan Tinggi P2LPTK*.
- Noor, J. (2011). Metodologi penelitian. *Jakarta: Kencana Prenada Media Group*.



- Nurrita, T. (2018). Pengembangan media pembelajaran untuk meningkatkan hasil belajar siswa. *Jurnal Misykat*, 3(1), 171–187.
- Nicolaidou, I., & Philippou, G. (2003). "The influence of literature in developing mathematical literacy." *Journal for Research in Mathematics Education*, 34(5), 464–479.
- Poladian, E., & Baccaglini-Frank, A. (2017). "The effect of visual cues in a mathematical storybook on children's mathematical abilities." *Journal of Early Childhood Literacy*, 17(4), 567–587.
- Sarama, J., & Clements, D. H. (2009). "Concrete" computer manipulatives in mathematics education." *Child Development Perspectives*, 3(3), 145–150.
- Syarifah, L. L. (2017). Analisis kemampuan pemahaman matematis pada mata kuliah pembelajaran matematika SMA II. *Jurnal Penelitian Dan Pembelajaran Matematika*, 10(2).
- Sugiono. (2016). "Metode Penelitian Pendidikan: Pendekatan Kuantitatif, Kualitatif, dan R&D." Alfabeta.
- Whitin, D. J. (2002). "Using children's literature to teach mathematics." *Teaching Children Mathematics*, 8(6), 348–353.