

INTERACTIVE MATHEMATICS ACTIVITY BOOKS: A STRATEGY TO BOOST STUDENTS' INTEREST AND ARITHMETIC ABILITIES

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ABSTRACT

This research is motivated by the fact that mathematics is still a subject that students consider difficult. The low interest of students in learning leads the low arithmetic ability. This can be caused by school mathematics learning that focuses a lot on practice questions, but is not varied enough. Mathematics learning should use learning media and varied questions. Based on interviews, students' understanding of one material is not enough, they must do an evaluation. Although many students are very effective in learning, there are still many students who have not completed their studies. Although many students are very effective in learning, there are still many students who have not completed their studies. Therefore, other teaching materials are needed to add references in providing exercises. For this reason, this study aims to increase students' interest in learning and also their arithmetic ability. This research method is research and development. The research and development method was chosen with 2 main stages, namely preliminary, which includes preparation and design, then formative evaluation, which includes self-evaluation, expert reviews, one-to-one, small group, and field test. This research was conducted at SD Negeri 19 Pangkalpinang. Participants in this activity were 2nd-grade students, consisting of 32 students. This activity was carried out on November 28, 2024. The activities carried out in this study were the implementation of the use of mathematics activity books developed with the help of Canva, so that with this implementation, students' numeracy skills increased. The results of this activity were an increase in student engagement that was very good, and students were more interested in learning using math activity books. So, it can be concluded that mathematics activity books can improve students' numeracy skills in Mathematics lessons.

Keywords: *Mathematics Activity Book, student's interest, elementary school, research and development*

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Submission March 15, 2025	Revised May 7, 2025	Accepted May 11, 2025	Published May 21, 2025
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How to cite (in APA style):
 Pitriyana, S., & Lathiifah, I. J. (2025). Interactive Mathematics Activity Books: A Strategy to Boost Students' Interest and Arithmetic Abilities. *Jurnal Pendidikan Matematika (JPM)*, 11(1), 86–95. <https://doi.org/10.33474/jpm.v11i1.23383>

INTRODUCTION

It is still a common discussion that mathematics is a difficult and boring subject. (Handayani & Mahrita, 2021). Some children think that mathematics is difficult to understand (Rawa & Yasa, 2019). Often students are enthusiastic when they first learn mathematics. Even before school, it is easier to teach children to count than to learn to read. But sadly, when children enter school, children prefer lessons that do not involve counting. This is very interesting for researchers, what makes mathematics the older they get, the less they like it.

Starting from this problem, researchers assume that school mathematics learning often emphasizes practice questions that are not very varied. This makes students easily bored and

difficult to see numbers. This boredom makes students eventually dislike mathematics (Swaratifani & Budiharti, 2022). Mathematics learning should use a variety of learning media (Fitri, 2023). Teachers are expected to provide a variety of questions. According to Fatahillah (Fatahillah et al., 2017) and Hasanah (Hasanah, 2016), guidance is not enough to just provide one-time practice, but must be repeated.

The Independent Curriculum is actually one of the ways to break this boredom. Through independent learning, learning books are also made as free as possible. Starting from the types of questions that are not only multiple choice and fill-in-the-blank, to 2 to the selection of questions that start from concrete concepts. This is in line with Kholiyanti's opinion (Kholiyanti, 2018) and Setyawan (Setyawan, 2020) that one of the important things in elementary school mathematics learning is when children can easily illustrate and connect concrete objects into something abstract to understand mathematical concepts. This greatly supports enjoyable learning.

But the problem does not stop there. Mathematics learning cannot be easily understood without a lot of repetition. According to Santoso (Santoso et al., 2021) Repetition is a structured and systematic exercise given so that students understand the material better. This is in line with the law of exercise by Torndike (Moreno & Park, 2012) that repetition results in someone understanding better. With practice, students will get used to it. (Indra & Rahadyan, 2021). However, this repetition exercise cannot be fully fulfilled by school books. Therefore, other teaching materials are still needed by teachers to add references in providing repetition exercises for students. In line with the opinion Pitriyana (Pitriyana, S., & Karnita Arafatun, S, 2022) appropriate teaching materials are needed to support the learning process in the classroom. According to Tafoano (2022), activity books play a very important role as a means of delivering learning materials. Eliyanti also argues (2020) that activity books are information, tools, and texts that teachers need for planning and reviewing learning implementation.

As conducted by researchers when conducting observations at SD Negeri 19 Pangkalpinang. The teacher revealed that sometimes students still do not understand the material just by filling in questions in school books, where the next page already discusses new material. The same is felt by students. Students are very happy when working on questions that are in the form of filling in empty boxes or drawing arrows. However, students' understanding of one material is not enough, they must conduct an evaluation. The result is that there are still many students who have not completed their learning.

Meanwhile, based on the results of interviews with class teachers, it is difficult to explore students' willingness to repeat learning at home, especially if the school is full until the afternoon. This is in line with Anggraeni's opinion (Anggraeni, Silvia Tri Muryaningsih & Ernawati, 2022) and Habibah (Habibah et al., 2021) that many students are still massive during learning and students do not want to study at home if they are not given assignments.

By considering these various problems, it is necessary to add teaching materials containing various practice questions so that students' understanding of concepts is deeper, especially in mathematics. As time goes by, Canva has become one of the favorites in developing media and teaching materials. Canva is the choice of various groups, especially educators, because its application is easy to access and easy to use (Kharissidqi & Firmansyah, 2022) (Tambunan & Tambunan, 2023). Seeing the various problems that have been described, this research aims to increase students' interest in learning and also their numeracy skills.

METHOD

This research method is development research (Akker, 1999), then continued with formative evaluation (Tessmer, 1993) (Lathiifah et al., 2015). This study will develop a math activity book assisted by Canva as a support for the independent learning program for elementary school students. This study will go through two stages of research, namely the

preliminary stage which includes preparation and design, then formative evaluation which includes self-evaluation, expert reviews, one-to-one, small group, and field test. Where revisions will be made at each stage.

The procedure in this study is as follows:

1. Preliminary, divided into 2 stages, namely:

a. Preparation

This stage includes analysis of research subjects, curriculum analysis and analysis of phase one mathematics materials, namely for grade 1 and grade 2 elementary school students which are adjusted to the independent curriculum teaching module.

b. Design

At this stage, the researcher designs or designs a mathematics activity book to support the independent learning program for grade 1 and 2 elementary school students. This design uses the help of the Canva application so that interesting characters and images can be included for elementary school students.

2. Formative Study

a. Self Evaluation

Self-evaluation: The design results on the first prototype developed on the basis of self-evaluation were given to expert reviews who were asked to observe and comment on the activity book that had been designed. The researcher also provided a validation sheet as a means for the validator to provide comments and suggestions. This stage is also called a validity test.

b. Expert reviews

Expert Review: The design results on the first prototype developed on the basis of self-evaluation were given to expert reviews who were asked to observe and comment on the activity book that had been designed. The researcher also provided a validation sheet as a means for the validator to provide comments and suggestions. This stage is also called a validity test.

c. One-to-one

One-to-One: Testing with individual students to gather in-depth feedback.

Along with the implementation of expert reviews, a one-to-one evaluation process was also carried out. The first prototype of the teaching material was tested on three students with high, medium and low abilities. Then the students were asked to provide comments and suggestions on the response sheet that had been provided. The results of the one-to-one trial and the results of the expert reviews were analysed, revised and then called the second prototype.

d. Small group

Small Group: Testing with a small group to observe interaction and understanding. At this stage, the second prototype teaching material was given to a small group of 6 3rd grade students who were divided into 2 groups. Students worked in groups on the math activity book and worked on all the activities in the book. After working on all the activities in the book, then the students in groups were given a response sheet and provided suggestions or comments on the activity book that had been worked on. While the students were working on the teaching material, the researcher also conducted direct observations and interviews related to the difficulties and positive things they got when working on the math activity book. From these observations and comments from students, the math activity book was revised again and named prototype 3. After the revision was completed, the developed math activity book was suitable for application in large classes, namely at the field test stage.

e. Field test

Field Test: Broader testing to assess effectiveness in a realistic setting. At this stage, the third prototype as the final product was tested on grade 3 students of SD Negeri 19 Pangkalpinang as research subjects. From this stage, the potential effects of the developed mathematics activity book can be seen.

Based on the methods and procedures in this study, the data collection and analysis techniques that will be used are documents, walk through, observation, student response sheets and tests. All will be analysed and used to see the validity and potential effects of the activity book being developed.

RESULT

The results of this study are in the form of implementing a Mathematics Activity Book for elementary school students in Phase A. The results of this activity are that students' responses are very good and students are more interested in learning using mathematics activity books. The development research method was chosen with 2 main stages, namely preliminary which includes preparation and design then formative evaluation which includes self-evaluation, expert reviews, one-to-one, small group, and field test. The results of the preliminary stage are:

a. Preparation

This stage includes analysis of research subjects, curriculum analysis and analysis of phase one mathematics material, namely for grade 1 and grade 2 elementary school students which are adjusted to the independent curriculum teaching module.

b. Design

At this stage, the researcher designs or designs a mathematics activity book for grade 1 and 2 elementary school students. This design uses the help of the Canva application so that characters and images that are interesting for elementary school students can be included. The appearance of the Mathematics Activity Book Design that has been developed can be seen in the image below:



Figure 1. Front Cover



Figure 2. Author Profile

DAFTAR ISI	
KATA PENGANTAR.....	ii
DAFTAR ISI.....	iii
CAPAIAN DAN TUJUAN PEMBELAJARAN	iv
BAB 1 BILANGAN	1
A. Mengenal bilangan dan simbol bilangan sampai 10.....	4
B. Mengenal bilangan dan simbol bilangan sampai 20.....	31
C. Penjumlahan sampai 10.....	40
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Figure 3. List of contents

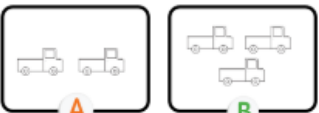
A. Mengenal Bilangan dan simbol bilangan sampai 10	
1. Menghitung, membaca dan menulis Bilangan.	
	1 sa-tu
	2 dua
	3 ti-ga
	4 em-pat
4 MATEMATIKA FASE A UNTUK SISWA SEKOLAH DASAR	

Figure 4. Book Contents

2. Warnai benda yang jumlahnya lebih banyak.

a. 

b. 

c. 

d. 

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Ayo Mencoba

1. Berapa potong banyak ayam semuanya?

 + 

Kalimat matematika:

 +  = 

2. Berapa banyak kumbang semuanya?

 + 

Kalimat matematika:

 +  = 

42 MATEMATIKA FASE A UNTUK SISWA SEKOLAH DASAR

Figure 5. Book Contents

2. Formative Study

a. Self Evaluation

In self evaluation, an assessment is carried out by the researcher himself on the design of the developed mathematics activity book, the results of which are called the first prototype.

b. Expert reviews

The design results on the first prototype developed on the basis of self evaluation are given to expert reviews who are asked to observe and comment on the activity book that has been designed. The researcher also provides a validation sheet as a means for the validator to

provide comments and suggestions. This stage is also called a validity test. The score results from media experts 1 and 2 obtained an average of 4.125 with Valid criteria for the aspect of Language feasibility, in the aspect of presentation feasibility and craft aspects, both obtained an average of 4.1 with valid criteria. Then the score from material experts 1 and 2 obtained an average of 4 from the aspect of content feasibility and presentation feasibility 4.1 with valid criteria. For complete details, see the following table 1 and 2.

Table 1. results of material expert assessment

Validator	Content Suitability Aspect	Presentation Feasibility Aspect
Subject Matter Expert 1	41	38
Subject Matter Expert 2	39	35
total score	80	73
average	4	4,1
Criteria	Valid	Valid

Table 2. results of media expert assessments

Validator	Language Eligibility Aspects	Presentation Feasibility Aspect	Graphic Feasibility Aspects
media expert 1	16	20	42
media expert 2	17	21	40
Total score	33	41	82
Average	4,125	4,1	4,1
Criteria	Valid	Valid	Valid

Based on the achievement of valid criteria from the activity book that has been developed, the book is tested in small group and field test.

c. One-to-one

Along with the implementation of expert reviews, a one-to-one evaluation process was also carried out. The first prototype of the teaching material was tested on three students with high, medium and low abilities. Then students were asked to provide comments and suggestions on the response sheet provided. The results of the one-to-one trial and the results of the expert reviews were analysed revised and then called the second prototype.

d. Small group

At this stage, the second prototype was tested on a group of students consisting of 6 people, each 2 students with high abilities, 2 students with medium abilities and 2 students with low abilities. Furthermore, the results of the trial were analysed, revised and called the third prototype.

e. Field test

At this stage, the third prototype as the final product will be tested on grade 1 and grade 2 students of SD Negeri 19 Pangkalpinang as research subjects. From this stage, the potential effects of the mathematics activity book that has been developed can be seen.

DISCUSSION

The development research method was chosen with 2 main stages, namely preliminary which includes preparation and design then formative evaluation which includes self-evaluation, expert reviews, one-to-one, small group, and field test. The math activity book that has been created by the research team is implemented to students. The results of the application of mathematics activity books showed that students' responses were very good and students were more interested in learning using mathematics activity books because elementary school students found it easier to understand the texts presented because the illustrated mathematics story problems were contextual. The researcher gave a pretest to students before the implementation activity of using the developed math activity book was carried out. This pretest aims to determine students' initial knowledge before using the math activity book. The next stage is the implementation stage. The implementation stage is the implementation of the use of the math activity book for students. Math activity books can be used as a learning medium to understand mathematical concepts and apply them in everyday life. The application of math activity books can help understand mathematical concepts in a focused manner, apply mathematical concepts in everyday life, accustom students to think systematically, logically, critically, creatively, and consistently. The following are the results of the student's pretest and posttest, Table 3.

Table 3. pretest and posttest results

Number	Group	average	Difference
1	Pre-test	69,63	17,91
2	Post-test	87,54	

The students' learning outcomes before and after using the mathematics activity book experienced a significant increase of 17.91. It is known that the average score of students before (pretest) using the activity book was 69.63 and the average score after (post-test) was 87.54.



Figure 6. Documentation when implementing math activity books for students



Figure 7. Documentation when students work on the activity book that was developed

This is in line with research conducted by Wiya (2022) that the main learning material in classroom learning that is often used is one of the activity books that contain material in accordance with core competencies and basic competencies of lessons that are suitable for use. This is also in line with research conducted by Permendikbud (2022) and Lumbantoruan (2023) that learning activity books are used to increase the efficiency and effectiveness of learning that is adjusted to the needs of students. In increasing the efficiency and effectiveness of learning, activity books that are easy for students to understand are very much needed

CONCLUSION AND SUGGESTIONS

Based on the research findings and discussion, it can be concluded that the development of a Canva-assisted mathematics activity book effectively enhances the learning experience for Elementary School Phase A students. The positive student responses indicate that the activity book is engaging, visually appealing, and facilitates a deeper understanding of mathematical concepts. The significant difference between the average pre-test score (69.63) and post-test score (87.54), with a gain of 17.91, demonstrates a notable improvement in students' conceptual understanding and problem-solving abilities. This result suggests that the integration of creative digital platforms like Canva can support independent learning and motivate students to engage more actively in mathematics.

For future research, it is recommended to explore different research methods, such as mixed-methods approaches, to gain deeper insights into the factors influencing teachers' preferences for traditional textbooks over varied teaching materials. Qualitative methods like interviews or focus group discussions with teachers and students could provide valuable perspectives on the challenges and benefits of using digital resources. Additionally, future studies could expand the scope to include different grade levels or investigate the long-term effects of using Canva-assisted materials on student retention and transfer of mathematical knowledge.

ACKNOWLEDGEMENTS

The researcher would like to express her deepest gratitude to all parties who have helped in this research that the researcher cannot mention one by one. Especially for the validators, thank you for being willing to validate in this research, thank you also to the education office and the principal who have given permission for this research to be carried out, and the researcher would also like to thank the Head of LPPM and the Chancellor of the

Muhammadiyah University of Bangka Belitung for the internal research and community service grants of the Muhammadiyah University of Bangka Belitung.

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