



Calbox Jurang: A Concrete Learning Tool to Enhance Numeracy in Grade 1 Mathematics

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Abstract

Students often view mathematics negatively because of the emphasis on memorizing formulas rather than conceptual understanding. Moreover, the delivery of theories is carried out without using learning media. As a result, students find it difficult to understand the material, especially in students' numeracy skills due to the minimal use of learning media. This study was conducted based on a gap in previous research, namely that there has been no research that shows the development of concrete media that focuses on improving numeracy as well as improving students' numeracy through story problems that are relevant to everyday life. The purpose of this study is to develop Calbox Jurang learning media to overcome problems in mathematics subjects, especially addition and subtraction materials and to improve the numeracy skills of class I students of MI Al Falah Kebonagung. This Calbox Jurang media provides an interactive learning experience with the visualization of concrete objects so that it can help students to explore mathematical concepts actively, compared to other concrete learning media that tend to be less likely to provide opportunities for students to be actively involved in the learning process. This research method uses R&D research with the ADDIE model (Analyze, Design, Development, Implementation, Evaluation). Data collection techniques use observation, interviews, questionnaires, tests, and documentation. The results of the validation of design experts obtained 82.5%, material experts 87.5% and language experts 85%. From the results of the three media validators, it can be categorized as suitable for use. The pretest results obtained 63.75%, and there was an increase in the posttest results of 90.75% and the effectiveness test results were 0.74 in the high category. So, it can be concluded that the development of Calbox Jurang learning media can improve students' numeracy skills and can be used as a learning medium for addition and subtraction materials.

Keywords: Mathematics; Calbox Jurang Learning Media; Numeracy

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INTRODUCTION

Mathematics is a science that we often encounter at every level of education. We use mathematics in our daily lives almost every day. Mathematics is not just a calculation or formula used to solve problems, but also as a foundation for developing critical, systematic, and analytical thinking skills (Susanti, 2020). However, in teaching mathematics today, there are many challenges, one of which is that the teaching methods used are often unable to meet the diverse needs of students.

Students' numeracy skills are currently declining, as evidenced by the results of the 2022 PISA study which shows that mathematics scores in Indonesia have declined. According to the latest PISA study results in 2022, Indonesia is ranked 70th out of 81 countries with an average mathematics literacy score of 366 (OECD, 2023a). The low PISA results of Indonesian students indicate that the majority of students are not yet able to understand concepts and apply their

knowledge in mathematics to solve problems in the context of everyday life (Khotimah, R.P. & Saputra, 2023).

In this context, it is important to explore new innovations related to the development of learning media that can improve students' understanding and involvement in the learning process (Eli and Daniel, 2023). Learning media includes all forms of media used to help teachers in carrying out learning activities. Learning media is essentially a means of conveying information from the communicator (teacher) to the communicant (student) as the recipient (M, Saleh et al., 2023). In developing learning media, it is also necessary to adapt to the needs and characteristics of students (Gerard et al., 2023). Nowadays, students need a more interesting and interactive approach to understand mathematical concepts that are often considered difficult. Especially for mathematical materials that are often considered abstract by students. The difficulties in learning mathematics require teacher creativity to develop learning both in terms of methods and media used (Hasiru et al., 2021). Thus, the Calbox Jurang media was developed as a concrete learning media which is expected to overcome these problems.

Calbox Jurang Media is a tool designed according to the characteristics and needs of students in learning mathematics (Mahruzah Yulia, N et al., 2023). This Calbox Jurang learning media is designed using plywood and equipped with several concrete objects such as numbers, toy balls, and story problem media for addition and subtraction material. By utilizing technology, this Calbox Jurang media offers an approach with a more active and dynamic learning experience, where students can explore the material well. This media not only presents information visually, but also encourages students to actively participate in the learning process. So that it can create a conducive and comfortable learning environment.

The development of concrete media has been the subject of many studies. Various previous studies have explored the development of concrete or real media to overcome problems in the mathematics learning process, such as those carried out by (Fina Atifatul Husna et al., 2023) regarding the development of counting board media to improve learning outcomes for elementary school students in the arithmetic operations material and (Dwi Ameilia et al., 2024) about the development of learning media for counting cards to improve division arithmetic skills in grade IV Elementary School students. However, previous studies have focused more on the development of concrete media that only focus on completing mathematical arithmetic operations such as addition, subtraction, multiplication and ordinary division, but have not developed concrete learning media products that are able to overcome problems related to teaching how to count while improving students' numeracy skills.

Based on the results of observations and interviews with class I teachers of MI Al Falah Kebonagung, the learning process is often less effective, this is because teachers do not accommodate students' abilities and the minimal use of concrete learning media. Learning media that only consist of teacher's handbooks and student worksheets (LKS), while concrete learning media has not been developed and applied optimally. Teachers also stated that during the learning process, students tend to be passive and crowded. This results in the development of students' potential being less than optimal, namely students have not been able to understand the material presented by the teacher, especially in mathematics subjects (Fitriyanti, 2025).

This research conducted a new development, namely developing the Calbox Jurang learning media which aims to improve students' numeracy skills in addition and subtraction materials up to grade 20 I. This is because numeracy is the main key for students to access and understand the world and equip students with awareness and understanding of the important role of mathematics in today's world (Savitri Sihombing, 2021). This media was developed not only to help students learn to count, but also to improve the numeracy skills of class I students through addition and subtraction story questions that are relevant to everyday life. Numeracy skills are important to apply in teaching and learning activities in schools because numeracy skills are related to solving mathematical problems in everyday life (Astuti and Matematika,

2023). By integrating story problems into the development of this media, mathematics learning not only becomes more relevant in terms of numeracy skills, but also helps shape better numeracy skills.

METHOD

This research uses the Research and Development (R&D) research development method. This research is an initial activity that aims to identify and understand user needs (Alizah et al., 2025). The ADDIE model used in this development research consists of five stages, including: 1) Analysis, 2) Design, 3) Development, 4) Implementation, 5) Evaluation (Gultom et al., 2019). The choice of using the ADDIE model is because it has systematic and effective stages (Dewi et al., 2019). Development of Calbox Jurang learning media equipped with visualization of concrete objects, with a gradual design process. The purpose of this development research is to produce a Calbox Jurang learning tool that can be used to teach the concept of addition and subtraction up to 20 in mathematics subjects. The following is a visualization that describes the validation and trial process of the Calbox Jurang learning media:

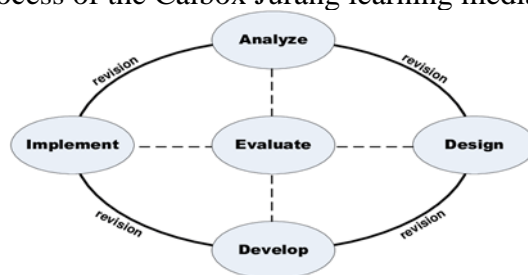


Figure 1 ADDIE Development Model Chart

The subjects of this study included teachers and students of grade I at MI Al Falah Kebonagung Padangan which is one of the madrasahs in Bojonegoro Regency totaling 20 students. The materials developed in the media are addition and subtraction materials up to 20 mathematics subjects for grade I at MI Al Falah Kebonagung Padangan.

The types of data obtained are qualitative and quantitative data. The research instruments used are observation, interviews, expert validation questionnaires and student response questionnaires, tests in the form of pretests and posttests. This research instrument is used to collect data for a study (Ashabulabib et al., 2024). The data collection techniques used were observation, interviews, questionnaires, tests, and documentation. Observations were conducted by researchers to analyze problems in the field. The aspects observed included the learning process in the classroom, student learning outcomes, media used by teachers in the mathematics learning process, teacher delivery to students related to mathematics materials, and student responses related to the mathematics learning process. Interviews are a data collection technique used when researchers intend to conduct initial research to identify problems that need to be researched (Sugiyono, 2016). Interviews were conducted with class teachers who teach mathematics. The questionnaire was used by researchers to measure the level of feasibility of the media developed, during the validation process with design experts, material experts, and language experts with 10 statements each. The statements in the design expert validation questionnaire cover two aspects, namely the quality and appearance of the learning media, and the feasibility of the learning media. The statements in the material expert validation questionnaire cover four aspects, namely the material aspect, the depth of the material content aspect, the curiosity-boosting aspect and the language aspect. The statements in the language expert validation questionnaire cover four aspects, namely the language aspect, the suitability aspect, the readability aspect and the practicality aspect. Each statement item in the questionnaire uses a Likert scale with 4 answer choices; strongly agree (ss), agree (s), disagree (ts) and strongly disagree (sts) (Simamora, 2022). Then the questionnaire results were

analyzed using the percentage of eligibility with the criteria according to (Wijaya et al., 2024) as follows:

Table 1 Interval Categories and Validity Criteria (Wijaya et al., 2024)

Percentage (%)	Criteria	Information
81 - 100	Good	Eligible (No Revision Required)
61 - 80	Good Enough	Quite Eligible (No Revision)
41 - 60	Less Good	Less Eligible (Revision)
20 - 40	Not Good	Not Eligible (Revision)

Then the student response questionnaire is used to determine the practicality of the developed product. The student response questionnaire is given after conducting a product trial. The criteria for the practicality of the developed product can be seen in the following table:

Table 2 Percentage of Practicality (Syifaurrehman, 2025)

Percentage (%)	Criteria	Information
81 - 100	Good	Eligible (No Revision Required)
61 - 80	Good Enough	Quite Eligible (No Revision)
41 - 60	Less Good	Less Eligible (Revision)
20 - 40	Not Good	Not Eligible (Revision)

Tests are given to students (field tests) during the implementation phase to determine the potential impact of the media on learning outcomes. Tests are evaluation tools commonly used in education to measure student achievement during the learning process (Arruarte et al., 2021). The test instruments used are pretest and posttest instruments with 20 questions each in the form of multiple choice questions. The test instrument grid can be seen in the following table:

Table 3 Grid of Pretest Posttest Questions

No	Question Indicator	Question Form	Cognitive	Question No	Answer Key
1	Able to calculate the difference in the number of objects using pictures	PG	C2	1	C
2	Able to pair numbers using differences	PG	C3	2	B
3	Able to determine addition arithmetic operations up to 20	PG	C4	3	B
4	Able to determine subtraction arithmetic operations up to 20	PG	C4	4	B
5	Able to solve addition problems up to 20 through story problems	PG	C4	5	A
6	Able to solve addition problems up to 20	PG	C4	6	B
7	Able to determine the difference in quantity through story problems	PG	C4	7	B
8	Able to solve subtraction problems up to 20 through story problems	PG	C4	8	C
9	Able to determine subtraction operations that have the same results	PG	C4	9	B

10	Able to solve addition problems up to 20 through story problems	PG	C4	10	C
11	Able to solve addition problems of less than 20	PG	C4	11	C
12	Able to analyze addition arithmetic operations	PG	C4	12	B
13	Able to pair numbers using differences	PG	C3	13	B
14	Able to solve addition problems through story problems	PG	C4	14	B
15	Able to analyze the number of objects compared to other objects	PG	C4	15	A
16	Able to solve subtraction problems of less than 20	PG	C4	16	C
17	Able to solve addition problems through story problems	PG	C4	17	C
18	Able to solve subtraction problems through story problems	PG	C4	18	C
19	Able to solve addition problems through story problems	PG	C4	19	B
20	Able to solve addition problems of less than 20	PG	C4	20	A

The results of the students' pretest and posttest that had been obtained were then analyzed to determine the level of effectiveness of the Calbox Jurang media using the N-Gain formula as follows (Nolasco, 2025) :

$$N - Gain = \frac{Nilai Posttest - Nilai Pretest}{Nilai Maksimum - Nilai Pretest}$$

(Source (Nolasco, 2025)).

Then the gain points obtained will be matched with the gain criteria. The gain criteria can be seen in the following table (Wahab et al., 2021):

Table 4 N-Gain Criteria

Criteria	Gain Points
High	$g > 0.7$
Medium	$0.3 \leq g \leq 0.7$
Low	$g < 0.3$

The data analysis technique used in this study is qualitative descriptive analysis. The validity and feasibility of the media are determined from the questionnaire scores filled out by the validator. The practicality of the media is obtained from the response questionnaire scores filled out by the users (students). Data obtained from the trial results are used to determine the potential impact or effectiveness of the media developed. This is done by analyzing the results of the pretest and posttest values. All data obtained have been anonymized and presented in aggregate form. Informed consent was obtained from students and homeroom teachers in accordance with ethical research practices.

RESULTS AND DISCUSSION

Analysis Stage

The analysis stage includes analysis of student abilities, student needs and curriculum analysis. Curriculum analysis is based on the use of the existing curriculum at MI Al Falah Kebonagung Padangan, namely the Independent Curriculum. Addition and Subtraction

materials up to 20 are adjusted to the Learning Achievement standards and Learning Objective Flow that have been set in the Independent Curriculum. Analysis of student abilities and needs is obtained through observation and interview activities with class I teachers at MI Al Falah to determine students' learning styles and learning attitudes in mathematics learning. This is also used to ensure that the development of the Calbox Jurang media is in accordance with the needs and characteristics of students. Basically, students in lower classes are not yet able to think abstractly, so the material presented by the teacher needs to be visualized in concrete or real form (Tege, M et al., 2014). This is in line with the opinion (Dibvya Afifah et al., 2023) which states that the results of this study indicate that teachers do not accommodate students' abilities and teachers have not used concrete or real learning media in the classroom learning process optimally. So, students still often do not understand the material, especially in addition and subtraction materials up to 20 mathematics subjects and the low numeracy skills of students.

Design Stage

At the design stage, researchers design media designs that are developed by adjusting the results of the field needs analysis (Hidayah, N et al., 2019). In the product design stage, it is necessary to prepare materials and media tools as well as research instruments. Furthermore, the media is designed using materials and tools that have been prepared as attractively as possible so that students are interested and enthusiastic in using the media developed by researchers. While research instruments are used to measure the validity, feasibility, practicality, and effectiveness of the media (Putri, W. A et al., 2024). The development product is in the form of Calbox Jurang media which is made from basic plywood material which is not easily brittle (Manba'ul Hikam, 2023). The following is a design image of the Jurang Calbox media which will be made from plywood and several media accessories such as a place for balls and numbers.



Figure 2 Making a Box Frame

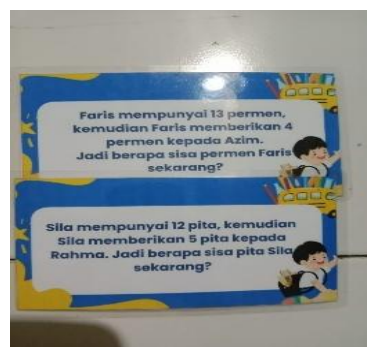


Figure 3 Creating Story Question Media from the Canva Application



Figure 4 Making a Drawer for Balls



Figure 5 Number Creation

Development Stage

In the development stage, the design created in the previous development stage is realized in a concrete form. Development is the process of realizing media design into a real form that can be used in learning activities (Adeoye et al., 2024). The development process begins with

the researcher preparing the materials used in making the Calbox Jurang media, namely, plywood cut to a size of 1 m x 60 cm as the base and cover, the side of the box measuring 50 cm x 20 cm, toy balls, numbers from plywood, story problems made using the Canva application printed and laminated, 7 m wooden stickers, 8 m black and purple stickers, magnets, hinges, nails, locks and door handles.

The first step in making Calbox Jurang learning media is the measurement process, the measurement is done using a wooden meter and pencil to provide a mark then the plywood is measured according to needs. Second, the plywood is cut using a wooden chisel and saw. The plywood is cut with a size of 1 m x 60 cm as many as 2 parts as the roof and base of the box, then cut again with a size of 50 cm x 20 cm as many as 2 parts as the sides of the box. Then cut the blabak wood with a size of 50 cm x 20 cm as much as 1 which will be used as a divider between the number place and the ball hole place, the blabak wood is given a rail track so that the number place cover can be closed and opened. Third, the gluing process on the plywood is done using nails, then shaped like a box or box. Then for the roof cover is attached using hinges. Fourth, making the ball hole. The tool used to make the ball hole is a liner board or rubber then perforated using a wood chisel. The ball hole is made into 80 holes. After making the ball hole is complete, then each side of the ball hole is installed with a wooden divider so that the ball does not fall. Fifth, the roof of the box is coated with zinc so that magnets can be attached to the numbers. The zinc used as a coating is the same size as the roof and base of the box, which is 50 cm x 20 cm. Sixth, the drawers are made using plywood. There are 4 drawers in the media, 3 drawers are used to store balls and 1 drawer is used to store story problems. The 3 drawers used to store balls are 2 drawers measuring 48 cm x 10 cm containing 20 balls and 1 drawer measuring 48 cm x 20 cm containing 40 balls. Each drawer has a handle and lock so that it is stored properly. Seventh, the number media is made using plywood that is cut into pieces, then the plywood that has been cut into pieces is formed into numbers using a small saw. The numbers made are 40 numbers, namely 1 to 20 as question numbers and 1 to 20 as answer numbers. After all the numbers are made, they are coated using colored stickers to make them more attractive. Eighth, sticker installation. The stickers used are wood-colored stickers. All parts of the box are covered with stickers to make them more attractive. Ninth, the creation of story question media is designed with the help of the Canva application, then printed and printed using buffalo paper, then cut into several questions. After that, it is laminated so that it is not easily damaged. After going through the stages above, the Calbox Jurang media is ready to use. The Calbox Jurang learning media can be seen in the following image:



Figure 6 Final prototype of Calbox Jurang media showing interactive box complete with numeric and ball placement features

After the Calbox Jurang media was developed, validation was carried out by three validators, including design expert validators, material experts, and language experts. The validation process was carried out to obtain input in the form of criticism and suggestions from

experts, which can be used to improve the Calbox Jurang media if there are still shortcomings. And to determine the percentage of the feasibility of the counting board media according to experts. The feasibility assessment was carried out by experts, including design experts, material experts, and language experts. Each has a relevant professional and academic background. The overall score results from the three validators can be seen in the following image:

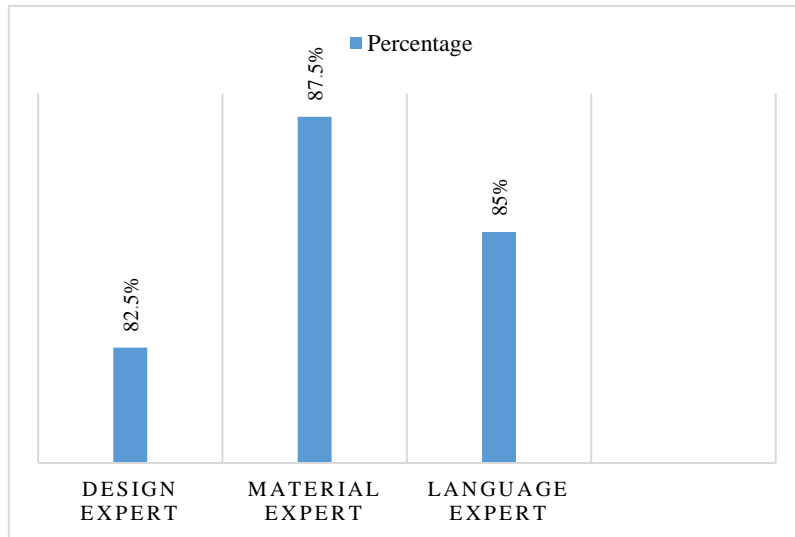


Figure 7 Validator Eligibility Percentage

Based on the results of the media feasibility assessment from the three validators, it can be concluded that the design expert validation got a score of 82.5% with the category "Feasible", the material expert validation got an overall score of 87.5% with the category "Feasible", and the language expert validation got an overall score of 85% with the category "Feasible". Thus, the development of the Calbox Jurang media is declared "Feasible" for use in the learning process.

Implementation Stage

The implementation stage is the stage of the media trial process that is developed to determine the level of practicality (Apsari, P. N., & Rizki., 2018). This implementation stage is carried out by conducting direct media trials in the learning process (Adeoye et al., 2024). The trial was conducted in two stages, namely a small-scale trial (5 students) and a large-scale trial (15 students). This implementation stage was conducted to determine the level of practicality of the Calbox Jurang media that had been developed which can be seen from the results of student responses through the student response questionnaire given. The results of the practicality test of the Calbox Jurang media can be seen in the following table:

Table 5 Results of Student Response Questionnaire

No.	Name	Questionnaire Number										Total	Score
		1	2	3	4	5	6	7	8	9	10		
1.	AAP	4	3	2	4	3	4	4	3	4	4	35	87.5
2.	AGHR	3	3	4	4	4	4	4	4	4	4	38	95
3.	AVP	3	3	3	4	2	4	4	3	4	4	34	85
4.	AKZ	3	3	3	3	3	3	3	3	3	3	30	75
5.	ANA	3	4	4	4	4	4	4	4	4	4	39	97.5
6.	AF	4	3	4	4	4	4	4	4	4	4	39	97.5
7.	ANM	3	4	4	3	4	4	4	4	4	4	38	95
8.	AAM	4	4	4	4	4	3	3	3	4	3	36	90
9.	AKN	3	4	3	4	2	4	3	1	4	3	31	77.5
10.	BFA	3	3	3	4	4	3	2	4	4	4	34	85

No.	Name	Questionnaire Number										Total	Score
		1	2	3	4	5	6	7	8	9	10		
11.	FZ	3	4	4	4	4	4	3	3	4	3	36	90
12.	FKM	3	4	4	4	4	3	4	4	4	3	37	92.5
13.	IA	3	4	4	4	4	4	4	3	4	4	38	95
14.	MAK	4	4	3	3	4	4	4	3	4	4	37	92.5
15.	MRA	4	3	4	4	4	4	4	4	4	3	38	95
16.	ND	3	4	4	4	4	3	3	4	3	4	36	90
17.	NIHRW	4	4	4	3	4	4	4	4	4	4	39	97.5
18.	SAA	3	4	2	3	1	4	3	3	4	3	30	75
19.	UA	4	3	3	4	4	4	4	4	4	3	37	92.5
20.	YAN	4	4	3	3	4	3	4	3	4	4	36	90
Total Score		720										1.795	
Average		3.59											
Percentage		89.75%											

Based on the results of the student response questionnaire above, the assessment of the practicality test of the Calbox Jurang media obtained a percentage score of 89.75% with the category of "Feasible". So it can be concluded that the development of the Calbox Jurang media has a positive impact on the learning process and students' numeracy skills can be improved.

The next step is to conduct an effectiveness test of the product that has been developed. The effectiveness test is obtained from the analysis of the learning outcomes of grade I students before the use of Calbox Jurang media (pretest) and after the use of Calbox Jurang media (posttest) on addition and subtraction materials up to 20 mathematics subjects presented in table 6 below:

Table 6 Pretest and Posttest Values

Pretest		Posttest		Maximum Score
Score	Average	Score	Average	
1.275	63.75	1.815	90.75	2000

The table above presents a comparison of the pretest and posttest scores obtained by students before and after the application of the media. The maximum score listed is the accumulation of the scores of 100 from all students. While the average refers to the individual average calculated from the total score divided by the number of students. After that, the data obtained based on the values before (pretest) and after (posttest) using the Calbox Jurang media were then analyzed using the N-Gain formula. N-Gain is a formula used to determine the level of product effectiveness (Jatisah Nur Anisah & Roziiqin, 2021). Analysis is significant based on the changes that occur using the N-Gain formula as follows:

$$N - Gain = \frac{\text{Nilai Posttest} - \text{Nilai Pretest}}{\text{Nilai Maksimum} - \text{Nilai Pretest}}$$

$$N\text{-Gain} = \frac{1.815 - 1.275}{2.000 - 1.275}$$

$$N\text{-Gain} = \frac{540}{725}$$

$$N\text{-Gain} = 0.74$$

Based on the results of the analysis of the pretest and posttest values above, the effectiveness test of the Calbox Jurang learning media obtained an average of 0.74, included in the high category according to the effectiveness test criteria (N-Gain). So that it shows that the development of the Calbox Jurang learning media can improve the numeracy skills of class I students of MI Al Falah Kebonagung Padangan and is effective for use in the process of learning mathematics on addition and subtraction materials up to 20. The results of the pretest and posttest obtained from the use of the Calbox Jurang media can be seen in Figure 8.

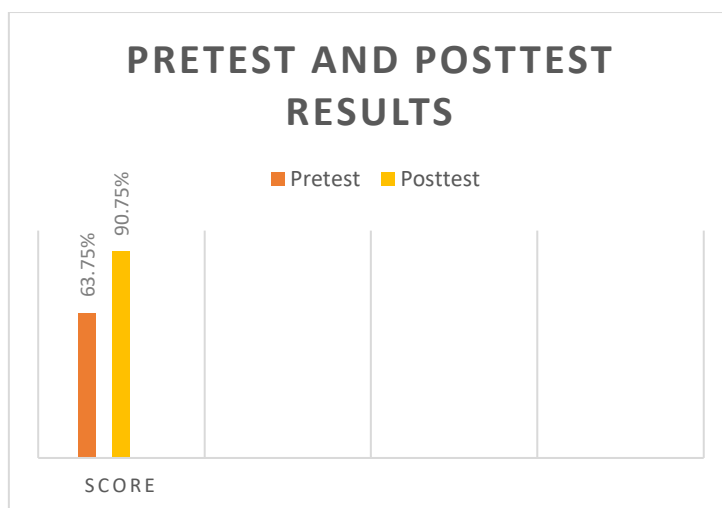


Figure 8 Pretest & Posttest Results

Evaluation Stage

After the implementation stage is complete, the next step is the evaluation stage. The evaluation stage in this learning is carried out until the formative evaluation aims to revise the needs (Schulze et al., 2022). Based on the results of expert validation and field trials that have been carried out at the implementation stage, an evaluation is then carried out regarding input, suggestions and criticisms from expert validation and field trials to be revised gradually for the development of better media. Criticism and suggestions from validation experts can be seen in the following table:

Table 7 Validator Criticism and Suggestions

No.	Validator	Criticism and Suggestions	Follow Up
1.	Design expert	The choice of sticker color needs to be considered to make it more attractive and the shape of the numbers should be made smaller so that they look neat	Researchers have changed the color of the stickers to make them look more attractive and have reduced the shape of the numbers to make them look neat
2.	Material expert	Materials must be adapted to learning objectives and achievements	Researchers have adapted the material to learning objectives and achievements
3.	Language expert	The use of EYD sentences and the placement of punctuation marks and the use of conjunctions in story questions and instructions for use need to be noted	Researchers have used punctuation and conjunctions in story questions and usage instructions correctly

This research is in line with research (Mahruzah Yulia, N et al., 2023) about the development of Calculator Box media for addition and subtraction materials in MI, where this study obtained the results of the media expert validation test of 66% with valid information but there were revisions and the material validation test of 86% with valid information and suitable for use. While in this study, the results of the design expert validation test were 82.5%, material experts 87.5%, and language experts 85%. The practicality test was 89.75% with a feasible category and the effectiveness test was 0.74 with a high and effective category. Similar findings were also obtained from (Khoo, Y.Y., et al., 2025) where the use of real manipulative media can significantly improve the fluency of arithmetic and improve learning outcomes among early-level students in Malaysia. Thus, it can be concluded that the development of the Calbox Jurang learning media is not only successful in improving students' numeracy skills, but is also

able to provide further new innovations in terms of developing concrete object visualization and can strengthen the results of previous studies.

CONCLUSION

Based on the results of the study, it resulted in the development of Calbox Jurang learning media to improve the numeracy skills of class I MI Al Falah Kebonagung Padangan, so it can be concluded that this study has succeeded in developing Calbox Jurang learning media to improve the numeracy skills of class I in mathematics subjects on addition and subtraction up to 20. Media development includes the analysis stage (student abilities, student needs, curriculum). Design stage (creating a media framework and research instruments). Development stage (media preparation and validity test). Implementation stage (small and large group product trials, practicality tests, and effectiveness tests). Evaluation stage (criticism and suggestions from validators and trial results). Based on the results of expert validation, it shows that the design expert validation got a score of 82.5% with a feasible category, the material expert validation got a score of 87.5% with a feasible category, and the language expert validation got a score of 85% with a feasible category. In addition, it is also seen from the results of student responses who got an overall score of 89.75% with a feasible category. The results of the effectiveness test of the Calbox Jurang media obtained a score of 0.74 with a high category according to the N-Gain classification. So from the results of the study it can be concluded that the Calbox Jurang learning media is able to improve the numeracy skills of class I students of MI Al Falah Kebonagung Padangan and is effective for use in the mathematics learning process, especially in addition and subtraction materials up to 20. Increasing numeracy skills presented in the form of story problems when integrated into the national curriculum can have a positive impact, namely that students not only learn to have mathematical skills, but also have the ability to solve problems that occur in the context of everyday life.

RECOMMENDATION

The challenges experienced by researchers in developing the Calbox Jurang learning media for mathematics subjects are time constraints, lack of creativity in researchers and the need for quite a large cost. Therefore, further research is needed to design the media better, so that the media becomes more practical and more attractive to users. The development of the Calbox Jurang media also requires quite a large cost, so researchers suggest that for further research it is better to reduce components that may be considered not too used. In addition, for further research it is expected to develop products that can provide more complete, practical and interesting content and are easy to use and understand by users.

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REFERENCES

- Adeoye, M. A., Adrian, K., Indra, S., Satya, M. S., & Septiarini, N. I. (2024). *Revolutionizing Education : Unleashing the Power of the ADDIE Model for Effective Teaching and Learning*. 13(1), 202–209. <https://doi.org/10.23887/jpiundiksha.v13i1.68624>
- Afifah, D., & Kristin, F. (2023). Peningkatan Kemampuan Operasi Hitung Penjumlahan dengan Media Manipulatif pada Kelas I Sekolah Dasar. *INNOVATIVE: Journal Of Social Science Research*, 3(5), 1537–1548. <https://j-innovative.org/index.php/Innovative>
- Alizah, L., Agustina, L., & Galatea, C.K. (2025). Pengembangan Media Pembelajaran Berbasis Android Kodular dan Wordwall untuk Meningkatkan Kemampuan Pemecahan Masalah Matematis Siswa SMP. *POLINAMIAL, Jurnal Pendidikan Matematika*, 4(2), 230–237.

- <https://doi.org/2830-0378>
- Apsari, P. N., & Rizki, S. (2018). Android-Based Mathematics Learning Media on Linear Program Material. *Journal of Mathematics Education, FKIP, Muhammadiyah University of Metro*, 7(1), 161–170. <http://dx.doi.org/10.24127/ajpm.v7i1.1357>
- Arruarte, J., Larranaga, M., Arruarte, A., & Elorriaga, J. A. (2021). Measuring the Quality of Test-based Exercises Based on the Performance of Students. *International Journal Artificial Intelligent Education*, 31, 585–602. <https://doi.org/10.1007/s40593-020-00208-0>
- Ashabulabib, A., Daimah, U.S., & Muhakimah, I. (2024). Pengembangan LKPD Terintegrasi Islam pada Materi Operasi Bentuk Aljabar. *Polynom, Journal in Mathematic Education*, 4(2), 35. <https://doi.org/http://dx.doi.org/10.22342/xxx.x.x4231.129-144>
- Astuti, S. P., & Matematika, P. (2023). *Kemampuan Numerasi Peserta Didik Dalam Menyelesaikan Masalah Aljabar Ditinjau dari Gender Students ' Numeracy Ability in Solving Algebra Problems in View of Gender*. 13(02).
- Eli, I. C., & Daniel, O. T. (2023). *Mathematical Modelling of Bifurcation Analysis on the Effect of Random Perturbation Value on a Dynamical System : Alternative Numerical Approach*. 69(2), 15–24.
- Gerard, L., Bradford, A., & Linn, M. C. (2023). Supporting Teachers to Customize Curriculum for Self-Directed Learning. *Journal of Science Education and Technology*, 3(1), 660–679. <https://doi.org/10.34312/jmathedu.v2i2.10587>
- Gultom, E. L., Simaremare, A., & Dewi, R. (2019). Developing Teaching Materials Based on Social Care Characters Based on Franciscan Spirituality With Contextual Teaching And Learning (CTL) Strategies. *Budapest International Research and Critics in Linguistics and Education (BirLE) Journal*, 2(4), 204–215. <https://doi.org/10.33258/birle.v2i4.509>
- Hasiru, D., Badu, S. Q., & Uno, H. B. (2021). Learning Media Effective in Helping Learning Distance Mathematics. Jambura J. Mathematics. Educator. *Journal Jambura Matematika*, 2(2), 59–69. <https://doi.org/10.34312/jmathedu.v2i2.10587>
- Hidayah, N., Aisyah, & Dewi, S. (2019). Development of Mathematics Learning Media Using Adobe Flash Cs6 with Contextual Teaching and Learning Approach on Line and Angle Material for Class VII at SMP Negeri 6. *Jambi: Journal of Mathematics Education*, 3(2), 98–103. <http://dx.doi.org/10.33087/phi.v3i2.73>
- Husna, F.A., Sari, R.N., & Putri, A.M. (2023). Pengembangan Media Papan Hitung Untuk Meningkatkan Hasil Belajar Materi Operasi Hitung Penjumlahan Siswa Madrasah Ibtidaiyah. *JRPM (Jurnal Review Pembelajaran Matematika)*, 8(1), 33–49. <https://doi.org/https://doi.org/10.15642/jrpm.2023.8.1.33-49>
- Jatisah, Nur Anisah & Roziiqin, A. (2021). Pengembangan media pembelajaran interaktif berbasis aplikasi android untuk meningkatkan pemahaman peserta didik pada kompetensi dasar sistem transmisi manual. *Automotive Science and Education Journal*, 10(1), 8–11. <http://journal.unnes.ac.id/sju/index.php/asej>
- Khoo, Y. Y., Ramdan, M. R., Abdullah, N. R., Aziz, N. A., & Mahjom, N. (2025). The Impact of Game-Based Learning on Thinking and Learning in Higher Education Context: A Scoping Review. *International Journal of Education in Mathematics, Science and Technology*, 13(3), 623–637. <https://doi.org/https://doi.org/10.46328/ijemst.4776>
- Khotimah, R. P. & Saputra, F. . (2023). Profil Kemampuan Literasi Matematika dalam Menyelesaikan Soal Berorientasi PISA Ditinjau dari Gaya Kognitif Siswa. *Jurnal Cendekia : Jurnal Pendidikan Matematika*, 7(2), 1675–1688.
- Mahruzah Yulia, N., Jannah, R., & Sa'diyah, Z. (2023). Pengembangan Media Pembelajaran Calculator Box Materi Penjumlahan dan Pengurangan Kelas I MI Development of Learning Media Calculator Box Material for Addition and Subtraction Class I MI. *Journal of Elementary Educational Research*, 3(1). <https://ejournal.iain-manado.ac.id/index.php/jeer> %0D

- Manba'ul Hikam, H. (2023). *Pengembangan Media Counting Box Pada Mata Pelajaran Matematika Untuk Siswa Kelas 1 MI Miftahul Ulum Sampangan Muncar Banyuwangi*. Skripsi Diterbitkan, Pendidikan Guru Madrasah Ibtidaiyah, Universitas Islam Negeri Kiai Haji Achmad Siddiq Jember, Banyuwangi.
- M, Saleh., M, Syahrudin., I, A. (2023). *Media Pembelajaran*. Eureka Media Script.
- Mustadi, A., Sayekti, O. M., Rochmah, E. N., Zubaidah, E., Sugiarsih, S., & Schulze, K. M. (2022). Pancalis: Android-based leaning media for early reading in new normal. *Jurnal Cakrawala Pendidikan*, 41(1), 71–82. <https://doi.org/10.21831/cp.v41i1.45883>
- Nolasco, R. E. (2025). *Effectiveness of an Outcomes-Based Education Module in Electrochemistry for Engineering Students*. 227–235.
- OECD. (2023a). *PISA 2022 Results The State of Learning and Equity in Education: Vol. I*. OECD Publishing.
- Putri, W. A., Alpusari, M., & Fendrik, M. (2024). Development of Ethnomathematics-Based Teaching Modules on Geometry Material for Elementary School Students. *Didactics: PGSD STKIP Subang Scientific Journal*, 10(1), 1897–1910. <https://doi.org/10.36989/didaktik.v10i1.2730>
- Sihombing, S. (2021). *Inspirasi Pembelajaran Yang Memperkuat Numerasi*. Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi.
- Simamora, B. (2022). Skala Likert, Bias Penggunaan dan Jalan Keluarnya. *Jurnal Manajemen*, 12(1), 85.
- Sugiyono. (2016). *Quantitative, Qualitative, and R&D Research Methods*. Alfabeta.
- Susanti, Y. (2020). Penggunaan Strategi Murder Dalam Pembelajaran Matematika di Sekolah Dasar. *Jurnal Pendidikan Dan Sains*, 2(2), 180–191. <https://ejournal.stitpn.ac.id/index.php/bintang>
- Syifaurrehman. (2025). Pengembangan media counting box untuk meningkatkan kemampuan berhitung bilangan bulat kelas i sdit syifaurrehman. *Jurnal Multidisiplin Ilmu Akademik*, 2(1), 297–307. <https://doi.org/https://doi.org/10.61722/jmia.v2i1.3316>
- Tege, M., Jampel, N., & Pujawan, K. (2014). *Development Research Model*. Graha Ilmu.
- Wahab, A., Junaedi, J., & Azhar, M. (2021). Efektivitas Pembelajaran Statistika Pendidikan Menggunakan Uji Peningkatan N-Gain di PGMI. *Jurnal Basicedu*, 5(2), 1039–1045. <https://doi.org/https://doi.org/10.31004/basicedu.v5i2.845>
- Wijaya, I.K.W.B., Wahyuni, N.N.T., Yasa, I.M.W., Suastini, N.N., & Santi, E.M. (2024). Pengembangan Buku Cerita Sains Bergambar Untuk Pembelajaran Ilmu Pengetahuan Alam dan Sosial (IPAS) Kelas III Sekolah Dasar. *DE JOURNAL (Dharmas Education Journal)*, 5(2). <https://doi.org/https://doi.org/10.56667/dejournal.v5i2.1636>