

Exploring the Role of Counting Box Media in Supporting Elementary Students' Understanding of Addition Concepts

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Abstract

This study aims to describe the role of the counting box media in learning addition in first grade, identifying obstacles, supporting factors, and solutions to these obstacles. The study used a descriptive qualitative method with a phenomenological design through interviews, observations, and documentation with teachers and first-grade students at an Islamic elementary school in Boyolali. The results show that counting box media helps students understand the concept of addition through concrete experiences, making learning more enjoyable, encouraging active participation, increasing motivation, and making the learning process more meaningful. Obstacles include limited media, inadequate components, and an uncondusive classroom environment. Solutions to overcome these obstacles include increasing the number of media, providing additional questions, adjusting the number of magnets, and adding pom-poms to make the media more effective. The implications of this study indicate that the use of the Counting Box media contributes to the achievement of the SDGs through effective and inclusive addition learning and the development of similar media for other arithmetic operations.

Keywords: Addition, Counting box media, Phenomenology

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INTRODUCTION

Mathematics is a field of science that is taught at all levels of education, from kindergarten to college. Apart from that, mathematics is very close to everyday life and we often encounter it in routine activities (Amalia & Kaltsum, 2026). The large role of mathematics is very influential in real life, because mathematics can also be said to be a science that plays a crucial role as a basis for technological development and plays a role in other scientific disciplines (Ladjali, 2023). Mathematics is also one of the subjects that is introduced to students when they are in grade I. At this stage, students' numeracy skills begin to develop, but not all students have the same speed. Some students are able to solve mathematical problems quickly, whereas others require more time to understand and complete them so that the learning process is hampered (Sari et al., 2024). This difficulty is related to the cognitive development characteristics of low-grade students, who find it easier to understand concrete concepts because students' abstract thinking abilities are still limited (Wahyuni, 2024).

Addition is a combination of two or more sets (Nanda & Rani, 2025). Addition of numbers is one of the mathematics materials taught in grade I. In practice, grade I students often experience difficulties in simple addition operations. Previous research shows that there are difficulties with addition in grade I students as is done (Daryanes et al, 2023). Similar findings were also presented in other research which revealed that there were still many lower grade students who had difficulty understanding addition operations (Rosanti et al., 2022). Likewise, research results show that grade I elementary school students are weak in understanding the concept of addition (Sugriani, 2019). This problem shows that weak understanding of the concept of addition is a common problem experienced by elementary school students, not just limited to one particular school.

Learning media is an important component in learning (Wulandari et al., 2023; Pratama & Sari, 2025). Media functions as an intermediary or tool to help teachers convey material so that it is more easily accepted by students (Wulandari et al., 2023). The use of media in learning can

actively involve students, increase students' memory of the material, and motivate learning participation (Capuno et al., 2019). Choosing appropriate and interesting learning media helps students understand the material, reduces boredom, increases interest in learning, and makes learning more dynamic and enjoyable (Shabrina et al., 2025). Elementary school students are not yet able to think formally, so in learning mathematics, educators are expected to link learning in elementary schools with concrete objects, namely through the learning media (Sulastri 2016 as cited in Permatasari et al., 2021).

One of the factors is conventional learning with the dominance of lecture methods and the use of textbooks (Valentina & Wulandari, 2022). Conventional learning is less appropriate for lower grade students, especially in mathematics learning, because it uses a one-way learning approach where the teacher dominates the teaching process without providing enough space for students to explore concepts independently. This learning model not only makes students bored quickly, but also inhibits students' active involvement in the learning process. As a result, students experience difficulties in understanding the material and experience obstacles in achieving optimal learning outcomes (Rukono et al., 2025). The minimal use of learning media also makes students less active and easily bored. Another obstacle comes from students who often view mathematics as a complicated and scary subject, making students less enthusiastic about learning and having difficulty understanding the material provided (Kristanto & Wahyudi, 2024).

As an alternative to overcome these problems, more innovative learning media is needed. Media has an important role in improving the quality of learning. Learning mathematics using appropriate media not only helps students understand mathematical concepts better, but is also able to encourage student motivation and involvement during learning (Ulfahyana & Herwandi, 2024).

One of the media that can be used in learning is a counting box. This media helps students count, increases the effectiveness of mathematics learning, and develops cognitive, affective and psychomotor aspects (Kartini, 2021). Counting box was developed based on the problem of minimal use of learning media in mathematics learning, especially in addition material. Research shows that mathematics learning in elementary schools is still dominated

by conventional methods with limited use of media, so that students' involvement and understanding of numeracy concepts is not yet optimal (Syafri et al., 2024). The process of developing counting box begins with the use of concrete media in the form of objects around students, such as straws, which are used as aids for learning addition. This kind of concrete media can help students build conceptual understanding through direct experience, but it is form and use are very common. Students' interest in media is low. This media was developed into counting box which is designed with a more attractive appearance and is equipped with various learning elements. The development of more varied and attractive manipulative media is in line with previous research findings which state that the use of manipulative media can increase interest in learning and understanding of the concept of addition in elementary school students (Rukono et al., 2025)

The learning media used in this study is a counting box, which was specifically designed for addition instruction and adapted to strengthen students' conceptual understanding through interactive learning activities. The counting box is suitcase-shaped, made of plywood, and equipped with several supporting components. It contains 20 counting holes to facilitate addition operations involving numbers up to 20. The right compartment stores pom-poms and magnetic number pieces, while the left compartment contains question cards, answer cards, and a hammer. The top section includes a user guide, the bottom section features a storage drawer, and the inside of the lid provides an answer area where students can attach the magnetic numbers.

The counting box is expected to enhance students' understanding of addition concepts in mathematics while also fostering curiosity, developing critical thinking skills, and creating a more enjoyable and meaningful learning experience. Therefore, this study aims to investigate the role of the counting box as a learning medium used by teachers in mathematics instruction. Specifically, the research focuses on describing the role of the counting box in teaching addition, identifying the challenges and supporting factors encountered during its implementation, and examining the strategies employed by teachers to overcome these challenges to ensure more effective classroom implementation.

METHOD

This research uses a qualitative approach which aims to understand in depth various symptoms, phenomena and events that occur in the learning context through a comprehensive and interpretive search process (Zelčāne & Pipere, 2023). This approach emphasizes exploring the meaning behind the actions, interactions and experiences of research subjects, so as to provide a complete and contextual picture of the situation being studied. In qualitative research, findings are not presented in the form of numbers or statistics, but in the form of detailed, systematic and in-depth descriptive descriptions, and presented in accordance with the facts found directly in the field (Izzah & Sukartono, 2023; Helmi, 2022).

This approach was selected because it was considered the most relevant to comprehensively describe the role of counting box in mathematics learning, especially in addition material. Through this approach, researchers can explore how the use of media influences students' learning processes, interactions that occur during learning, as well as students' responses and understanding of the material being taught. Thus, it is hoped that the research results will be able to provide a more in-depth and meaningful picture of the

effectiveness and contribution of counting box in improving the quality of mathematics learning.

The research design is phenomenological, namely a design that focuses on the real experiences of individuals. Phenomenology aims to reveal the meaning of a concept or phenomenon based on conscious experiences experienced by several individuals. This design is used to explore the experiences of teachers and students in applying media (Minsih et al., 2019). This research was carried out at one of the Islamic elementary schools in Boyolali. The object of this research is the role of the media in teaching addition, while the subjects of this research are 1 teacher and 32 students.

Data collection techniques include interviews, observation and documentation. Interviews are data collection through conversations between interviewers and sources (Sari et al., 2025). Interviews were conducted with teachers and grade I students. Interviews with teachers were used to obtain information regarding the implementation of learning, use of counting box, and obstacles. Interviews with students aim to determine understanding of addition material during learning using counting box. Teacher and student interview guidelines can be seen in Table 1.

Table 1. Teacher and student interview guidelines

Role	Aspect	Question
Teacher	Media understanding	What is the definition of learning media?
		How to choose the right learning media?
		What are the criteria for suitable learning media for grade I?
		What are the criteria for suitable learning media for learning mathematics?
	The role of counting box	What is the role of media in helping students understand mathematical concepts?
		Does counting box make it easier for students to learn the material?
		Does counting box make students more active?
		Does counting box make learning fun?
		Does counting box increase student motivation?
		Does counting box make students more interested in learning?
Obstacle and support	Does counting box make students more enthusiastic in learning?	
	Are there any obstacles in implementing counting box?	
Student	The role of counting box	Are there any supporting factors in implementing counting box?
		Does counting box make it easier for students to learn the material?
		Does counting box make students more active?
		Does counting box make learning fun?
		Does counting box increase student motivation?
		Does counting box make students more interested in learning?
		Does counting box make students more enthusiastic about learning?
		Do you experience difficulties when using counting box?

Observation is a method of collecting data through direct observation of phenomena or behavior in the field (Pratama et al., 2024). Researchers made direct observations of the mathematics learning process of addition material for grade I students. Documentation can be in the form of writing, drawings, or someone's monumental work (Rita Fiantika et al., 2022). The documentation used includes photos of learning activities using counting box as well as supporting documents such as journals and teaching modules. Documentation guidelines in this research were obtained during the mathematics learning process using counting box.

This research uses 2 types of triangulation, namely source and technique triangulation. Source triangulation is carried out by comparing information from teachers, students, and observation results to ensure data consistency (Alfansyur & Mariyani, 2020; Jailani, 2020). In addition, triangulation techniques are used by verifying data through interviews, observation and documentation from the same source (Ratnaningtyas et al., 2023). The data analysis technique uses interactive analysis with 3 stages, namely data reduction, namely simplifying and grouping data; data presentation, namely presenting data in a structured manner; and drawing conclusions, namely interpreting the data obtained (Saleh, 2017).

RESULT AND DISCUSSION

The findings were derived from observations, interviews, and documentation involving informants including teachers and grade I students. Three main points of discussion were produced, namely the role of counting box in mathematics learning on addition material, obstacles and supporting factors, and solutions to overcome these obstacles. To provide a clearer picture, each finding is explained one by one in the specified order of discussion.

The role of counting box in mathematics learning addition material. Based on observations and interviews with teachers, the role of counting box in learning mathematics, addition material, can be understood by students because it uses concrete objects. Students can directly see and hold the objects that students use to count, so that students do not just imagine numbers, but actually feel the process. The teacher also said that using this media made the class more active because all students had the opportunity to try. Research conducted in other studies shows that

the use of concrete media can increase student activity. Students seemed more active when choosing paper containing questions that were equipped with interesting pictures, then took the pom-poms according to the number on the question and put them in the counting hole while counting the total number entered. After finding the answer, students choose a magnetic number and stick it on the board. Students are more focused because they can see directly the number of objects that students are counting. It is also easier for teachers to direct the counting steps, and students follow with a natural rhythm according to their respective abilities. Activities like this make the learning atmosphere feel more fluid and do not burden students, because students learn by doing, not just listening. Therefore, the use of concrete media such as counting box really helps clarify concepts while maintaining student involvement throughout learning (Dwisa et al., 2022).

The shape of the suitcase is quite large, like a suitcase with animated wallpaper and elements inside such as pom-poms, magnetic numbers, magnetic whiteboard, toy hammer, user guide, storage drawer, counting holes totaling 20, cards for adding questions up to 20 accompanied by supporting images according to the question, and brightly colored answer cards make students curious from the start. Attractive media displays arouse curiosity. When students begin to be interested in how the media works, students also become more interested in the addition material being studied. The teacher said that when students liked the media, students became more interested in participating in learning activities, and often seemed more enthusiastic and wanted to immediately try every step given. Concrete media can encourage students to be more active in learning (Rukono et al., 2025)

These findings show that interactive learning media is able to encourage active involvement of students. When curiosity arises, students are more motivated to try and practice the addition material they have learned. Increased motivation makes students more focused, more active, and easier to understand concepts concretely. The use of learning media can increase learning motivation because it makes the learning process feel more interactive and encourages students to be more actively involved in class (Audie, 2019). The following is documentation of the external appearance and contents of counting box which can be seen in the Figure 1 – Figure 2.



Figure 1. External appearance of the counting box



Figure 2. Internal appearance of the counting box

The results of observations and interviews with grade I students showed that students felt learning was more enjoyable because the media display was attractive and made students curious. Students said that curiosity arose when students saw the colors on the media, the shape of pom-poms, magnetic numbers, and question cards that looked like toys. When they start trying, students find it easier to count because they can immediately move the objects while following the teacher's instructions. This method makes students understand the lesson more quickly, because students see for themselves how the number increases every time an object is moved. The use of this media also makes students more enthusiastic about learning, because the learning atmosphere feels like they are playing with friends. Media that is interesting, interactive, and provokes student participation can increase student involvement in the learning process (Magdalena et al., 2021).

Students often showed enthusiasm to take turns using the media. This situation makes learning activities more lively. Students became more active, as reflected in their willingness to

answer teachers' questions, solve problems using the media, and confidently present their answers. For students, learning addition with counting box feels more fun and easier to understand because students can see, hold and play with objects that help students find the answer. Concrete media can function to attract students' interest in the learning material presented. This finding is supported by the conditions that arise during the use of counting box which can be seen when students become interested in trying the media so that students can be directly involved in using the media during learning (Wijaya et al., 2021).

The teacher also said that this media really helps students understand addition, especially for students who have difficulty in adding. Students also said that they wanted to try the media again when learning mathematics about addition. This shows that counting box can attract students' interest in the material presented. This kind of learning activity makes students braver to try, more focused, and not get bored quickly, because students perceive the activities as enjoyable games, but still learning. Increasing students' learning activities is an important indicator of

meaningful learning, shown by students' involvement in understanding the material (Rukono et al., 2025).

Obstacles and supporting factors in using the media in mathematics learning addition material, the teacher explained that there were several obstacles that arose during the process. One of them is the classroom situation which often becomes less conducive because only one media is available, while the number of students is quite large. When someone is trying, other students who are waiting for their turn start to look bored and have difficulty maintaining focus. This condition makes students wait quite a long time, and while waiting, students begin to lose focus, talk to their friends, or appear less enthusiastic about participating in activities. Apart from that, the large number of magnetic numbers often makes some students were confused when choosing which numbers to use, so that the counting process stops for a while before students find the right number. There are also not enough pom-poms in the box, so once the pom-poms are put in, they have to be taken out

immediately from the storage drawer so they can be used by the next student.

A fairly strong supporting factor can be seen from the appearance of the counting box itself. The teacher said that media designs that were full of color and contained small objects in them were able to arouse students' curiosity. As soon as the box was opened, the student immediately approached because they were interested in the contents inside, and then wanted to try using it in learning. This curiosity makes it easier for students to get involved, so that the learning process feels more fluid because students really want to try and see for themselves how the media helps students understand addition. The media contains 20 counting holes, a magnetic whiteboard, a storage drawer, and four storage spaces containing small elements, namely the space on the right to accommodate toy hammers, pom-poms and number magnets, the left space contains question and answer cards, and the space above the counting hole contains a guide to using the media. The details of the space and elements inside the media can be seen in Figure 3–Figure 6.

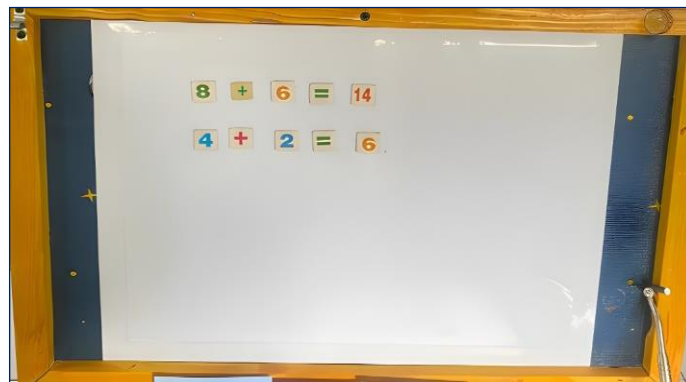


Figure 3. Whiteboard



Figure 4. The right space contains pom-poms and magnetic numbers



Figure 5. The left space contains a toy hammer, question and answer cards



Figure 6. The top space contains a guide to using the media

The teacher conveyed four solutions to overcome obstacles that arose during learning using counting box, namely reducing the number of number magnets, increasing the number of pom-poms, providing additional questions in the notebook, and increasing the amount of media. From the results of the interview, the teacher explained that one of the steps taken was to reduce the number of number magnets in the box. The goal is that students do not take too long to choose numbers and can focus more on the counting process. The only numbers left are those that are truly relevant to the problem being worked on, so that when the box is opened, students can immediately find the numbers they need without confusion. Apart from that, the teacher also suggested increasing the number of pom-poms in the box. With a sufficient number of pom-poms, each turn change can take place more smoothly, so that students who are waiting do not have to wait long for their turn and the class atmosphere remains maintained. This solution can support the achievement of effective and efficient learning goals because the presence of media will make it easier for students to

understand mathematical concepts (Balqis, 2019).

Observation results show that students who have finished using the media sometimes look bored when they have to wait for other friends' turn to try. Students tend to go for a walk or play with their friends. To overcome this, the teacher provides additional questions to work on in the notebooks of each student who has finished using the media. This step ensures that each child continues to have activities and is actively involved in learning. Counting box has been added, so that more students can try simultaneously without having to wait too long for their turn. These strategies make the learning process smoother, the class more conducive, and all students still get the opportunity to learn while playing. By adjusting the number of magnets, adding pom-poms, providing additional questions in notebooks, and adding media, several obstacles during learning using counting box can be reduced, especially in terms of smooth learning process and student involvement.

Students not only follow the teacher's instructions but also actively practice using media, moving pom-poms, attaching magnetic

numbers, and trying to solve problems independently. Although some students still have to wait their turn, this approach increases motivation and makes learning addition more enjoyable, more tangible, and easier to understand because students can see and hold objects that help them find the answers themselves. This aligns with Putranta's opinion on the role of learning media in increasing learning motivation (Marfuatun & Miftakhurrohman, 2022).

CONCLUSION

The findings indicate that counting box media supports the achievement of learning objectives. The use of this media is effective because it can foster curiosity, increase motivation, and encourage student activity. The obstacles that arise are mainly related to the limited number of media and supporting components, while attractive media design is an important factor that supports student involvement. Solutions to problems include adjusting the number of number magnets and adding pom-poms so that the process of using media can run more smoothly in classes with a large number of students. The implications of this research show that the use of the media contributes to achieving Sustainable Development Goals, especially in the aspect of quality education through effective and inclusive addition learning in elementary schools. Future research can develop similar media for other arithmetic operations.

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