Development of Counting Board Media in Class II Mathematics Learning Subject SDN 06 Rantau Alai

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Abstrak

Counting board media is a tool to attract students' learning attention. With one of the supporting subjects, namely mathematics. However, learning math in elementary school (SD) is very feared by students and is considered difficult even though learning math is very easy when we already know the method. This study uses development research or research and development. In this study the number of subjects was 22 students. This media was developed using the ADDIE model which consists of 5 stages, namely Analysis, Design, Development, Implementation, and Evaluation. Data collection was carried out by observation, validation questionnaire sheet, and student response questionnaire sheet. This research produces counting board media which is a real learning media and there are animated images. The data analysis technique was carried out by analyzing validity using a validation questionnaire sheet addressed to experts, and analyzing practicality using student response questionnaires. The results of data analysis of the development of counting board media in mathematics learning subjects conducted and developed by researchers are categorized as very valid from the validation questionnaire sheet with an average of 92%, the counting board media in mathematics learning subjects developed are categorized as very practical from the aspect of teacher response with an average of 88% and small group questionnaire sheets in trials with an average value of 89.5%. The counting board media in mathematics learning subjects developed was categorized as effective in the posttest test of students with an average of 86%. Based on the results of validation and trials, it is concluded that the counting board media in mathematics learning subjects is suitable for use in the learning process and can be an attractive alternative for students.

Keywords: Counting Board Media and Math Learning.

ABSTRAK

Media papan berhitung merupakan alat bantu untuk menarik perhatian belajar siswa. Dengan salah satu mata pelajaran pendukung yaitu matematika. Namun pembelajaran matematika di Sekolah Dasar (SD) sangat di takuti oleh siswa dan dianggap sulit padahal belajar matematika itu sangat mudah ketika kita sudah mengetahui metode nya. Penelitian ini menggunakan penelitian pengembangan atau *research and development.* Pada penelitian ini jumlah subjek adalah 22 siswa. Media ini dikembangkan dengan menggunakan model ADDIE yang terdiri dari 5 tahapan yaitu *Analysis, Design, Development, Implementation, dan Evaluation*. Pengumpulan data dilakukan dengan observasi, lembar angket validasi, dan lembar angket respon siswa. penelitian ini menghasilkan media papan berhitung yang merupakan media pembelajaran berbentuk nyata dan terdapat gambar animasi. Teknik analisis data dilakukan dengan analisis kevalidan dengan menggunakan lembar angket validasi yang ditujukan kepada para ahli, dan analisis kepraktisan yang dilakukan dengan menggunakan angket respon siswa. Hasil analisis data pengembangan media papan berhitung pada mata pembelajaran matematika yang dilakukan dan dikembangkan peneliti dikategorikan sangat valid dari lembar angket validasi dengan rata-rata 92%, media papan berhitung pada mata pembelajaran matematika yang dikembangkan dikategorikan sangat praktis dari aspek respon guru dengan rata-rata 88% dan lembar angket *small group* dalam uji coba dengan nilai rata-rata sebesar 89.5%. Media papan berhitung pada mata pembelajaran matematika yang dikembangkan dikategorikan Efektif pada uji coba *posttest* peserta didik dengan rata-rata 86%. Berdasarkan hasil validasi dan uji coba serta, disimpulkan bahwa media papan berhitung pada mata pembelajaran matematika ini layak digunakan dalam proses pembelajaran serta dapat menjadi alternatif yang menarik bagi siswa.

Kata Kunci: Media papan berhitung dan Pembelajaran Matematika.

Introduction

Education plays an important role in the nation and state and is one of the media for improving and developing quality human resources. Competition in education can follow developments in science and technology. According to Law Number 20 of 2003 concerning the National Education System Article 1 paragraph 3, the national education system is all educational components are interconnected in an integrated manner to achieve national goals. The function of national education is to develop knowledge in order to educate the nation's life with effective learning (Amreta, Rofi'ah, & Markhamah, 2023, p. 200).

The learning process is a set of actions created to support the student's learning process. Media is a learning process that introduces the source of the message to the recipient of the message, stimulates the mind, attention and will of students so that they are encouraged and involved in learning (Hamid, Ramadhani, Juliana, Safitri, Jamaludin, & Simarmata , 2020, pp. 3-4).

Media is an intermediary or messenger from the sender of the message. In conclusion, media is a container for messages that the source wants to transmit to the target or recipient of the message, the material received is an instructional message, and the goal achieved is the achievement of the learning process (Kustandi & Darmawan, Development of learning media, 2022, pp. 4-5) In particular, the definition of media in the teaching and learning process tends to be interpreted as graphic, photographic or electronic tools for capture, process, and reconstruct visual and verbal information. Another limitation of AECT (Association of Education and Communication Technology) provides limitations regarding media as all forms and channels used to reach messages and information (Sundayana, Rostina, 2018)

Based on initial observations carried out by researchers precisely at SD Negeri 06 Rantau Alai on February 10 2023, researchers conducted an interview with the class II teacher named Desi Herlina, S.Pd. that teachers' mathematics learning still uses conventional methods and uses learning media that is still focused only on the available media. Mathematics learning media at SD Negeri 06 Rantau Alai only provides very simple media.

The counting board is a medium created to facilitate and develop multiplication counting in children, especially in mathematics lessons. In utilizing this counting board media, teachers can also interlude with singing activities and students can pay attention directly to this so that it attracts children's interest in learning and makes it easier for children to understand learning (Yulyani & Anwar, 2022, p. 3757).

Matematika adalah ilmu yang kebenarannya mutlak, tidak dapat direvisi Karena didasarakan pada deduksi murni yang merupakan kesatuan system dalam pembuktian matematika merupakan salah satu cabang ilmu pengetahuan yang pelajari di sekolah (Ulfa & Parnabhakti, 2020).

Mathematics according to Damayanti & Mawardi in (Sutiarso, Herpratiwi, & Effendi, 2021). Mathematics is a subject that contains various necessities of life, one of which is a means of education that plays a role in human activity which is obtained from the process of thinking and reasoning so that it can solve problems. Mathematics not only makes students able to utilize mathematics theoretically but also applies it, having the ability to reason logically and be critical in solving problems.

The ability to count is for every child to develop his abilities, the characteristics of children's ability development can increase to the level of understanding numbers. Regarding addition, subtraction and multiplication, Safuro, A.etal (2020) states that calculation is

a very important basic knowledge to be introduced to students.

The ability to calculate is an effort to introduce mathematics which is concerned with the properties and relationships of real numbers, with these calculations mainly involving addition, subtraction and multiplication, which are very basic number operations. In line with the statement above, children's numeracy skills aged 7 to 11 years are at a real operational stage. According to Rahmi etal (2020), at this age children need to be bridged with a counting board so that they can easily understand the material on arithmetic operations presented by the teacher.

Mathematics is often considered the most difficult subject for students. Many students are afraid of mathematics before they actually study it. In the end, it will be ingrained in students that learning mathematics is difficult.

Based on research observations, researchers found a problem in class II of SD Negeri 06 Rantau Alai, teachers still using simple media which made students quickly bored and had difficulty understanding multiplication material. Therefore, researchers developed counting board media to attract students' attention so that students do not get bored quickly and students can understand the multiplication material.

The media developed by this researcher is counting board media. This media will be tested on class II students at SD Negeri 06 Rantau Alai. This media is also equipped with games, the aim of which is so that the learning process, especially mathematics, is also practiced directly by students so that they become more active in the learning process. The aim of this research is to determine students' interest in learning by using the counting board media at SD Negeri 06 Rantau Alai.

Based on this statement, the researcher conducted research and media development entitled **Development of a counting board in the mathematics subject, multiplication material in class II of SD Negeri 06 Rantau Alai.**

Research methodology

The research and development procedures used are based on research procedures using the ADDIE model. The ADDIE chosen by researchers is a model that has been systematic so that it makes it easier for researchers to carry out the process of developing learning media (Mardhotillah & et al, 2023). The data collection techniques used in this development research are in the form of observations, questionnaires and tests for obtaining learning outcomes. The data analysis techniques used in this research are qualitative descriptive analysis techniques and quantitative descriptive analysis techniques. The qualitative descriptive analysis method is a way of processing data in the form of sentences, categories regarding an object so as to obtain general conclusions (Agung, 2018). The data analysis carried out in this research was to determine the validity, practicality and effectiveness of the module on living creature material.

Results and Discussion

trial phase to see practical results. When conducting a small group trial that is used by 10 students, before conducting research, the researcher can first ask permission from the class II teacher to fill out a questionnaire regarding the practicality of a product to be developed. The following are practical results from the teacher response questionnaire.

Table 1 Teacher Response Questionnaire

No	Aspek	Indikator	Skor Penilaian Guru
1.	Komponen Perumusan Tujuan Belajar	a. Kejelasan dalam kompetensi inti dan dalam kompetensi dasar	4
		b. Kesesuaian antara indikator dengan tujuan pembelajaran	5
2.	Komponen Kegrafikan	a. Kesesuaian penggunaan ilustrasi/gambar dengan materi	4
		b. Kemenarikan tampilan roda putar	5
3.	Komponen Pada Bahasa	a. Bahasa yang digunakan sesuai dengan bahasa Indonesia	4
		b. Kemudahan memahami bahasa yang digunakan	5
4.	Komponen Materi	a. Kejelasan langkah-langkah penyelesaian	4
		b. Kesesuaian materi dengan kompetensi dasar	4
		c. Kesesuaian materi dengan indikator pencapaian kompetensi	5
		Skor	40
		Rata-rata	4,4
		Hasil Validasi	88%

(Sumber : Penulis, 2023)

Calculation:
Practicality (%) = (Total Score)/(Maximum Score) × 100%
Practical Value =40/45 ×100 =88%

Information :
Total Maximum Score = Total Indicators x Maximum Score Value
Maximum Total Score = 5 x 9
Total Maximum Score = 45

Based on the validator's research on the counting board media from the questionnaire aspect, teacher responses showed good results, because the practical value reached the criteria in accordance with the provisions. Where the combined practicality results in the teacher response aspect were obtained at 88% with the criteria "Very Practical" for application in the research setting. Next, below is an explanation of the practical results of small groups.

Table 2 Results of Small Group Trials (Small Classes)

No	A	N	F	M	B	R	T	Y	H	P
1	4	4	4	4	4	3	5	4	4	5
2	5	5	5	5	5	3	5	5	5	4
3	4	4	5	5	4	3	5	4	4	5
4	5	5	5	4	5	4	5	5	4	4
5	4	4	5	4	5	4	4	4	4	5
6	5	5	4	5	5	5	5	5	4	4
7	4	4	4	4	5	5	3	5	5	5
8	5	4	5	4	5	5	5	5	5	4
Skor	36	35	37	35	38	32	37	37	35	36
Hasil Skor	90%	87,5%	92,5%	87,5%	95%	80%	92,5%	92,5%	87,5%	90%
Gabungan Hasil					89,5%					

Inisial Peserta Didik

Information :
Total Maximum Score = Total Indicators x Maximum Score Value

Total Maximum Score = 5 x 8
Maximum Total Score = 40

After looking at the results in the table above, 10 students participated. There is a highest score of 95% with very practical criteria. The lowest score is 80% with very practical criteria achieved. Conclusion Protype II from the small group questionnaire received an average score of 89.5%. So it can be stated that the counting board media product is very practical to use.

The results of the effectiveness of testing a learning media product in the form of a counting board which was attended by 25 students in class II who had carried out a pre-test first, along with a table of the results of the pre-test trials that had been carried out.

Table 3 Results of Student Pretest Trials

No.	Inisial Peserta Didik	1	2	3	4	5	Jumlah Skor	Keterangan
1.	AD	20	20	20	20	20	100	Tuntas
2.	FQ	20	20	20	20	0	80	Tuntas
3.	MH	20	20	0	0	0	40	Belum Tuntas
4.	RPN	20	20	20	0	0	60	Belum Tuntas
5.	RK	20	20	20	0	20	80	Tuntas
6.	RH	20	20	20	0	0	60	BelumTuntas
7.	RD	20	20	20	0	20	80	Tuntas
8.	VZ	20	20	0	0	20	60	Belum Tuntas
9.	SA	20	20	20	0	20	80	Tuntas
10.	ZK	20	20	0	0	20	60	BelumTuntas
11.	NNU	20	20	20	0	20	80	Tuntas
12.	HM	20	20	0	0	20	60	Belum Tuntas
13.	AZ	20	20	20	0	20	80	Tuntas
14.	MA	20	20	20	0	20	80	Tuntas
15.	FO	20	20	20	0	20	80	Tuntas
16.	MY	20	20	0	0	0	40	Belum Tuntas
17.	AF	20	20	0	0	20	60	Belum Tuntas
18.	FL	20	20	20	0	20	80	Tuntas
19.	RAR	20	20	20	0	20	80	Tuntas
20.	KV	20	0	0	0	20	40	Belum Tuntas
21.	AN	20	20	20	0	20	80	Tuntas
22.	TS	0	0	0	20	0	20	Belum Tuntas
	Jumlah						1.500	
	Rata-rata						68,1	
	P						52%	Belum Efektif

P= Pa/(Pb)×100

P= 13/22×100 = 52%

Information :
P = Percentage of students' learning completeness
Pa = Number of students who completed
Pb = Total number of students

Table 4 Posttest Test Results of Students

No.	Inisial Peserta Didik	Nilai Skor Peserta Didik					Jumlah Skor	Keterangan
		1	2	3	4	5		
1.	AD	20	20	20	20	20	100	Tuntas
2.	FQ	20	20	20	20	0	80	Tuntas
3.	MH	20	20	20	20	20	100	Tuntas
4.	RPN	20	20	20	0	0	80	Tuntas
5.	RK	20	20	20	0	20	80	Tuntas
6.	RH	20	20	20	0	0	60	BelumTuntas
7.	RD	20	20	20	0	20	80	Tuntas
8.	VZ	20	20	0	20	20	80	Tuntas
9.	SA	20	20	20	0	20	80	Tuntas
10.	ZK	20	20	0	0	20	60	BelumTuntas
11.	NNU	20	20	20	20	20	100	Tuntas
12.	HM	20	20	20	0	20	80	Tuntas
13.	AZ	20	20	20	0	20	80	Tuntas
14.	MA	20	20	20	20	20	100	Tuntas
15.	FO	20	20	20	0	20	80	Tuntas
16.	MY	20	20	20	20	0	80	Tuntas
17.	AF	20	20	20	20	20	100	Tuntas
18.	FL	20	20	20	0	20	80	Tuntas
19.	RAR	20	20	20	0	20	80	Tuntas
20.	KV	20	0	20	0	20	60	Belum Tuntas
21.	AN	20	20	20	0	20	80	Tuntas
22.	TS	20	20	0	20	20	80	Tuntas
	Jumlah						1.800	
	Rata-rata						81,81	
	P						86%	Efektif

$P = Pa/Pb \times 100$

$P = 19/22 \times 100 = 86\%$

Information :
P = Percentage of students' learning completeness
Pa = Number of students who completed
Pb = Total number of students

Discussion

This research uses development research which aims to produce a learning material product that is valid, practical and effective. This research was carried out at SDN 06 Rantau Alai directly using the ADDIE model which consists of 5 stages, namely: Analysis, Design, Development, Implementation, and Evaluation in the development of counting board media in mathematics subjects.

The counting board media is a mathematics learning that must be given in stages and in a structured manner starting from simple ones such as basic concepts to more complex learning, in accordance with Muksetyo's statement that mathematics learning is the process of providing learning experiences to students starting from a series of planned activities so that students gain competence regarding mathematical material studied (Safuro & et al, 2020, p. 22). Counting board media has the following benefits: Can improve aspects of children's development, Increases children's ability to remember, Teaches children to be independent and skilled at remembering, Improves children's concentration skills.

Meanwhile, mathematics learning according to Susanto from (Mahmudah & et al, 2023) is a teaching and learning process built by teachers to develop students' creative thinking which can improve students' thinking abilities, as well as increasing their ability to construct new knowledge as an effort to improve good mastery of mathematical material.

After the product is developed, it is then validated by experts, namely media, language and material experts. Next, the validator will provide comments/suggestions regarding the design that has been created by the researcher and the researcher will improve the product to produce a good product. After validation by several experts, the score obtained was 91% by media experts, 98% by material experts, 82% by language experts and one to one with a score of 92% in the very valid category. Next, the researcher conducted a small group trial, and a teacher response questionnaire at SDN 06 Rantau Alai Palembang by filling in the questionnaire provided by the researcher. The practicality obtained in the small group trial was 88.75% and the teacher response questionnaire was 88% which can be categorized as very practical. After that, looking at the effectiveness of the learning media developed with test results, the results were 86% in the category of very effective to use. From the overall development data, the counting board media is a valid, practical and effective learning media for use in learning activities.

Based on this analysis, it can be concluded that the counting board media product is a valid, practical and effective learning media for use in learning activities.

Conclusion

From the results of research and discussions by researchers regarding the development of counting board media at SDN 06 Rantau Alai, the following conclusions can be drawn:

a. Based on the results of validation questionnaires by several validators on the counting board media, it can be declared valid, which has been carried out by several experts, as follows: media experts with an average score of 91%, material experts 98%, and language experts 82% and one to one 92%.

b. Based on the results of a questionnaire that was carried out by researchers at the practical stage by filling out a small group questionnaire with an average score of 88.5% and a teacher response questionnaire of 88%.

c. Furthermore, based on the results of the trial test on the counting board media, the pre-test results were obtained with a score of 52% and the post-test results with a score of 86%.

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