REALISTIC MATHEMATICS EDUCATION USING PAPAN TAKALINTAR MEDIA TO ENHANCE STUDENTS' LEARNING OUTCOMES IN FOURTH GRADE OF ELEMENTARY SCHOOL

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Abstract

This research explores the implementation of the Realistic Mathematics Education (RME) approach assisted by *papan takalintar* media to enhance mathematics learning outcomes among fourth-grade students at MIN 8 Southwest Aceh. The study was motivated by students' difficulties in performing multiplication calculations, especially with large-digit numbers, and their lack of accuracy in solving problems. The research aimed to analyze teacher activities, student engagement, and student learning outcomes following the application of this approach. Using a Classroom Action Research (PTK) methodology, the study involved 31 students from class IVA. Data collection techniques included observations and tests, with results analyzed using percentage techniques. The findings showed a significant improvement in teacher activity, which increased from 57.64% in cycle I to 94.11% in cycle III. Similarly, student activity rose from 58.82% in Cycle I to 91.76% in Cycle III. Student learning outcomes also showed a steady increase, from 48.38% in cycle I to 83.87% in cycle III, meeting the criteria for classical completeness. These results suggest that integrating the RME approach with *papan takalintar* media effectively improves students' mathematical understanding and accuracy in multiplication operations. This study highlights the potential of contextual learning tools in enhancing student engagement and performance in mathematics education.

Keywords*: Realistic Mathematics Education* (RME), Papan Takalintar Media.

INTRODUCTION

Mathematics is inherently connected to daily life; despite its complexity, it remains an essential subject for students. According to Wehman and Laughlin, a fundamental component of mathematics education is studying number operations, encompassing addition, subtraction, multiplication, and division. [1]

One of the materials in mathematics is multiplication. Multiplication is a counting operation that requires more understanding than other materials. So far, the meaning of multiplication is memorization, not understanding. This is also one of the reasons mathematics learning outcomes are always poor, and the field of study is considered the most difficult for some students [2].

Based on the results of initial observations that researchers carried out in class IV A MIN 8 Southwest Aceh on June 10, 2023, which had 31 students. A problem occurred in the classroom: when the teacher gave a question, many students could not answer if the question differed from the example shown, even though it was still on the same material. Also, many students get stuck if the digits of the number being multiplied are too significant and often make mistakes when determining the tens and one's digits. Situations like this occur repeatedly, and as a result, the grades obtained by students are consistently below the KKM. From the interviews, information was also obtained that the teacher had never used the Takalintar board to teach multiplication material.

Papan takalintar is a concrete learning tool to help students understand mathematical concepts, particularly multiplication operations. This media usually uses a board with numbers arranged systematically to make multiplication calculations easier and more interactive for students. Using *it* in learning aims to enhance students' understanding of mathematical concepts through a more tangible and contextual approach, which aligns with Realistic Mathematics Education (RME) principles. This tool helps students reduce calculation errors while improving their accuracy and comprehension of multiplication concepts.

The individual KKM for class IV mathematics is 68, while the classical KKM is 80%. Based on preliminary data at MIN 8 Aceh Barat Daya for class IV A students, it shows that students' numeracy skills in multiplication material are still low, and the results of practice questions are not optimal or satisfactory. This is proven by the pre-test results, which were carried out on Thursday, 16 November 2023. The results obtained were that of the 31 students who fulfilled their learning completeness or achieved the KKM, there were 4 students with a percentage of 12.90%, while 27 people had a percentage of 87. The other 09% are said to be incomplete.

One of the learning approaches that is suitable to use is the Realistic Mathematics Education (RME) approach. According to Faturrhoman, RME is a mathematics learning approach that uses real-world situations or a real context and students' experiences as a starting point for learning mathematics. One of the learning approaches that is suitable to use is the Realistic Mathematics Education (RME) approach. According to Faturrhoman, RME is a mathematics learning approach that uses real-world situations or a real context and students' experiences as starting points for learning

[1] dkk Dea Alvionita Azka, 'Pembelajaran Operasi Perkalian Melalui Permainan Tepuk Bergambar Pada Siswa Tunangrahita Ringan Di YPAC Palemban', *Jurnal Pendidikan Matematika*, 5.1 (2016), 27; Mardiani A Zikra hayati, Nida Jarmita, Putri Rahmi, 'Pengembangan Media Busy Book Numbering Dari Bahan Bekas Untuk Pengenalan Matematika Pada Anak Usia Dini', *Jurnal Awlady, Jurnal Pendidikan AUD*, 9.2 (2023) <https://doi.org/10.24235/awlady.v9i2.14812>.

[2] and Oyon Haki Pranata Fauzy Agung, Dindin Abdul Muiz Lidinillah, 'Penerapan Pendekatan Realistik Mathematic Education (RME) Untuk Meningkatkan Pemahaman Konsep Perkalian Pada Siswa Di Sekolah Dasar', *Jurnal Ilmiah Pendidikan Guru Sekolah Dasa*, 7.3 (2020), 189–19; Nurul Fitria Utami and Ratna Kartika Irawati, 'Effectiveness of Ethnomathematics-Based Learning Media on Students ' Understanding of Geometry Material Concepts in Grade IV', 2.3 (2024).

mathematics[34]. Meanwhile, according to Freudenthal, RME is a theory in mathematics education, namely that human and mathematical activities must be connected tangibly to the context of everyday life, which emphasizes the skills of the 'process of doing mathematics, discussing and collaborating, arguing with classmates so that they can discover for themselves, and ultimately using mathematics to solve problems both individually and in groups. In this approach, the teacher's role is no more than a facilitator, moderator, or evaluator while students think, communicate, and practice the nuances of democracy by respecting other people's opinions.

Meanwhile, according to Freudenthal, RME is a theory in mathematics education, namely that human and mathematical activities must be connected in a real way to the context of everyday life, which emphasizes the skills of the 'process of doing mathematics,' discussing and collaborating, arguing with classmates so that they can discover for themselves, and Ultimately using mathematics to solve problems both individually and in groups. In this approach, the teacher's role is no more than a facilitator, moderator, or evaluator while students think, communicate, and practice the nuances of democracy by respecting other people's opinions. [5]

Realistic Mathematic Education (RME) is learning that uses the real world as a starting point for developing mathematical ideas and concepts. In the realistic mathematical approach, Treffers formulated two types of mathematization: horizontal and vertical. In the horizontal process, students try to solve problems from the real world in their own way and use their language and symbols.

Meanwhile, vertical mathematization is the process of formalizing mathematical concepts. The realistic approach is an approach that uses real problems as a starting point for learning. Through horizontal and vertical mathematization activities, it is hoped that students can discover and construct mathematical concepts [6].

In addition to employing an appropriate instructional approach in mathematics education, concrete media is also essential. According to Udin Winata Putra, concrete media refers to any tangible object that facilitates the transmission of messages from the sender to the recipient, thereby stimulating students' thoughts, emotions, attention, and interest. This, in turn, enhances the effectiveness and efficiency of the learning process in achieving the desired educational outcomes[7]. In this study, the concrete medium utilized is the Takalintar board.

Similarly, Nazifah defines concrete media as a visual aid in learning that provides students with direct experiences and a tool for conveying instructional content. By stimulating cognitive and emotional engagement, such media contribute to a more effective and efficient learning process [8].

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[3] Miftakhul Rizqi, 'Pengaruh Pendekatan Realistic Mathematic Education (RME) Berbantuan Media Fabel Terhadap Hasil Belajar Pada Mata Pelajaran Matematika MI', *Prosiding Seminar Nasional PGSD UNIKAMA*, 3.1 (2019), 525.

[4] Rifki festiawan, *Belajar Dan Pendekatan Pembelajaran* (Universitas Jenderal Soedirman, 2020).

[5] Hazami Hazami Nida Jarmita, 'Ketuntasan Hasil Belajar Siswa Melalui Pendekatan Realistic Mathematics Education (Rme) Pada Materi Perkalian', *Jurnal Ilmiah DIDAKTIKA: Media Ilmiah Pendidikan Dan Pengajaran*, 13.2 (2013), 215–16; Fauzy Agung, Dindin Abdul Muiz Lidinillah; Rizqi; Yusrizal Zuhra Ruhmi, Cut Morina Zubainur, 'Perangkat Pembelajaran Berbasiis Budaya Gayo Dengan Pendekatan Matematika Realistik Untuk Meningkatkan Kemampuan Pemecahan Masalah', *International Journal of Trends in Mathematics Education Research*, 2.2 (2019), 64–67.

[6] Seri Ningsih, 'Realistic Mathematics Education: Model Alternatif Pembelajaran Matematika Sekolah', *Jurnal Pendidikan Matematika*, 1.2 (2014), 76; Sarah Prihatinia & Melva Zainil, 'Penerapan Pendekatan Pendidikan Matematika Realistik Untuk Meningkatkan Hasil Belajar Matematika Di Sekolah D', *Jurnal Pendidikan Tambusa*, 4.2 (2020), 13–15.

[7] dkk Syarifah Aini, 'Penggunaan Media Konkrit Dalam Pembelajaran Matematika Untuk Meningkatkan Hasil Belajar Siswa', *Jurnal Pendidikan Dan Pembelajaran Khatulistiwa (JPPK)*, 4.6 (2015), 3.

[8] Nurul Dwi Yuliana & Yudi Budia, 'Pengaruh Penggunaan Media Konkret Terhadap Hasil Belajar Siswa Pada Mata Pelajaran Matematika Kelas II Sekolah Dasar Negeri Babelan Kota 06 Kecamatan Babelan Kabupaten Bekasi', *Pedagogik: Jurnal Pendidikan Guru Sekolah Dasar*, 3.1 (2015), 35; Zikra Hayati, 'Evaluasi Alat Permainan Edukatif (Ape) "Mini Drum" Ditinjau Dari Syarat Pembuatan Ape Pada Mata Kuliah Pengembangan Ape', *Bunayya : Jurnal Pendidikan Anak*, 7.1

Takalintar is a learning aid in the form of a table made from board or cork. It is an alternative method for addressing multiplication concepts alongside short-stacking and long-stacking techniques. [9]

Based on this theoretical framework, Takalintar is a mathematics teaching aid designed to facilitate multiplication operations. Its primary role is to enhance student engagement and interest in learning. However, effective use of this teaching aid requires proper guidance from teachers, who ensure students can utilize it correctly. Through teacher guidance, Takalintar functions as a bridge to foster student interest in mathematics and improve their ability to perform multiplication operations.

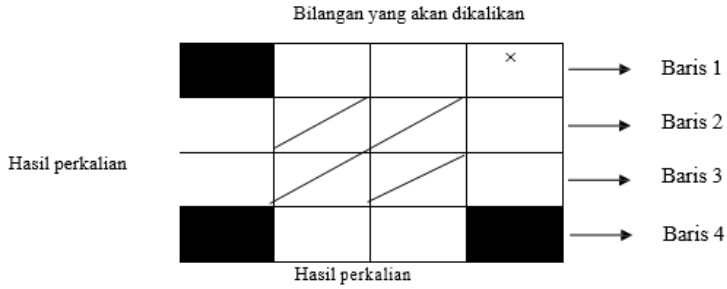

Figure 1. Papan Takalintar Media

Based on previous research relevant to Sarah and Annisa's research, they say that the RME approach can improve student learning outcomes [10]. The difference between Ikhsan's research and the researchers is that Ikhsan did not use learning media, while the researchers used different learning media and materials.

RESEARCH METHODS

This study employs a Classroom Action Research (CAR) design. According to Suharsimi Arikunto, classroom action research systematically investigates learning activities through deliberate actions that occur collectively within a classroom setting. [11]

According to Kunandar, classroom action research (PTK) is action research carried out by teachers and researchers in their class or together with other people (collaboration) by designing, implementing, and reflecting on actions collaboratively and participatively to improve or enhance the quality of the process. Learning in class through certain actions in a cycle [12].

(2021), 137 <https://doi.org/10.22373/bunayya.v7i1.9294>; Anik Lestariningrum, 'PENGARUH PENGGUNAAN MEDIA VCD TERHADAP NILAI-NILAI AGAMA DAN MORAL ANAK', *PG PAUD Universitas Nusantara PGRI Kediri*, 8.2 (2014), 192.

[9] Fery Muhamad Firdaus, 'Pengaruh Teknik Takalintar Terhadap Kemampuan Proses Kognitif Siswa Sekolah Dasar', *Jurnal Institut Pendidikan*, 5.1 (2018), 446.

[10] Sarah Prihatinia & Melva Zainil; Annisa Arrafi & Masniladevi, 'Penerapan Pendekatan Pendidikan Matematika Realistik Indonesia (PMRI) Sebagai Upaya Meningkatkan Hasil Belajar Matematika Di SD', *Journal of Basic Education Studies*, 3.2 (2020), 752.

[11] Afi Parnawi, *Penelitian Tindakan Kelas (Classroom Action Research)*, 2022; Dorothea Nelson, 'Participatory Action Research: A Literature Review', *Unpublished Manuscript*, November 2017, 2014 <https://doi.org/10.13140/RG.2.2.30944.17927/1>; Sugiyono, 'Sugiyono', *ISSN 2502-3632 (Online) ISSN 2356-0304 (Paper) Jurnal Online Internasional & Nasional Vol. 7 No.1, Januari – Juni 2019 Universitas 17 Agustus 1945 Jakarta*, 2019; Sudaryono, *Metodologi Penelitian: Kuantitatif, Kualitatif, Dan Mix Method*, Cetakan ke (Depok: Rajawali Pers, 2021) <https://perpustakaan.man1kabgorontalo.sch.id/opac/detail-opac?id=660>.

[12] & Ahmad Nadhira Ali Ramadhan., 'Penelitian Tindakan Kelas (Ptk) Solusi Alternatif Problematika Pembelajaran Dengan Berbasis Kearifan Lokal Dan Penulisan Artikel Ilmiah Sesuai Dengan Kurikulum Tahun 2013 Di Madrasah Tsanawiyah Darul Hikmah Medan', *Serunai: Jurnal Ilmiah Ilmu Pendidikan*, 8.1 (2020), 122; Siti K, 'Upaya Meningkatkan Kemampuan Mengenal Bentuk Geometri Melalui Permainan Lompat Geometri Pada Anak Kelompok B TK Di Ponegoro 109 Pageraji,

Classroom Action Research (CAR) was chosen for this study because it allows for directly implementing and evaluating teaching strategies in a classroom setting. This research approach is particularly effective in identifying and addressing specific learning challenges, improving instructional methods, and enhancing student engagement.

By employing CAR, the study can systematically assess the impact of using concrete media, such as the Takalintar board, on students' understanding of multiplication. Additionally, CAR involves a cyclical process of planning, action, observation, and reflection, enabling continuous improvement and adaptation based on real-time feedback. This ensures that the interventions applied are relevant and beneficial for student learning outcomes.

A research design was planned to use a research design developed by Kurt Lewin [13]. This model is designed in cyclical form, namely cycle I and cycle II, and consists of 4 stages: planning, implementation, observation, and reflection. If cycle I does not achieve the desired target, it will continue with cycle II. If the target is not achieved, it will continue with the next cycle [14].

DISCUSSION

This research was carried out at MIN 8 Aceh Barat Daya in the odd semester 2023/2024, which was carried out from 16 November 2023 to 21 November 2023. This research was conducted in IVA class, with subjects totaling 31 students: 19 boys, 12 men, and 37 women. This research was carried out in three cycles. Cycle I was carried out on Thursday, 16 November 2023, cycle II on Monday, 20 November 2023, and cycle III on Tuesday, 21 November 2023. The researcher also gave final evaluation questions in each cycle. In the last cycle, the researcher gave post-test questions to see learning outcomes and the extent of students' abilities in solving questions according to the presented material.

The data contained in this research was analyzed using Classroom Action Research (PTK). In conducting research, researchers prepared several learning tools needed during the learning process, including a Learning Implementation Plan (RPP), Student Worksheets (LKPD), Teacher Activity Observation Sheets, Student Activity Observation Sheets, Pre-Test questions, and Post-Test

AUDIENSI':, *Jurnal Pendidikan Dan Perkembangan Anak*, 1.2 (2022) <https://doi.org/10.24246/audiensi.vol1.no22022pp105-112>.

[13] Suharsimi Arikunto, *Penelitian Tindakan Kelas*, 2012.

[14] Suharsimi Arikunto.

questions. Tests, learning media, and evaluation questions. In the first lesson, namely on November 16, 2023, to be precise, Thursday, the researcher did not immediately start learning, but the researcher gave Pre-Test questions to students, which aimed to find out the extent of knowledge that students had understood regarding multiplication material. The Pre-Test results are as follows:

Table 1 Scoring *Pre-Test*

No	Students	Score	Achievement
1	S1	20	Not Passed
2	S2	20	Not Passed
3	S3	60	Not Passed
4	S4	40	Not Passed
5	S5	0	Not Passed
6	S6	20	Not Passed
7	S7	40	Not Passed
8	S8	80	Passed
9	S9	60	Not Passed
10	S10	60	Not Passed
11	S11	40	Not Passed
12	S12	60	Not Passed
13	S13	20	Not Passed
14	S14	60	Not Passed
15	S15	20	Not Passed
16	S16	20	Not Passed
17	S17	80	Passed
18	S18	20	Not Passed
19	S19	60	Not Passed

1. Cycle I

a. Planning Phase

In the planning stage, researchers draw up and prepare plans to implement in the research. The planning stages that researchers must carry out on multiplication calculation operation material using the Realistic Mathematics Education approach are to create a lesson plan I, prepare LKPD, create instruments for observing teacher and student activities, takalintar board media, and also evaluation questions.

b. Action Phase

At the implementation stage, researchers will carry out classroom actions using learning tools that have been prepared previously. The implementation phase of the cycle I was carried out on 16 November 2023 on Thursday using the RME approach assisted by takalintar board media in mathematics lessons on multiplication of two terms by two terms. Cycle I was attended by 31 students who participated in that day. The researcher was assisted by Safriani, S. Pd (Mathematics teacher for class IVA MIN 8 Southwest Aceh who acted as an observer during the learning process.

The learning process takes place in three stages, namely, initial activities, core activities, and closing activities. In the initial activity, the teacher opens the lesson by saying hello, greeting, and inviting students to pray. Checking attendance and the teacher, together with the students, singing the

national song "Garuda Pancasila" and giving Pre-Test questions, apperception questions, and answers to find out students' initial knowledge of the material on multiplication of two terms by two terms, and motivating students by showing them the takalintar board media.

Next, in the core learning activity, using takalintar board media and giving other examples of this material, the teacher conveys the learning material to be studied and the learning objectives. The teacher stimulates students' knowledge to understand the concept of multiplication by linking the learning material with students' daily lives and continues with how to solve it. Students are encouraged to ask questions about material they do not understand and answer each other. The teacher distributes the LKPD, discusses working on it, presents the results of the LKPD, and then announces the results of the LKPD. After that, the teacher distributes evaluation questions to test the students' abilities with the material. After completing the evaluation questions, the teacher explained that the material being studied was the material at the next meeting: multiplication of two terms by three.

In the closing activity, the teacher asks students to summarize the conclusions, and the teacher also reinforces learning. After that, the teacher asks students how their learning was today: "Was our learning today enjoyable?" before the teacher ends the lesson, the teacher gives a moral message, and after that, ends learning.

c. Observation Phase

At this stage, observers observe every event in the classroom. When the researcher carries out the learning process, observations are made of teacher and student activities. Then, the observer and researcher collected data from these observations.

1. Teacher's Observation Activity Cycle I

Observations of teacher activities were carried out using instruments in the form of teacher activity observation sheets. The class IVA mathematics teacher, Safriani, S.Pd, directly observed the teacher's activities. Cycle I teacher activity data can be seen in the following table:

Table 2. Teacher Observation Activity Cycle I

No	Observed Aspected	Score				
	First Activity	1	**2**	**3**	**4**	**5**
1.	The teacher's ability to greet and pray.				**4**	
2.	The teacher's ability to coordinate the class before learning begins.			**3**		
3.	The teacher's ability to convey apperception		**2**			
4.	The teacher's ability to motivate students		**2**			
5.	The teacher's ability to convey learning objectives			**3**		
	Prime Activity					
6.	The teacher's ability to stimulate students' knowledge to understand the concept of multiplication.			**3**		
7.	The teacher's ability to divide students into groups.			**3**		
8.	The teacher's ability to prepare learning media.				**4**	

9.	The teacher's ability to explain the material, recognize multiplication material using takalintar learning media and relate it to real-life/student experiences.			**3**		
10.	The teacher's ability to convey contextual problems.			**3**		
11.	The teacher's ability to facilitate students to do modeling.			**3**		
12.	The teacher's ability to invite students to ask questions about material that is not yet understood.		**2**			
13.	The teacher's ability to distribute and direct LKPD in study groups.		**2**			
14.	The teacher's ability to switch roles in the group as a motivator and trainer and provide support for students in presenting the results of the LKPD.			**3**		
15.	The teacher's ability to provide assessments of student learning outcomes			**3**		
	Final Activity					
16.	The teacher's ability to provide reinforcement of the material that has been studied.			**3**		
17.	The teacher's ability to link the material studied with what will be studied at the next meeting.			**3**		
The score obtained				**49**		
Maximal Score				**85**		
Percentage				**57,64%**		

2. Student's Observation Activity Cycle I

Observations of student activities were carried out using instruments in the form of student activity observation sheets. Student activities were observed directly by colleagues, namely Nur Nilam Sari. Cycle I student activity data can be seen in the following table:

Table 3. Student's Observation Activity Cycle I

No	**Observed Aspected**	**Score**				
	First Activity	**1**	**2**	**3**	**4**	**5**
1.	Students respond to greetings, greet each other, and pray.				**4**	
2.	Students change their clothes and seats before learning begins			**3**		
3.	Students listen to the apperception given by the teacher.		**2**			

4.	Students listen to the motivation given by the teacher.	**2**		
5.	Students listen to the learning objectives presented by the teacher		**3**	
	Prime Activity			
6.	Students understand basic multiplication		**3**	
7.	Students divide into groups according to teacher instructions.	**2**		
8.	Students listen and understand the material presented by the teacher about getting to know the concept of basic multiplication using takalintar learning media and relating it to real-life/student experiences.		**3**	
9.	Students listen to the teacher explain the material for multiplying two terms by two		**3**	
10.	Students pay attention to other examples the teacher gives and interact with each			**4**
11.	Students ask about material they do not understand.	**2**		
12.	Students receive LKPD and work on it according to the teacher's instructions.		**3**	
13.	Students discuss work with each other LKPD.			**4**
14.	Students present the results of their discussion.		**3**	
15.	Students work on evaluation questions.		**3**	
Final Activity				
16.	Students conclude the learning material and listen to reinforcement conveyed by the teacher		**3**	
17.	Students listen to the material presented by the teacher during the following		**3**	
The score obtained			**50**	
Maximal Score			**85**	
Percentage			**58,82%**	

Based on the results of observations on student activity sheets observed by colleagues in Table 4.4, which consists of 17 aspects, an average of 58.82% was obtained. The average score is included in the sufficient category, but several student activities must still be improved in the next cycle.

2. Student's Learning Result Cycle I

Data on student learning outcomes is obtained from evaluation scores at the end of learning activities. The scores from the first cycle of student evaluation results can be seen in the following table:

Table 4. Results Test Cycle I

No	Students	Score	Achievement
1	S1	40	Not Completed

2	S2	30	Not Completed
3	S3	70	Completed
4	S4	30	Not Completed
5	S5	40	Not Completed
6	S6	30	Not Completed
7	S7	50	Not Completed
8	S8	70	Completed
9	S9	70	Completed
10	S10	70	Completed
11	S11	70	Completed
12	S12	70	Completed
13	S13	40	Not Completed
14	S14	70	Completed
15	S15	50	Not Completed
16	S16	40	Not Completed
17	S17	70	Completed
18	S18	40	Not Completed
19	S19	70	Completed
20	S20	40	Not Completed
21	S21	70	Completed
22	S22	30	Not Completed
23	S23	100	Completed
24	S24	70	Completed
25	S25	70	Completed
26	S26	30	Not Completed
27	S27	70	Completed
28	S28	40	Not Completed
29	S29	40	Not Completed
30	S30	70	Completed
31	S31	40	Not Completed
Completed Students			**15**
Not Completed Students			**16**

Based on Table 4 above, it can be seen that in the first cycle of the lesson plan, only 15 students completed it with a percentage of 48.38%, while the other 16 students did not complete it with a percentage of 51.62%. Based on the KKM stipulated in MIN 8, students are considered complete if they have a minimum completeness score of ≥68 and classical completeness of≥80. Students in that class have completed their studies. Therefore, it can be concluded that students' classical learning for RPP I has not been completed.

d. Reflection Cycle I

Reflection is an activity to remember and look back at all activities and learning outcomes in the learning cycle activities that have been carried out to perfect them in the next cycle. The results of the reflection on cycle I learning activities can be seen in Table 4 below:

Table 5 Findings and Revision Results of Cycle I

No	Reflection	Finding	Revise
	Teacher Activity	a. Teachers are less able to convey apperception to students	a. At the next meeting, the teacher must better understand the student's character and be more evident and firmer in providing apperception.
		b. Teachers are less able to convey motivation to students.	b. At the next meeting, the teacher must better understand the students' character and be more enthusiastic in motivating students
		c. Teachers can motivate students to ask questions about material they have not yet understood.	c. At the next meeting, the teacher must be able to convey motivation clearly and loudly and provoke students to ask questions.
		d. Teachers are less able to distribute and direct LKPD in their respective groups.	d. In the next meeting, the teacher will be even more active in dividing and directing each group to complete the LKPD to make it easier for students to understand the studied material. Studying can also help students develop their potential.
2.	Student's activity	a. Students still pay less attention to the apperception conveyed by the teacher.	a. At the next meeting, the teacher must be more enthusiastic and clear about conveying
		b. Students still pay less attention to the motivation conveyed by the teacher.	b. the teacher must be more enthusiastic and motivating at the next meeting.
		c. Students cannot form groups according to the teacher's instructions.	c. At the next meeting, the teacher must be firm in giving instructions for group division so that students are orderly in forming groups.

		d. Students still fail to ask questions about what they don't understand.	d. At the next meeting, the teacher must be able to provoke students to ask questions by relating the material to everyday events.
3.	Results Test	Of the 31 students, only 15 achieved learning completeness, while the other 16 had not yet achieved learning completeness. According to students' answers to the evaluation questions, students are still a bit confused about how to use smart times tables in	In the next stage, the teacher will guide the other 16 students who have not yet finished by explaining in detail how to use smart multiplication tables in multiplication when answering evaluation questions and filling in the LKPD.

It can be seen from Table 5 that teacher activities, student activities, and student learning outcomes in the teaching and learning process have not shown satisfactory results. Therefore, improvements need to be made for the next meeting in the next cycle, namely cycle II.

2. Cycle II

The results of cycle II from teacher activity data, student activity, and student learning outcomes in the teaching and learning process have not shown satisfactory results. Therefore, for the next meeting, improvements need to be made in the next cycle, namely cycle III.

Table 5 Findings and Revision Results of Cycle II

No	Reflection	Finding	Revise
1.	Teacher's Activity	Teacher activities in providing apperception, motivation, and guiding students have improved, but some students still lack participation in groups.	At the next meeting, the teacher must further encourage/motivate students to work together in groups.
2.	Student's Activity	Most of the students were able to form groups with the teacher's instructions, and most of the students were seen to be active in asking questions and answering but still lacked in presenting the results of their discussions.	At the next meeting, the teacher will guide students in presenting the results of their discussion.

3.	Results Test	Of the 31 students, only 22 achieved learning completion, while the other 9 students have not yet achieved learning completion. According to students' answers to the evaluation questions, students were not careful in carrying out multiplication calculations when answering the questions.	In the next stage, the teacher will guide the other 9 students who have not yet finished by providing special time to guide them to achieve maximum

3. Cycle III

Based on the test results above, it can be seen that 26 students completed 83.87%, and 5 other students did not complete 16.13%. During learning activities, students began to be active, and their grades also showed improvement in participating in learning. The completeness of all cycles in classical learning can be seen in Table 6 below:

Table 6 Completeness of Learning from the Results of Classical Evaluation Questions for Class IVA Students Using the RME Approach

No	Completed	Frequency (f)			Percentage (%)		
		Cycle I	Cycle II	Cycle III	Tahap I	Tahap II	Tahap III
1.	Completed	15	22	26	48,38 %	70,96 %	83,87 %
2.	Not Completed	16	9	5	51,62 %	29,40 %	16,13 %
	Total	**31**	**31**	**31**	**100%**	**100%**	**100%**

The reflection stage in cycle iii is written based on the findings obtained in the learning process. The findings can be seen in Table 7 below:

Table 7 Findings and Revision Results of Cycle III

No	Reflection	Finding	Revise
1.	Teacher's Activity	The teacher's ability to manage learning scored 94.11% in the excellent category.	No further revisions have been made because it has already been done to achieve success indicators.
2.	Student's activity	Student activities in managing learning received a score of 91.76% in the excellent category.	No further revisions were carried out because the success indicators had been achieved.

3.	Results test	Only 5 students did not achieve learning completeness in percentage 16.13%, while 26 other students completed with a percentage of 83.87%.	5 students did not complete with a percentage of 16.13%, which will be handed over to the class teacher for remediation.

The *papan takalintar* serves as an innovative learning tool that goes beyond traditional multiplication methods by providing students with a concrete, structured, and interactive approach to understanding mathematical concepts. Unlike conventional techniques that rely heavily on memorization and abstract calculations, this tool offers a visual representation of multiplication, making it easier for students to grasp the underlying principles.

One of the key advantages is its ability to guide students through step-by-step multiplication. Many students struggle with large-digit multiplication because keeping track of multiple steps and carry-over values is challenging. With its, the structured format helps break down complex calculations into smaller, manageable parts, ensuring greater accuracy and reducing errors. This approach minimizes common mistakes, such as misaligning numbers or incorrect carrying of digits, which are frequent pitfalls in traditional multiplication.

Beyond accuracy, this tool also fosters deeper conceptual understanding. Instead of viewing multiplication as a set of mechanical rules, students see it as a form of repeated addition, reinforcing a fundamental principle of arithmetic. This hands-on experience strengthens their comprehension and allows them to develop a more intuitive grasp of number relationships.

Moreover, it enhances student engagement in learning. Traditional methods often rely on repetitive drills that can become monotonous and disengaging for students. In contrast, this tool makes learning interactive and enjoyable, encouraging active participation. Students who manipulate the board to perform calculations become more involved in their learning process, improving retention and motivation.

Another significant benefit of its adaptability to different learning needs is that struggling students can use it as a scaffold to build confidence in multiplication. At the same time, more advanced learners can explore multiplication patterns and strategies with greater ease. This flexibility makes it a valuable tool for differentiated instruction, allowing teachers to cater to diverse student abilities.

By integrating it into mathematics education, students can perform multiplication more efficiently and develop a stronger foundation in mathematical reasoning. This approach transforms multiplication from a challenging task into an engaging and accessible learning experience, ultimately fostering greater confidence and success in mathematics.

CONCLUSION

Based on analysis of the research results conducted in class IV MIN with research subjects in class IVA totaling 31 students. It can be concluded as follows:

1. The results of the teacher activity in cycle I observation reached 57.64% in the relatively good category. In cycle II, it increased to 71.76% in the good category, and cycle III, it increased to 94.11% in the excellent category and reached the success indicator of≥80%.

2. Student activity increases in each cycle. In cycle I, it was 58.82% in the relatively good category. In cycle II, the results of observing student activities increased to 64.70% in the relatively good category, and in cycle III, it became 91.76% in the excellent category.
3. Student learning outcomes in cycle I reached 48.38%, not yet meeting the classical requirements. In cycle II, it increased to 70.96%. In cycle III, student learning outcomes increased to 83.87%.

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