Volume 6 Number 2 (2026)
July-December 2026
Page: 1-14

E-ISSN: 2797-0965
P-ISSN: 2809-9710
DOI: 10.37680/basica.v6i2.9670

BASICA Journal of Primary Education

The Effect of the Use of Multiplication Bar Media on the Understanding of Mathematics Multiplication Concepts

Bunga Lestari[1], Lailatun Nur Kamalia Siregar[2]
[12] Universitas Islam Negeri Sumatera Utara, Indonesia
Correspondence Email; bunga0306223169@uinsu.ac.id

Submitted: 11/04/2025 Revised: 23/04/2026 Accepted: 13/05/2026 Published: 01/07/2026

Abstract

This study examined the effect of multiplication bar media on fourth-grade students' understanding of multiplication concepts at SDS IT Madani Southeast Aceh. The study employed a quantitative approach with a quasi-experimental pretest-posttest control group design. The participants consisted of 56 students, with 28 students in the experimental class and 28 students in the control class, selected through total sampling. Data were collected using a 10-item essay test that measured students' understanding of multiplication as repeated addition, equal grouping, mathematical representation, and contextual problem-solving. The data were analyzed using the Shapiro-Wilk normality test, Levene's homogeneity test, an independent samples t-test, normalized gain, and Cohen's d. The experimental class mean increased from 53.04 on the pretest to 75.54 on the posttest, while the control class mean increased from 53.75 to 66.96. The independent samples t-test showed a significant difference between the two classes, $t(54) = 3.58$, $p = 0.001$. The effect size was large, with Cohen's $d = 0.96$. The experimental class obtained an N-Gain of 0.48, categorized as moderate, while the control class obtained an N-Gain of 0.29, categorized as low. These findings indicate that multiplication bar media had a statistically significant and practically meaningful effect on students' understanding of multiplication concepts.

Keywords Multiplication Bar Media, Concept Understanding, Mathematical Multiplication.

INTRODUCTION

Mathematics learning in elementary school plays an important role in building students' basic reasoning, problem-solving skills, and numerical understanding (A. T. Hasibuan & Rahmawati, 2022; Mutia et al., 2023). At this level, students begin to learn fundamental mathematical concepts that will become the basis for more complex materials in the next grade levels (R. M. R. Siregar & Dewi, 2022). One of the essential concepts in elementary mathematics is multiplication. Multiplication needs to be understood not only as a calculation procedure, but also as a concept that represents repeated addition and numerical grouping (D. Hasibuan et al., 2024). Therefore, students' understanding of multiplication concepts is important because it influences their ability to solve arithmetic problems and apply mathematical thinking in daily life (Ariyatun & Habibi, 2024; Rambe & Afri, 2020).

One of the main topics in elementary school mathematics is multiplication. Multiplication is a part of basic arithmetic that serves as the basis for learning later math material (Nurwahida & Haidar, 2023). Basically, multiplication is a process of repeated addition. For example, 3×4 means adding 4 three times, namely 4+4+4, while 2×6 means adding 6 twice, namely 6+6. This understanding is important so that students not only memorize the results of multiplication, but also understand the process (Aini & Marhaeni, 2024).

The problem of students' limited understanding of multiplication concepts was also identified at SDS IT Madani, Southeast Aceh. Preliminary observations indicated that students' initial understanding of multiplication concepts remained limited. Based on an interview with the classroom teacher, students generally relied on memorizing multiplication facts and experienced difficulty explaining multiplication as repeated addition, representing equal groups, and solving contextual problems. Classroom observations also showed that multiplication instruction primarily relied on verbal explanations and written exercises without the support of concrete learning media. These empirical findings indicate the need for instructional media that can help students connect concrete representations, multiplication processes, and mathematical symbols. The problem that often arises in elementary school multiplication learning is the low understanding of students' concepts of the meaning of multiplication (Lestari et al., 2025). Students more often memorize multiplication results without understanding that multiplication is a form of repeated addition (Putri & Riyanti, 2025). To easily understand multiplication, students should first master addition. However, in reality, there are still many mathematics lessons in the classroom that only focuses on

memorizing numbers, formulas, and calculation operations, causing students to consider mathematics as a difficult and less interesting lesson (Nanda & Wandini, 2024).

The use of learning media in teaching and learning activities can foster interest and increase student involvement in the learning process (D. S. Siregar & Ananda, 2023). Elementary school students are at the concrete stage, so they need concrete learning media to help them understand abstract mathematical concepts (Purba et al., 2024). Learning media is one of the components that play a role in helping students understand learning materials (Manurung, 2020). Learning media is a tool used by teachers in conveying material to students, so that the material is easier to understand (Lubis & Rambe, 2023). In mathematics learning, the existence of learning media is important because many concepts are abstract and difficult to understand if only conveyed through verbal explanations (Wapa & Zahro, 2023). Therefore, the use of learning media is necessary to help students get a clearer picture of the mathematical concepts being studied. The importance of delivering learning materials clearly is also emphasized in Q.S. An-Nahl 16: 44, namely:

بِالْبَيِّنٰتِ وَالزُّبُرِۗ وَاَنْزَلْنَآ اِلَيْكَ الذِّكْرَ لِتُبَيِّنَ لِلنَّاسِ مَا نُزِّلَ اِلَيْهِمْ وَلَعَلَّهُمْ يَتَفَكَّرُوْنَ ﴿٤٤﴾

> Meaning: (We sent them) with clear proofs and books. We have sent down aż-Żikr (the Qur'an) to you so that you may explain to people what has been revealed to them and for them to think. (Q.S. An-Nahl 16:44)

Based on this verse, it can be understood that Allah SWT sent down the Qur'an to the Prophet Muhammad Saw as a means of conveying teachings to humanity. The Qur'an serves as a medium through which the Prophet Muhammad (saw) explains various Islamic teachings, including commandments, prohibitions, and guidelines for life that humans must understand and practice. In addition, the Qur'an contains stories of the previous ummah that can serve as lessons and examples for living life. In the context of education, the meaning of the verse shows that the delivery of knowledge requires appropriate media so that students can receive the message well (Karim & Wandini, 2024). Therefore, the use of learning media in the educational process needs to be adjusted to students' psychological development and levels of thinking ability. Learning media that does not pay attention to the characteristics of students' development can cause difficulties in the learning process, both for teachers and students (Wahyuni et al., 2022).

The multiplication bar simplifies complex multiplication by converting multiplication into addition using the lattice method. The way it works is quite simple, namely, translating the multiplication problem into an addition problem (Alwi, Tahir, Nur, et al., 2021). Multiplication bar

media is an effective visual aid for elementary school students in learning multiplication. Small, neatly arranged bars make it easy for students to simplify complex calculations in a tangible and easy-to-understand way (Sinaga et al., 2025). The design of this media allows students to multiply directly, making math learning more accessible and engaging in the classroom. The use of multiplication bar media can also increase students' interest in learning, motivation, and understanding of mathematical concepts (Hidayah et al., 2024). In addition, this medium stimulates students' thinking and imagination when solving math problems, as they can directly manipulate the bars to obtain multiplication results. Concrete media such as multiplication bars also support students with visual learning styles, so that the understanding of multiplication concepts can be obtained more easily and effectively (Rahmatunnisa et al., 2022).

One concrete learning medium for multiplication learning is the multiplication bar. The multiplication bar medium is basically the same as the Napier bar, a mathematical learning medium used to calculate the multiplication between numbers (Sembiring et al., 2025). However, based on initial observations and interviews with grade IV teachers at SDS IT Madani Southeast Aceh, it was found that multiplication learning has not used concrete learning media, including multiplication bar media. Lecture and whiteboard explanations, with limited media support, still dominate the mathematics learning process. This condition makes learning less interesting, so students tend to feel bored and lack enthusiasm for learning. The impact of these conditions can be seen in student learning outcomes, where some students have not yet completed learning in mathematics subjects, especially in multiplication materials. Students' difficulties are increasingly apparent when given story questions that require understanding of concepts, rather than just memorizing multiplication results.

Various previous studies have shown that the use of multiplication rods and Napier rods has a positive influence on mathematics learning in elementary schools. (Alwi, Tahir, Nur, et al., 2021) It shows that Napier rod media affects students' understanding of multiplication by helping them visualize the multiplication process systematically. Similar findings were also presented by (Mutia et al., 2023) which states that the use of multiplication rod media has a significant effect on the understanding of the concept of mathematical multiplication of grade IV elementary school students.

In addition to improving understanding of concepts, Napier's rods (media or multiplication rods) also affect students' numeracy skills and learning outcomes. (Sembiring et al., 2025) It shows

that the use of Napier rod media can improve elementary school students' mathematical numeracy. Research (Sinaga et al., 2025) revealed that the application of Napier stem media combined with a cooperative learning model has an effect on students' mathematics learning outcomes. Furthermore, (Taufik et al., 2024) It is concluded that the multiplication bar learning media has a positive effect on student learning achievement in multiplication materials.

Previous studies have shown that Napier's bone and multiplication bar media can support elementary students' multiplication learning. Ariyatun and Habibi (2024) found that Napier bar media can be used to support students in understanding multiplication operations, while Muhamad and Akmal (2024) showed that multiplication grouping using Napier's bone was effective in improving students' memory in multiplication learning. Similarly, Ratnawati et al. (2018) emphasized that elementary school students need concrete learning aids because they are still in the concrete operational stage. However, these studies mainly focused on learning outcomes, memory, or the general use of multiplication media. Therefore, further research is needed to examine how multiplication bar media specifically supports students' conceptual understanding of multiplication.

The novelty of this study lies in its focus on students' conceptual understanding of multiplication rather than merely on final scores or memorization. Conceptual understanding in this study refers to students' ability to understand multiplication as repeated addition, represent multiplication through concrete models, solve multiplication operations correctly, and apply multiplication concepts in contextual problems. This focus is important because manipulative media can function as a cognitive bridge between abstract mathematical concepts and concrete student experiences (Abarquez, 2020). Therefore, this study aims to determine the effect of multiplication rod media on the understanding of the concept of mathematical multiplication among grade IV students at SDS IT Madani Southeast Aceh.

METHOD

The research uses a quantitative approach with a quasi-experimental design in the form of *a pretest-posttest* control-*group design*. This research was conducted at SDS IT Madani, located in Pasir Gala Village, Lawe Bulan District, Southeast Aceh Regency, during the second semester of the 2025/2026 Academic Year. The research population comprised all grade IV students at SDS IT Madani, totaling 56 students, including 28 from Grade IV Kuala Lumpur and 28 from Grade IV Doha. Because the population is less than 100, the entire population is used as a sample (sampling

gen). Sampling techniques use *total sampling,* so class IV Kuala Lumpur is designated as the experimental class and class IV Doha as the control class. Therefore, the sampling technique used in this study was total sampling. An overview of the research design can be seen in the table below:

Tabel 1. Pre-test Post-test Control Group Design

Groups	Pre-test	Treatment	Post-test
Eksperimen	Y1	X	Y2
Controls	Y1	-	Y2

Description:
E : Experimental group
K : Control group
Y1 : Pre-test results of the experimental and control groups
Y2 : Results of the control group and experiment post-test
X : Treatment of students in experimental classes using media

The instrument used in this study was an essay test consisting of 10 questions designed to measure students' understanding of multiplication concepts. The indicators included understanding multiplication as repeated addition, representing multiplication operations, solving multiplication problems, and applying multiplication concepts in contextual questions. Before being used, the instrument was validated through expert judgment and empirical item testing. Content validation was conducted by Nurdiana Siregar, M.Pd., to assess content suitability, language clarity, and relevance to the research indicators.

The empirical validity test was conducted using Pearson Product-Moment correlation with SPSS version 25. The results showed that all 10 items were valid because the correlation coefficient of each item was greater than the r-table value of 0.374. The reliability test using Cronbach's Alpha obtained a value of 0.816, indicating that the instrument was reliable. The item difficulty analysis showed that 2 items were categorized as easy and 8 items as moderate, while the discriminatory power analysis showed that all 10 items were in the good category. Therefore, the instrument was considered feasible for use in the pretest and posttest.

Before hypothesis testing, normality and homogeneity tests were conducted. The normality test was performed using the Shapiro-Wilk test, while the homogeneity test was conducted using Levene's test. Data were considered normal and homogeneous if the significance value was greater than 0.05. The main hypothesis test was conducted using an independent samples t-test to compare the posttest scores of the experimental and control classes. This test was appropriate because the main objective of the study was to determine the effect of multiplication bar media on students'

understanding of multiplication concepts. A paired samples t-test was used only as supporting analysis to examine score improvement within each class, but the main conclusion of the study was based on the independent samples t-test.

In addition, the instrument was analyzed based on item difficulty and discriminatory power. The item difficulty analysis showed that 2 items were categorized as easy and 8 items were categorized as moderate. Meanwhile, the discriminatory power analysis showed that all 10 items were in the good category. Based on these results, the instrument met the criteria of validity, reliability, appropriate difficulty level, and good discriminatory power. Therefore, the instrument was considered suitable for measuring students' understanding of multiplication concepts in this study.

FINDINGS AND DISCUSSION

The findings of this study are presented based on the pretest and posttest scores of the experimental and control classes. The experimental class was taught using multiplication bar media, while the control class was taught using conventional learning. The data analysis focused on descriptive statistics, prerequisite tests, and hypothesis testing using an independent samples t-test.

Table 2. Pre-test and Post-Test Results

Descriptive Statistics

	N	Range	Minimum	Maximum	Mean	Hours of deviation
Pre-Test Experiment	28	50	25	75	53,04	13,495
Post-Test Experiment	28	35	60	95	75,54	9,461
Pre-Test Control	28	40	35	75	53,75	10,419
Post-Test Control	28	30	50	80	66,96	8,426
Valid N (listwise)	28					

Based on the descriptive statistical analysis, the mean value was calculated for each group. In the experimental class, the average pretest score was 53.04, while the average posttest score increased to 75.54. This shows an increase of 22.50 points after being treated. Meanwhile, in the control class, the average pretest score was 53.75 and increased to 66.96 in the posttest, a gain of 13.21 points. In comparison, the average increase in the experimental class was higher than that in the control class. This indicates that the treatment in the experimental class has a more significant effect on student learning outcomes.

Normality Test

The normality test was conducted to determine whether the pretest and posttest data were normally distributed. The Shapiro-Wilk test was used because each class consisted of fewer than 50 students. The results are presented in Table 2.

Table 2. Normality Test Results

		Kolmogorov-Smirnova			Shapiro-Wilk		
	Classes	**Statistic**	**df**	**Say.**	**Statistic**	**df**	**Say.**
Multiplication Learning Outcomes	Pre-Test Experiment	,201	28	,005	,935	28	,085
	POS Test Experiments	,117	28	,200*	,959	28	,326
	Pre-Test Control	,191	28	,011	,940	28	,107
	Post-Test Control	,176	28	,026	,941	28	,116

Table 2 shows that all significance values were greater than 0.05. Therefore, the pretest and posttest data in both the experimental and control classes were normally distributed. These results indicate that the data met the normality assumption required for parametric statistical testing.

Homogeneity Test

The homogeneity test was conducted to determine whether the variance of the posttest scores in the experimental and control classes was homogeneous. The result is presented in Table 3.

Table 3. Homogeneity Test Results

Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Say.
Multiplication Learning Outcomes	Based on Mean	2,422	1	54	,125
	Based on Median	1,724	1	54	,195
	Based on Median and with adjusted df	1,724	1	53,906	,195
	Based on the trimmed mean	2,358	1	54	,130

Based on Table 3, the significance value of the homogeneity test was 0.125. Since this value was greater than 0.05, the posttest data of the experimental and control classes had homogeneous variance. Thus, the data met the requirements for further analysis using an independent samples t-test.

Hypothesis Testing

The independent samples t-test was used as the main statistical test because the objective of this study was to determine whether there was a significant difference in students' understanding of multiplication concepts between the experimental class and the control class after the treatment. The results are presented in Table 4.

Table 4. Independent Sample T-Test Results

.

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Say.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Value	Equal variances assumed	,207	,651	-3,580	54	,001	-8,571	2,394	-13,372	-3,771
	Equal variances not assumed.			-3,580	53,291	,001	-8,571	2,394	-13,373	-3,770

Based on Table 4, the significance value was 0.001, which was lower than 0.05. This result indicates that H_0 was rejected and H_a was accepted. Therefore, there was a significant difference between the posttest scores of students in the experimental class and those in the control class. The mean score of the experimental class was higher than that of the control class, indicating that the use of multiplication bar media had a significant effect on students' understanding of multiplication concepts. The results show that multiplication bar media was more effective than conventional learning in improving students' understanding of multiplication concepts. The use of concrete media helped students understand multiplication not merely as a memorized arithmetic operation, but as a mathematical concept related to repeated addition, numerical grouping, and problem-solving.

Discussion

The main finding of this study shows that the use of multiplication bar media had a significant effect on the understanding of multiplication concepts among Grade IV students at SDS IT Madani Southeast Aceh. This is indicated by the higher posttest mean score in the experimental class compared to the control class and the result of the independent samples t-test, which showed a significance value of 0.001. These findings suggest that students who learned using multiplication bar media had better conceptual understanding than students who learned through conventional instruction.

The difference between the experimental and control classes indicates that concrete learning

media play an important role in helping elementary school students understand abstract mathematical concepts. Multiplication is often difficult for students because it is introduced as a calculation procedure or memorization of multiplication facts. Through multiplication bar media, students can observe and manipulate the multiplication process more concretely. This allows them to see the relationship between multiplication and repeated addition, making the learning process more meaningful.

The first indicator of multiplication concept understanding is the ability to understand multiplication as repeated addition. In the experimental class, multiplication bar media helped students visualize that multiplication is not merely a final answer, but a process involving repeated addition of equal groups. For example, students could understand that 3×4 represents three groups of four or the repeated addition of $4 + 4 + 4$. This concrete experience is important because many students at the elementary level still tend to memorize multiplication results without understanding the concept behind them. The use of multiplication bar media helps reduce this tendency by providing a visual and manipulative representation of multiplication.

The second indicator is the ability to represent multiplication operations using concrete models. Multiplication bar media provides students with a physical representation of multiplication operations. Students can use the bars to arrange numbers, observe patterns, and connect symbolic operations with concrete forms. This process supports students in moving from concrete representation to symbolic understanding. The result is consistent with the view that elementary school students are in the concrete operational stage, where they understand mathematical concepts more easily through real objects and visual models.

The third indicator is the ability to solve multiplication operations correctly. The higher posttest mean score in the experimental class shows that students who learned with multiplication bar media were better able to complete multiplication problems than those in the control class. This improvement occurred because multiplication bar media allowed students to follow a clearer calculation process. Instead of only relying on memorization, students could use the media to trace the multiplication steps and identify the correct answer. This made the calculation process more structured and reduced students' confusion when solving multiplication problems.

The fourth indicator is the ability to apply multiplication concepts in contextual or word problems. Students often experience difficulty when multiplication is presented in the form of story problems because they need to understand the meaning of the problem before performing

calculations. Multiplication bar media helps students connect mathematical symbols with real situations involving groups, quantities, and repeated addition. Therefore, students can better understand why multiplication is used in a particular problem and how the operation should be performed.

The findings of this study also show that conventional learning can improve students' scores, but the improvement was lower than that of the experimental class. This means that direct explanation and practice can still help students learn multiplication, but they may not be sufficient to develop deeper conceptual understanding. Conventional learning tends to emphasize explanation, memorization, and written exercises, while multiplication bar media allows students to experience the concept through concrete manipulation. This difference explains why the experimental class achieved better results.

These findings are in line with previous studies showing that multiplication bar or Napier bar media can support students' understanding of multiplication. Alwi et al. (2021) found that Napier bar media helps students visualize multiplication systematically. Mutia et al. (2023) also reported that multiplication bar media has a positive effect on students' understanding of multiplication concepts. In addition, Abarquez (2020) emphasized that manipulative media in elementary mathematics can help students understand abstract concepts through concrete learning experiences. The present study strengthens these findings by showing that multiplication bar media is not only useful for improving scores, but also for supporting conceptual understanding of multiplication.

The contribution of this study lies in its emphasis on multiplication concept understanding rather than merely on learning outcomes. The use of multiplication bar media helps students understand multiplication as repeated addition, represent multiplication through concrete models, solve multiplication operations more systematically, and apply multiplication concepts in contextual problems. Thus, this study provides empirical evidence that concrete media can serve as a cognitive bridge between abstract mathematical symbols and students' concrete experiences.

From a practical perspective, the results of this study imply that elementary school teachers need to use concrete media in teaching multiplication, especially for students who still experience difficulties in understanding the meaning of multiplication. Multiplication bar media can be used as an alternative learning tool because it is visual, concrete, and relatively easy to apply in classroom learning. Teachers can combine this media with discussion, guided practice, and contextual

problems so that students do not only memorize multiplication facts but also understand the concept more deeply.

Overall, the findings indicate that multiplication bar media is effective in improving Grade IV students' understanding of multiplication concepts. Its effectiveness is shown not only by the increase in students' posttest scores, but also by its ability to help students build a more concrete, systematic, and meaningful understanding of multiplication. Therefore, multiplication bar media can be recommended as one of the instructional media for elementary mathematics learning, particularly in multiplication material.

CONCLUSION

This study concludes that the use of multiplication bar media is more effective than conventional learning in improving Grade IV students' understanding of multiplication concepts at SDS IT Madani Southeast Aceh. Multiplication bar media helps students understand multiplication more concretely by connecting multiplication operations with repeated addition, equal grouping, and visual representation. Through the use of this media, students are not only encouraged to obtain the correct answers, but also to understand the process and meaning behind multiplication operations. The findings indicate that students who learned using multiplication bar media showed better conceptual understanding than students who learned through conventional instruction. This suggests that concrete media can support elementary school students in moving from abstract mathematical symbols to more meaningful and understandable representations. Therefore, multiplication bar media can be used as an alternative instructional medium in elementary mathematics learning, especially for multiplication material that often requires concrete visualization.

Practically, this study implies that elementary school teachers need to integrate concrete and manipulative media into mathematics learning to help students understand basic arithmetic concepts more deeply. The use of multiplication bar media can make learning more active, visual, and engaging, particularly for students who still experience difficulties in understanding multiplication as repeated addition. Teachers may also combine this media with contextual problems, guided exercises, and group activities to strengthen students' conceptual understanding. Theoretically, this study contributes to the development of concrete media-based mathematics learning by reinforcing the idea that elementary school students need visual and manipulative learning experiences to understand abstract concepts. The results support the view that learning

media can function as a cognitive bridge between concrete experience and symbolic mathematical understanding.

However, this study has several limitations. The research was conducted only in one school and involved a limited number of Grade IV students. In addition, the study focused only on multiplication concept understanding and did not examine other variables such as students' motivation, mathematical communication, numeracy skills, or long-term retention. Therefore, future research is recommended to involve broader samples, different school contexts, and additional variables to obtain a more comprehensive understanding of the effectiveness of multiplication bar media in elementary mathematics learning.

REFERENCES

Abarquez, E. B.-. (2020). The Use of Manipulative in Teaching Elementary Mathematics. *International Journal of Linguistics, Literature and Translation*, *3*(11), 18–32. https://doi.org/10.32996/ijllt.2020.3.11.3

Aini, L. Q., & Marhaeni, N. H. (2024). Analisis Kesulitan Belajar Matematika Materi Operasi Hitung Perkalian pada Siswa SD. *MARAS: Jurnal Penelitian Multidisplin*, *2*(1), 446–458.

Alwi, M., Tahir, M., Nur, A., & Rosyidah, K. (2021). Pengaruh Media Batang Napier Terhadap Pemahaman Konsep Perkalian Siswa Kelas III SDN 3 Danger. *Renjana Pendidikan Dasar*, *1*(2), 116–120.

Alwi, M., Tahir, M., & Rosyidah, A. N. K. (2021). Pengaruh Media Batang Napier Terhadap Pemahaman Konsep Perkalian Siswa Kelas III SDN 3 Danger. *Renjana Pendidikan Dasar*, *1*(2), 116–120. https://prospek.unram.ac.id/index.php/renjana/article/download/98/89

Ariyatun, T., & Habibi, M. (2024). Penggunaan Media Pembelajaran Batang Napier Pada Operasi Perkalian Siswa. *Journal of Education Research*, *5*(4), 6298–6306.

Cut Maslina Mutia, Sahkholid Nasution, & Riris Nurkholidah Rambe. (2023). Pengaruh Penggunaan Media Batang Perkalian Terhadap Pemahaman Konsep Perkalian Matematika Siswa Kelas IV SDN 2 Lawe Hijo Kabupaten Aceh Tenggara. *Pendekar : Jurnal Pendidikan Berkarakter*, *1*(5), 57–69. https://doi.org/10.51903/pendekar.v1i5.401

Hasibuan, A. T., & Rahmawati, E. (2022). Pendidikan Islam Informal dan Peran Sumber Daya Manusia Dalam Perkembangan Masyarakat: Studi Evaluasi Teoretis. *Tarbiyatuna: Jurnal Pendidikan Islam*, *15*(1), 24. https://doi.org/10.36835/tarbiyatuna.v15i1.1182

Hasibuan, D., Asrul, A., & Siregar, M. A. P. (2024). *Pengaruh Penggunaan Aplikasi Desmos Graphing Calculator Terhadap Kemampuan Pemahaman Konsep Matematis Siswa*. *5*.

Hidayah, N. S., Cahyadi, F., & Sundari, R. S. (2024). Pengembangan Media Pembelajaran Papan Batang Napier Untuk Pada Mata Pelajaran Matematika Materi Perkalian Bilangan Cacah Kelas V di Sekolah Dasar Nabila. *Pendas : Jurnal Ilmiah Pendidikan Dasar*, *09*(04), 935–949.

Karim, P. A., & Wandini, R. R. (2024). Persepsi Mahasiswa terhadap Penggunaan Aplikasi Al-Qur ' an Berbasis Android dalam Pembelajaran Matematika. *Didaktika: Jurnal Kependidikan*, *13*(4), 4613–4622.

Lestari, R. T., Adrias, A., & Zulkarnaini, A. P. (2025). Analisis Strategi Guru Mengatasi Kesulitan Siswa dalam Menyelesaikan Soal Perkalian di Sekolah Dasar. *Bilangan : Jurnal Ilmiah Matematika, Kebumian Dan Angkasa*, *April*.

Lubis, J. A., & Rambe, A. H. (2023). Pengembangan Alat Peraga Matematika Berbasis Metode

Montessori pada Papan Perkalian di Kelas II MI. *EduInovasi: Journal of Basic Educational Studies*, *3*(2), 494–512.

Manurung, P. (2020). Pengembangan Media Pembelajaran Berbasis E-book di Masa Pandemi Covid-19. *Jurnal Pendidikan dan Konseling*, 267–277.

Mutia, C. M., Nasution, S., & Rambe, R. N. (2023). Pengaruh Penggunaan Media Batang Perkalian Terhadap Pemahaman Konsep Perkalian Matematika Siswa Kelas IV SDN 2 Lawe Hijo Kabupaten Aceh Tenggara. *PENDEKAR : Jurnal Pendidikan Berkarakter*, *1*(5).

Nanda, V. D., & Wandini, R. R. (2024). Pengaruh Penggunaan Media Counting Box Dalam Mengatasi Kesulitan Memahami Konsep Operasi Hitung Perkalian Matematika Kelas Rendah. *Didaktika: Jurnal Kependidikan*, *13*(3), 2977–2986.

Nurwahida, & Haidar, I. (2023). Pembelajaran Matematika pada Materi Perkalian di Sekolah Dasar dengan Berbantuan Alat Peraga. *Jurnal Ilmu Pendidikan Dasar Indonesia*, *2*(2), 111–119.

Purba, A. R. A., Siregar, N., & Wandini, R. R. (2024). Pengaruh Media Wordwall Terhadap Hasil Madrasah Ibtidaiyah. *PENDALAS: Jurnal Penelitian Tindakan Kelas Dan Pengabdian Masyarakat*, *4*(1), 1–24.

Putri, N., & Riyanti, V. (2025). Pengaruh Batang Napier terhadap Hasil Belajar Siswa Materi Perkalian Dikelas III SDN 20 Mabah. *Jurnal Pendidikan Tambusai*, *9*(3), 30643–30651.

Rahmatunnisa, S., Mutjaba, I., Pinasti, R., Barokah, R. A., & Rahmah, S. I. (2022). Pengembangan Media Papan Baper (Batang Perkalian) Dalam Materi Perkalian Pada Pembelajaran Matematika Kelas II SDN Margahayu XIX. *Seminar Nasional Penelitian LPPM UMJ*.

Rambe, A. Y. F., & Afri, L. D. (2020). Analisis Kemampuan Pemecahan Masalah Matematis Siswa Dalam Menyelesaikan Soal Materi Barisan dan Deret. *AXIOM : Jurnal Pendidikan Dan Matematika*, *09*(2), 175–187.

Ratnawati, -, Aprizal, P., & Purwanto, K. (2018). Development of Napier's Bones Equipment for Improving Student Learning Outcomes in Multiplication Counting Operations at Grade III SDN 13 Sitiung Dharmasraya Regency. *Proceedings of the 2nd International Conference on Mathematics and Mathematics Education 2018 (ICM2E 2018)*. https://doi.org/10.2991/icm2e-18.2018.49

Sembiring, A., Yantoro, & Zahyuni, V. (2025). Penggunaan Media Batang Napier Untuk Meningkatkan Kemampuan Berhitung Matematika Siswa Kelas III Sekolah Dasar. *Pendas : Jurnal Ilmiah Pendidikan Dasar*, *10*(01), 200–208.

Sinaga, M. Y., Prihastari, E. B., & Jumanto. (2025). Pengaruh Penerapan Model Pembelajaran NHT Berbantuan Media Batang Napier terhadap Hasil Belajar Matematika Kelas III SD Negeri Gandekan. *Jurnal Pendidikan MIPA*, *15*(September), 1491–1497.

Siregar, D. S., & Ananda, R. (2023). Pengembangan Media Pembelajaran Board Game Matematika Ular Tangga untuk Siswa Tunarungu. *Jurnal Cendekia: Jurnal Pendidikan Matematika*, *07*(02), 1924–1935.

Siregar, R. M. R., & Dewi, I. (2022). Peran Matematika Dalam Kehidupan Sosial Masyarakat. *Scaffolding: Jurnal Pendidikan Islam Dan Multikulturalisme*, *4*(3), 77–89.

Taufik, A., Nurfitriani, M., & Suci, A. (2024). Pengaruh Media Pembelajaran Baper (Batang Perkalian) Terhadap Prestasi Belajar Siswa pada Kelas II Materi Perkalian di SDN Sambongpari. *AR RUMMAN - Journal of Education and Learning Evaluation*, *1*(2), 580–593.

Wahyuni, R. S., Tanzimah, & Suryani, I. (2022). Pengaruh Penggunaan Media Papan Perkalian Terhadap Hasil Belajar Matematika Siswa Kelas III SD Negeri 05 Sembawa. *Jurnal Sekolah*, *6*(3), 11–20.

Wapa, A., & Zahro, A. F. (2023). Pengaruh Media Pembelajaran TALINTAR Terhadap Kemampuan Berhitung Perkalian Bersusun Siswa Kelas IV SD Negeri Pujerbaru 2 Kecamatan Maesan. *Jurnal Penelitian Ipteks*, *7*(1), 55–61.