The Influence of Using Division Boards towards Improvement of Students' Islamic Elementary School Arithmetic Skills

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Keyword
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ABSTRACT
This research investigates the students' inability to execute mathematical division calculations in Islamic elementary school. Learning through lecture methods, giving examples, and exercises is frequently monotonous. So, mathematics is considered a subject that is complicated and difficult to understand. The purpose of the research is to assess the impact of using division boards in enhancing students' arithmetic skills, especially regarding basic and operational arithmetic aspects. Quantitative approach uses a quasi-experimental nonequivalent control group design. The sample includes 30 students separated into control and experimental groups. Data collection techniques are observation, interviews, documentation, and tests, while data analysis is conducted using normality tests, homogeneity tests, and independent t-tests. The results indicate that there is a significant difference between the experimental and control groups, which has a significance value of 0.000 < 0.05. These findings demonstrate the effectiveness of the division board media in enhancing students' arithmetic skills and in encouraging student to participate actively in learning activities. This study recommends the use of concrete media as instructional tools that are relevant to the cognitive development stages of students, particularly in understanding abstract mathematical concepts such as division.

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INTRODUCTION

The ability to read, write, and count (calistung) in primary school education is a prerequisite for learning further skills and knowledge. Law No. 20/2003 on the National Education System, Article 4, Paragraph 5, emphasizes that education is organized by developing a culture of reading, writing, and arithmetic for all citizens.[1] According to the law, the purpose of education is not only to convey knowledge in the classroom but also to develop reading, writing, and counting habits. Numeracy skills in mastering mathematics play an important role in the success of learning.[2] This ability is an important foundation in

[1] Rusdi, Pembelajaran Calistung:Membaca, Menul*is d*an Berhitung (Jambi, 2013).

[2] M. Muzakki, Ani Pajrini, and Yulia Tri Mawati, "Matematika Menggunakan Media Batang Napier Talang Pantai Kecamatan Bungo Dani M . Muzakki Institut Agama Islam Yasni Bungo Ani Pajrini Institut

education. Numeracy is an essential skill for everyday life. Teaching students basic numeracy knowledge is crucial for their practical application in life.[3,4]

The constructivism learning approach emphasizes that students' interaction with the environment helps build the knowledge. In the context of mathematics learning, the constructivism approach encourages students to be actively involved in the learning process to shape the understanding through exploration, discussion, and reflection. This approach also supports the learning process, because students it can improve the understanding through direct interaction with the media. According to Nur's point of view, the constructivism approach facilitates students' building knowledge through media-based activities, which increases their participation and understanding.[5] The teacher as a facilitator who enables students build an individual understanding. The application of constructivist theory in mathematics education has proven effective in helping students understand concepts and develop their ability to think critically.[6]

The basic skills that children have and relate to basic operations are known as counting skills. Numeracy skills in mathematics are important to improve both in education and everyday life. Numeracy skills, according to Mawati, et al, are an important foundation for success in learning and teaching mathematics.[7] Numeracy skills need to be improved, because it will be a useful provision both now and in the future, especially because this ability is important in life.

Naga defines that numeracy skills including basic operations such as addition, subtraction, times, and divide, are the basis for learning mathematics.[8] Division is a basic skill that is very important to learn. Division is basically repeated subtraction which is often a difficulty for students. An understanding of division is essential for learning mathematics complex. Division is taught after students understand the basis of other mathematical operations such as addition, subtraction, and multiplication, this concept is taught through real objects or images that are relevant in life.[9]

Previous research has proven that board media helps improve numeracy skills, especially in addition and subtraction in elementary schools.[10] Research states that board media has an effect on students' numerical skills. Another study proved that board media has an influence on students' mathematical understanding, especially on divide and multiply

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[3] Alivia Ramadhani, Rizki Ananda, and Yenni Fitra Surya, "Penerapan Metode Snowball Throwing Berbantuan Media Papan Pengurangan Untuk Meningkatkan Kemampuan Berhitung Siswa Kelas II Madrasah Ibtidaiyah," *Al-Madrasah: Jurnal Pendidikan Madrasah Ibtidaiyah* 7, no. 1 (2023): 84, https://doi.org/10.35931/am.v7i1.1465.

[4] Wilhelmina Menge et al., "Pemanfaatan Media Papan Pintar Numerasi Untuk Meningkatkan Kemampuan Berhitung Pada Anak Usia 6-7 Tahun" 5 (2024): 1933–42.

[5] Muhammad Nur and Kalimantan Timur, "Pendekatan Konstruktivisme Dalam Proses Pembelajaran IPS" 2, no. 4 (2022): 636–49.

[6] Marwia Tamrin, St. Fatimah S. Sirate, and Muh. Yusuf, "Teori Belajar Vygotsky Dalam Pembelajaran Matematika," *Sigma (Suara Intelektual Gaya Matematika)* 3, no. 1 (2011): 40–47.

[7] Adira Valentina and Murfiah Dewi Wulandari, "Media Pembelajaran Mabeta Untuk Menguatkan Kemampuan Berhitung Peserta Didik Sekolah Dasar," *Jurnal Cakrawala Pendas* 8, no. 3 (2022): 601–10, https://doi.org/10.31949/jcp.v8i3.2474.

[8] Devita Anggraeni et al., "Upaya Peningkatan Kemampuan Berhitung Materi Perkalian Menggunakan Papan Perkalian Siswa Kelas Ii" 8, no. 2 (2024): 137–44.

[9] Karso et al., *Pendidikan Matematika I* (Tangerang Selatan, 2012).

[10] Yuli Amreta and Ani Safa, "Pengaruh Media Papinka Terhadap Kemampuan Menghitung Penjumlahan Dan Pengurangan Dalam Pembelajaran Matematika Di Sekolah Dasar" 1, no. 1 (2021): 21–28.

material.[11] In addition, other research shows that board media has an effect on the ability to understand concepts.[12] Based on this explanation, the researcher offers novelty by using board media as an improvement in numeracy skills, with a focus on basic numeracy and operational skills.

Learning is successfully based on three aspects, namely teachers, students and teaching tools.[13] Teaching tools are determinants of learning activities and important elements in learning.[14] Learning mathematics at the elementary school level does not utilize teaching tools, even though the use of media in learning is a necessity for educators. Setiowati, learning mathematics at school tends to underutilize media that contain elements of creativity and innovation.[15] The media use to attract students' attention in math lessons, so it means that students have learned through these activities. Media acts as a supporting tool to convey abstract material. In accordance to Piaget's theory, children aged 7-12 years enter the concrete operational stage, so they tend to easily understand concepts through real objects or objects.[16] Division boards are an example of creatively designed media from simple materials to help students understand division operations. Based on Sutrisno Learning media includes various tools that teachers choose to stimulate the senses, attract students' attention, and encourage their involvement during the learning process.[17]

In this study, students' counting ability in math is a basic skill. Improving basic arithmetic skills is very important, because it is the initial foundation in learning more complex mathematics. Without a good mastery of counting skills, students will have difficulty in learning advanced topics such as fractions, equations.

Numeracy skills, especially in division operations, are not only useful in education, but also have many benefits in everyday life. For example, students can use their understanding of division when organizing a fair picket schedule or when dividing class members into groups. Mathematics plays an important role in many aspects of life, and students who master it can hone their numeracy skills, measuring abilitie to solve math problems everyday.[18]

Based on observations and interviews to the class teachers, some information was found such most students have difficulty understanding math material, especially division and less active in learning math. when given a math problem, students are afraid and confused for solving it. Researchers observed the learning process in the classroom and found that learning focused on the teacher and the teacher rarely used teaching tools, so students has difficulty understanding division material. This affects students' weak numeracy skills in mathematics.

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[11] Aulia Akbar An Nisa Suryani, Hani Handayani, "Pengaruh Media Pembelajaran Papan Baki (Bagi Dan Kali) Terhadap Pemahaman Matematis Siswa Pada Materi Operasi Hitung Pembagian Dan Perkalian Bilangan Cacah" 7, no. 02 (2023): 92–101.

[12] Restu Panjaitan, Endang Sri Mujiwati, and Kukuh Andri Aka, "Pengembangan Media Papan Pecahan Untuk Materi Penjumlahan Dan Pengurangan Pecahan Berpenyebut Sama Siswa Kelas III SDN Sambi 2," *Jurnal Penelitian Inovatif* 2, no. 2 (2022): 389–96, https://doi.org/10.54082/jupin.83.

[13] I Gede Wahyudi, "Meningkatkan Kemampuan Berhitung Perkalian Dan Pembagian Siswa Sd 2 Pengasan Melalui Penggunaan Media Papan Pintar Perkalian Dan Pembagian" 5, no. 1 (2023): 14–21.

[14] Ani Daniyati et al., "Konsep Dasar Media Pembelajaran," *Journal of Student Research* 1, no. 1 (2023): 282–94, https://doi.org/10.55606/jsr.v1i1.993.

[15] Syifaun Nafisah and Yayang Furi Furnamasari, "Penerapan Media Pembelajaran Papan Pintar Dalam Pembelajaran Matematika Kelas Dua Uptd Sdn 1 Juntinyuat," *ALFIHRIS : Jurnal Inspirasi Pendidikan* 1, no. 3 (2023): 208–16, https://doi.org/10.59246/alfihris.v1i3.360.

[16] AnwarZain et al., Psikologi Pendidikan, ed. Fidya Arie Pratama Rina Indriani, Aas Saraswati, Kasmawati (Cirebon- Jawa Barat, 2023).

[17] Faqih Hakim Hasibuan, "Penerapan Media Pembelajaran Papan Pintar Di Desa Bah Jambi Application of Multiplication Smart Board Learning Media in Mathematics Lessons" 5 (2024): 48–52.

[18] Navita Hasybyah and Sasih Karnita Arafatun, "(Jurnal Basic Education Skills)" 2, no. 3 (2024): 202–11, https://doi.org/10.35438/jbes.v2i3.132.

This study aims to assist the effect of using division board media in improving students' Arithmetic skills. This research seeks to explore the effectiveness of the media in helping students understand basic math concepts in a more systematic and fun way. The results of this study are expected to be a reference for educators in designing more interactive and effective learning strategies to optimally develop students' Arithmetic skills.

RESEARCH METHODS

Quantitative approach and type of research Quasi Experimental Design by Nonequivalent Control Group Design used in this study.[19] By involving a control group and an experimental group. This design has similarities to the pretest-posttest control design, but in this design, the selection of experimental groups and control groups is not randomized. In MI Assunniyyah Kencong students control and experimental groups is totally 30 students became the population and sample. The sampling technique used in this study was saturated sampling in which all members of the population are used as samples. This approach is taken because the population is relatively small.[20]

Several techniques were used in collecting data to obtain the required information such as observation, interviews, documentation, and tests. Through observation, researchers can directly observe students' interaction by using of board media. Interviews classroom teachers were conducted to find out the changes that occurred during the learning process. Interviews conducted to the several students, to find out their experiences about learning using board media. Collecting photos during learning activities and photos during tests are evidence of documentation. Tests are used to measure ability or knowledge.[21] The main instrument in this study was an objective test developed based on basic competency indicators in mathematics subjects. The test consisted of 18 items of multiple choice questions that were arranged to measure aspects of numeracy skills in accordance with the learning objectives. To strengthen the validity of the instrument, several stages of testing were carried out as content validation, construct validation, and reliability test. Based on the test results, there were 12 items in the good criteria. The instruments that had passed these stages and met the criteria were then distributed to a research sample of 30 respondents.

There were 12 objective tests given in two stages in which pretest and posttest. The pretest was conducted before the treatment was given to measure the participants' initial abilities, while the posttest was conducted after the treatment to evaluate the changes or improvements that occurred as a result of the treatment. . The data from the pretest and posttest were then analyzed through several stages such normality test, homogeneity test, independent t-test.[22] The normality test in this study was carried out using the Shapiro-Wilk method, because the number of samples used only consisted of 30. The following are the decision-making criteria in the validation test:

Table 1. Validation Criteria

Coefficient interval	Validity level
$r_{xy} \leq 0.00$	Invalid
$0.00 < r_{xy} \leq 0.20$	Very low validity
$0.20 < r_{xy} \leq 0.40$	Low Validity
$0.40 < r_{xy} \leq 0.60$	Medium
$0.60 < rxy \leq 0.80$	high

[19] Sugiyono, *Quantitative Qualitative and R&D Research Methods* (Bandung, 2008).
[20] Sugiyono, *Metode Penelitian Pendidikan Pendekatan Kuantitatif* (Bandung, 2019).
[21] Sugiyono, *Metode Penelitian Kuantitatif Kualitatif Dan R&D*.
[22] muhammad ali Gunawan, "Statistik Untuk Penelitian Pendidikan," 2013.

In reliability testing, decisions are based on several key criteria, such:

Table 2. Reability coefficient criteria

Reliability Coefficient	Interpretation
$r_{11} \leq 0{,}20$	Very Low
$0{,}20 < r_{11} \leq 0{,}40$	Low
$0{,}40 < r_{11} \leq 0{,}70$	Simply
$0{,}70 < r_{11} \leq 0{,}90$	High
$0{,}90 < r_{11} \leq 1{,}00$	Very High

In the normality test, decision making is based on the following criteria:

Table 3. Normality Test

Variables	Class	Shapiro Wilk statistics	Sig	Criteria	Description
Pretest	Control	0,910	0,572	Sig. > 0.05	Normally Distributed Data
	Experiment	0,890	0,056	Sig. > 0.05	Normally Distributed Data
Posttest	Control	0.964	0,785	Sig. > 0.05	Normally Distributed Data
	Experiment	0.954	0,626	Sig. > 0.05	Normally Distributed Data

In the homogeneity test, decisions are made based on several criteria:

Table 4. Homogeneous Test

Class	Sig	Criteria	Description
Control	0,529	Sig. > 0.05	Homogeneous Variant
Experiment	0,777	Sig. > 0.05	Homogeneous Variant

RESULTS AND DISCUSSION

The results of the analysis show that the use of division board media has a significant effect on improving students' Arithmetic skills in Madrasah Ibtidaiyah. Quantitative data to support the independent test also showed a difference in the average score between the control class (mean = 0.788) and the experimental class (mean = 0.871), indicating an increase in counting ability in the group using the division board media.

Table 5. Independent Test

Variants	Class	N	Mean
Posttest	Control	16	0, 788
	Experiment	14	0, 871

Qualitative by observations and interviews to the classroom teachers revealed that after the use of media, students were more excited and actively participated in the learning process. Previously, students tended to be passive and had difficulty in understanding the division operation, but after applying the board media, improvements were seen in term basic and

operational Arithmetic aspects. In addition to the improvement in counting ability, the division board media proved to be effective in developing students' basic Arithmetic skills. This is shown through students' statements, for example "T", who previously had difficulty understanding division, but got better understanding after using the media.

Oktafia, Prastiwi, and Hattarin's research supports these findings by showing that the use of board media contributes to improving student learning outcomes.[23] Wahyudi, found that concrete media such as division boards can improve students' understanding of basic math operations[24] Pramesta supports the argument by claiming that media can enhance students' numeracy abilities by facilitating interaction with tangible objects.[25]

In the context of Piaget's cognitive development theory, children aged 7-11 years start the concrete operational stage, where they begin to be able to think logically about real objects and events, butstudent still have difficulty in understanding abstract concepts. So that real visual media is very helpful in facilitating their understanding. Sadirman also emphasized that visual media such as smart boards are highly effective because of their ability to convey information in a direct and interesting way.[26]

However, this efficacy is also contingent upon the initial conditions of students, as illustrated by Kristanto's research. According to the study, the use of media has little impact on students who have already established an excellent basis.[27] In addition, Lestari emphasized that the success of contextual learning does not only depend on the media, but also on the teacher's skills in managing learning activities.[28] Thus, the role of the teacher as a facilitator remains a determining factor in the effectiveness of using division board media in improving students' overall numeracy skills.

The constructivism approach also supports this kind of learning as students build understanding through direct interaction with the media. 29 In this context, the division board media allows students to build understanding through direct manipulation of real objects. This statement is supported to Gagari's view states that visual aids can bridge abstract concepts with students' concrete experiences.[30]

However, not all research supports the absolute effectiveness of board media for example, Ethics research shows that concrete media is not significant in improving learning outcomes without good supervision and planning, the use of concrete media can experience

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[23] Amreta and Safa, "Pengaruh Media Papinka Terhadap Kemampuan Menghitung Penjumlahan Dan Pengurangan Dalam Pembelajaran Matematika Di Sekolah Dasar."

[24] Wahyudi, "Meningkatkan Kemampuan Berhitung Perkalian Dan Pembagian Siswa SD 2 Pengasan Melalui Penggunaan Media Papan Pintar Perkalian Dan Pembagian."

[25] Syah Putri Endar Pramesta and M.Si. Dr. Wiryanto, "Pengaruh Media Pembelajaran Counting Board Terhadap Kemampuan Berhitung Siswa Kelas I di Sekolah Dasar Syah Putri Endar Pramesta," n.d., 1049–59.

[26] Dwi Hady Kristanto, "Pengembangan Media Pembelajaran Kotak Pintar Untuk Meningkatkan Kemampuan Pelajaran Matematika Siswa Kelas II SDN," 2024.

[27] KRISTANTO.

[28] Syasmi Dwi Lestari, "Pengaruh Penggunaan Alat Peraga Papan Perkalian Berbasis Metode Montessori Terhadap Hasil Belajar Matematika Siswa KelaS III di SDN 72 Kota Bengkulu SKRIPSI," *Braz Dent J.* 33, no. 1 (2022): 1–12.

[29] Maulida Adhiyah, "Pembelajaran Konstruktivisme Berbantuan Media Benda Konkret Untuk Meningkatkan Hasil Belajar Siswa Pada Materi Bangun Ruang di Sekolah Dasar," *Jurnal Basicedu* 7, no. 4 (2023): 2081–90, https://doi.org/10.31004/basicedu.v7i4.4988.

[30] Amreta and Safa, "Pengaruh Media Papinka Terhadap Kemampuan Menghitung Penjumlahan Dan Pengurangan Dalam Pembelajaran Matematika di Sekolah Dasar."

a decrease in effectiveness.[31] This is a reminder that using media without the right pedagogical approach can lose its effectiveness.

In addition, besides cognitive aspects, the use of the board media also has an impact on affective and social aspects. Furthermore, the division board media also has a positive impact on students' operational skills such the aimplementation of the concept of division everyday life. Students are able to apply division in real contexts such as dividing groups or class picket schedules. This reflects the success of the contextual approach that places mathematics as a life skill, as stated by Valentina and Wulandari.[32]

Thus, the success of the division board media in improving students' Arithmetic skills is not only seen from the aspect of learning outcomes, but also from the cognitive, affective, social aspects, as same as learning theory and the readiness of the learning environment. It means that the effective use of media must pay attention to student conditions, the active role of the teacher, and the appropriate learning context. Without all of that thing, media is only a visual tools that will not maximize the impact on student learning outcomes

CONCLUSION

According to this study, division board media significantly enhances students arithmetic abilities, particularly in the fundamentals of division. Students become more engaged, driven, and capable of applying the division concept to real-world situations. This research demonstrates the value of tangible objects like division boards in enhancing student understanding of fundamental mathematical concepts. However, this study has limitations that need to be considered. However, this study has limitations that need to be considered. the results could not be entirely generalizable to a larger population due to the comparatively small number of samples used. The researcher suggests using larger samples in future study to improve external validity in light of these limitations. In the future research should be conducted over a longer period to see the sustainability of the impact of media use on students' numeracy skills over time.

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[32] Valentina and Wulandari, "Media Pembelajaran Mabeta Untuk Menguatkan Kemampuan Berhitung Peserta Didik Sekolah Dasar."

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