

**THE EFFECT OF THE SMARTICK INDONESIA APPLICATION ON THE
ABILITY OF MATHEMATICS LITERACY MATERIAL FOR
COUNTING NUMBERS OF STUDENTS OF CLASS V
MINU DURUNGBEDUG CANDI SIDOARJO**

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Abstract

This study is motivated by the urgency to strengthen the numeracy literacy competence of fifth-grade students at MI Nahdlatul Ulama Durungbedug Candi, particularly regarding the topic of whole number operations, which remains suboptimal. This research aims to evaluate the effectiveness of adaptive-based digital media, specifically Smartick Indonesia, as an intervention to accelerate mathematical literacy skills. The investigation was conducted using a quantitative approach with a quasi-experimental method, utilizing a nonequivalent control group design. Research participants involved 48 students distributed into an experimental class (24 students) and a control class (24 students). Data collection was performed using a mathematical literacy test instrument aligned with PISA standards that has been tested for validity. Statistical data processing techniques applied the Independent Sample t-Test and N-Gain calculation supported by SPSS version 24 software. The study findings confirm a tangible positive impact from the utilization of the Smartick application on students' literacy competence, indicated by a significance value (Sig. 2-tailed) of 0.000, which is below the 0.05 threshold. Descriptively, the mean posttest score in the intervention group was recorded at 83.70, surpassing the comparison group, which only reached 66.50. Furthermore, effectiveness analysis revealed that the experimental class achieved an N-Gain index of 0.51, classified in the moderate category, while the control class only reached 0.17, which falls within the low category. This gap demonstrates that the use of the Smartick Indonesia application yielded a more optimal improvement in students' mathematical literacy compared to conventional instruction.

Keywords: Smartick Application, Mathematical Literacy, Whole Numbers



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INTRODUCTION

Basic education is the main factor determining the quality of national education because it serves as the foundation for all levels of education above it.¹ Basic education in Indonesia faces a major challenge in achieving the vision of a Golden Indonesia 2045, which demands a paradigm shift in learning from just knowledge transfer to holistic 21st century skills development. The role of educators is now transformed into a facilitator who must be able to hone students' understanding of abstract concepts, especially in mathematics which is often a scary scourge for elementary school students. The low quality of national mathematics literacy is a crucial issue, strengthened by PISA 2022 data which places Indonesia at 69 out of 80 countries with an average score of only 366.² This phenomenon is in line with the findings of the Minimum Competency Assessment (AKM) which shows that only around 35% of elementary school students have achieved adequate numeracy literacy standards.³ Students' incompetence is often rooted in learning methods that emphasize too much on memorizing procedures without instilling concrete basic concepts, thus killing students' critical power from an early age. Therefore, innovations in mathematics learning are needed that are able to bridge conceptual understanding with real-life contexts.

Mathematical literacy at the Madrasah Ibtidaiyah (MI) level is highly dependent on mastery of the material of counting numbers of numbers, but in reality many students experience significant difficulties in this domain. These difficulties range from failure to understand the concept of multiplication due to lack of visualization, to the inability to solve story problems due to obstacles in integrating interoperative relationships. Empirical studies even document that more than half of grade V students experience obstacles to division operations triggered by low motivation and monotonous teaching approaches.⁴ This real condition is also found at MI Nahdlatul Ulama Durungbedug Candi, where the results of initial observations show that only 30% of grade V students are able to exceed the Learning Goal Achievement Criteria (KKTP) in the number material. Learning that still relies heavily on lectures and static textbooks causes students to not be actively

¹ Robiatul Adawiyah and Rafiantika Megahnia Prihandini, "Pendampingan Pendidik dalam Pengembangan Meaningfull dan Joyfull Learning Berbasis Mathtrail untuk Meningkatkan Literasi Numerasi Siswa Menggunakan Model ADDIE," *JPKMI (Jurnal Pengabdian Kepada Masyarakat Indonesia)* 4, no. 1 (February 2023), <https://doi.org/10.36596/jpkmi.v3i4.609>.

² OECD, *PISA 2022 Results (Volume I): The State of Learning and Equity in Education*, PISA (OECD Publishing, 2023), <https://doi.org/10.1787/53f23881-en>.

³ Nurul Fatimah Nurlan, Agustan Agustan, and Sulfasyah Sulfasyah, "Analisis Hubungan Kemampuan Berpikir Kritis, Kreatif, dan Refraktif terhadap Kemampuan Literasi Matematika Sekolah Dasar," *Jurnal Papeda: Jurnal Publikasi Pendidikan Dasar* 5, no. 1 (January 2023), <https://doi.org/10.36232/jurnalpendidikandasar.v5i1.3629>.

⁴ Meli Andriyani, Oyon Haki Pranata, and Karlimah Karlimah, "Faktor Penyebab Kesulitan Belajar Operasi Hitung Pembagian Bilangan Cacah pada Siswa Kelas V SD," *PEDADIDAKTIKA: Jurnal Ilmiah Pendidikan Guru Sekolah Dasar* 8, no. 2 (June 2021), <https://doi.org/10.17509/pedadidaktika.v8i2.35335>.

involved in building their own understanding. Without interactive media interventions, this cognitive gap will continue to hinder students' numeracy literacy skills in a sustainable manner.

As a solution to the limitations of conventional methods, the use of digital technology through artificial intelligence (AI)-based adaptive learning platforms is an urgent need. Large-scale research using the *Randomized Controlled Trial (RCT)* method on the use of adaptive learning platforms showed a significant positive impact, with an *effect size* of 0.35 in the group of students who used the software intensively for basic math materials.⁵ In line with this, digital learning platforms such as *Khan Academy* have been proven to be able to improve concept understanding through an interactive visual approach and *customizable learning* paths according to individual progress.⁶

The Smartick Indonesia application emerged as an innovative platform that offers daily exercises for 15 minutes with a personalized approach for each student. Unlike static media, Smartick uses adaptive algorithms to construct learning paths that are responsive to students' learning speed in *real-time*. This allows each individual to learn without feeling left behind by their peers or feeling bored because of material that is too easy. Smartick also offers *gamification features* designed to strengthen literacy through contextual questions that stimulate students' independence and critical thinking. This personalization advantage is expected to be able to effectively close the gap in understanding the operation material of number counts.

Theoretically, mathematical literacy is defined by the *OECD* as an individual's capacity to formulate, use, and interpret mathematics in a variety of practical situations.⁷ This competence is not just the ability to calculate, but the skill of using reasoning to describe, explain, and predict phenomena in the real world. The importance of math literacy for MI students lies in its ability to help individuals make rational decisions in daily life, such as managing time and budget. Students with good literacy will find it easier to understand complex story problems and formulate the right solution strategies. Within the framework of the Independent Curriculum, mathematics literacy is the main pillar to develop an analytical mindset that students urgently need in the future.⁸ The implementation of adaptive media such as Smartick is very much aligned with this goal because it facilitates the in-depth exploration of mathematical concepts through an applicative approach.

⁵ John Pane et al., *How Does Personalized Learning Affect Student Achievement?* (RAND Corporation, 2017), <https://doi.org/10.7249/RB9994>.

⁶ Indah Ririn and Yahfizham, "Pemanfaatan Khan Academy sebagai Platform Pembelajaran Digital dalam Meningkatkan Literasi Ilmu Komputer dan Algoritma," *Journal of Literature Review* 1, no. 1 (June 2025), <https://doi.org/10.63822/qya70g24>.

⁷ OECD, *PISA 2022 Results (Volume I): The State of Learning and Equity in Education*, PISA (OECD Publishing, 2023), <https://doi.org/10.1787/53f23881-en>.

⁸ Sahrul Ramadhan et al., "Penggunaan Teknologi Untuk Mengembangkan Literasi Matematika Peserta Didik Pada Kurikulum Merdeka," *AKSIOMA: Jurnal Program Studi Pendidikan Matematika* 12, no. 3 (September 2023), <https://doi.org/10.24127/ajpm.v12i3.7526>.

This research is based on Lev Vygotsky's theory of cognitive development, specifically regarding the *Zone of Proximal Development* (ZPD). Learning is seen as most effective when students are given tasks that are within their developmental range with the help of the right tools, or what is known as *scaffolding*.⁹ Smartick Indonesia acts as a digital *scaffolding* tool through an automatic feedback system and precise problem difficulty adjustment. By learning within their ZPD range, students can achieve a higher understanding without experiencing the math anxiety that often arises in *one-size-fits-all* learning. These adaptive technologies act as "cultural tools" that support cognitive development in a highly personalized way. The integration of this social constructivist theory reinforces the reason why adaptive digital interventions have great potential to improve mathematics literacy learning outcomes.

Although research on interactive media such as *Heyzin*, *Ludo Math*, or *GeoGebra* has been widely conducted, there is a real *research gap* related to adaptive technology.^{10,11,12} These media are generally non-adaptive, manual, or do not provide dynamic personalization of difficulty levels according to individual progress. No specific study has been found that tests the influence of Smartick Indonesia on mathematical literacy on the material of decimal number operations in the Madrasah Ibtidaiyah environment. Therefore, this study has novelty in filling the empirical gap regarding the effectiveness of *AI* in basic education in madrasahs. By focusing on three main cognitive processes, namely formulating, using, and interpreting, this research aims to make a real contribution to the development of digital-based teaching media. It is hoped that the results of this study can be a reference for educators in facing educational challenges in the digital era concretely.

RESEARCH METHODS

This study uses a quantitative approach with a quasi-experimental design using a *non-equivalent control group design* that includes *pretest* and *posttest measurements*.¹³ The research population includes all students of class V of MI Nahdlatul Ulama Candi totaling 48 students, with a sample of class 5A (24 students) as an experimental group and class 5B (24 students) as a control group determined through a saturated sampling technique, namely all members of the population

⁹ Ivo Retna Wardani, Mirza Immama Putri Zuani, and Nur Kholis, *Teori Belajar Perkembangan Kognitif Lev Vygotsky dan Implikasinya Dalam Pembelajaran*, n.d.

¹⁰ Khoirunnisa Berliananda Sukesi and Hella Jusra, "Development Of Interactive Teaching Materials Through Heyzin In Improving Students' Mathematical Literacy Ability," *AULADUNA: Jurnal Pendidikan Dasar Islam* 11, no. 2 (December 2024), <https://doi.org/10.24252/auladuna.v11i2a4.2024>.

¹¹ Ghina Aliefia Rahma and Adi Asmara, "Meningkatkan Kemampuan Literasi Dan Numerasi Siswa Kelas V SD Negeri 55 Kota Bengkulu Dengan Menggunakan Ludo Math," *Journal Of Human And Education (JAHE)* 4, no. 4 (July 2024), <https://doi.org/10.31004/jh.v4i4.1290>.

¹² Naili Fajriati and Budi Murtiyasa, "Kemampuan Literasi Matematika Siswa Menggunakan Multimedia Interaktif," *Jurnal Cendekia: Jurnal Pendidikan Matematika* 7, no. 1 (March 2023), <https://doi.org/10.31004/cendekia.v7i1.2219>.

¹³ Andi Ibrahim et al., *Metodologi Penelitian*, 1st ed. (Gunadarma Ilmu, 2018).

are used as research samples. The determination of class 5A as an experimental group and class 5B as a control group is carried out directly based on the existing class structure (intact group).

The research instruments used include mathematical literacy tests, operation materials, counting numbers based on AKM questions in 2024 that have been validated, students' daily journals to record qualitative experiences, and documentation of learning activities. The research procedure began with the administration of a *pretest* to both groups, followed by treatment for seven meetings where the experimental group used the Smartick application while the control group followed conventional learning, and ended with the administration of a *posttest*. The data collected were statistically analyzed using IBM SPSS Statistics software version 24, including the Kolmogorov-Smirnov normality test, the Levene homogeneity test, the independent t-test to test the hypothesis, and the *N-Gain analysis* to measure the effectiveness of improving students' abilities.

RESULTS AND DISCUSSION

Results

1. Mathematical Literacy Skills of Experimental Classes and Control Classes

Table 1. Comparison of *Pre-test* and *Post-test* Average Scores of Experimental and Control Classes

Kelompok		N	Min	Max	Mean	Std. Deviation	Gain Absolut
Control	Pretest	24	55	65	59,62	2,960	—
	Posttest	24	61	72	66,50	3,162	+6,88
Eksperimen	Pretest	24	62	73	67,29	3,329	—
	Posttest	24	79	89	83,70	2,941	+16,41
Valid (N)		24					

Source: Research data processing results

Research data on the mathematical literacy ability of grade V students of MI Nahdlatul Ulama Durungbedug Candi was obtained through two main instruments, namely the initial test (*pretest*) and the final test (*posttest*) given to the experimental group (V-A) and the control group (V-B). The experimental group was given treatment in the form of using the Smartick Indonesia application, while the control group used conventional methods. Before the treatment, students' initial abilities were measured to ensure cognitive equivalence between the two groups on the computed number operation material. The results of descriptive statistics showed that the average pretest score of the experimental class was 67.29, while the control class was 59.62.

This low score confirms that students' mathematical literacy is still at the basic level and requires digital media stimulus to develop optimally. This low initial score is also due to the lack of variety of learning media that is able to visualize abstract concepts of computational operations. With this *pretest data*, the researcher has a basis to measure the effectiveness of the intervention that will be given during the seven meetings.

Table 2. Normality Test Results

Tests of Normality							
	Classes	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
pretest	eksperimen	.089	24	.200*	.959	24	.414
	Control	.104	24	.200*	.961	24	.457
posttest	eksperimen	.095	24	.200*	.964	24	.523
	Control	.099	24	.200*	.967	24	.584

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Source: Research data processing results

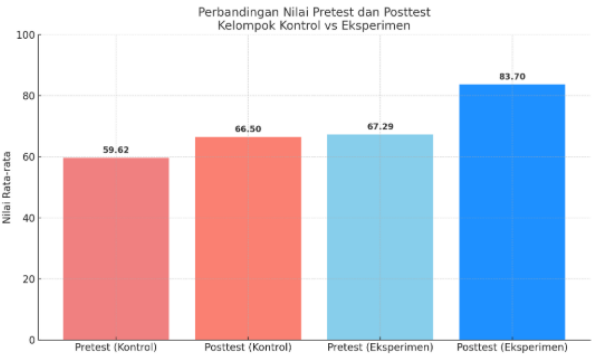
Before conducting a hypothesis test, the researcher conducts a prerequisite test for data analysis which includes a normality test to ensure that the data is distributed normally. Using the SPSS-assisted Kolmogorov-Smirnov technique version 24, a significance value (Sig.) for *the experimental and control class pretest* data was obtained of 0.200 each, which is greater than 0.05. A similar condition was found in *the posttest* data where both groups recorded a significance value of 0.200, so that the assumption of normality was fully met. The normality of this data proves that the sample taken is representative of the student population of MI Nahdlatul Ulama Candi and is not influenced by extreme data fluctuations. With a normal distribution of data, researchers can use parametric statistics in the form of t-tests to accurately test research hypotheses. This provides scientific assurance that the results obtained truly reflect the true condition of the student's abilities without any distribution bias.

Table 3. Variance Homogeneity Test Results

Test of Homogeneity of Variance					
		Levene Statistic	df1	df2	Sig.
Pretest	Based on Mean	.493	1	46	.486
	Based on Median	.487	1	46	.489
	Based on Median and with adjusted df	.487	1	45.586	.489
	Based on trimmed mean	.493	1	46	.486
Posttest	Based on Mean	.212	1	46	.648
	Based on Median	.210	1	46	.649
	Based on Median and with adjusted df	.210	1	45.933	.649
	Based on trimmed mean	.212	1	46	.648

Source: Research data processing results

The next prerequisite test is the variance homogeneity test using Levene's Test to ensure the equivalence of variance between the research groups. The test results showed a significance value based on *the mean* of 0.486 for *the pretest* data and increased to 0.648 for *the posttest* data. Since all significance values are greater than 0.05, it can be concluded that the experimental and control groups had homogeneous or equivalent variance. This homogeneity is crucial so that the comparison of the final results between the use of Smartick and conventional methods is fair and statistically valid. The researcher ensured that the characteristics of students in both classes had equal diversity so that the difference in final results was purely due to the treatment given. With the fulfillment of the conditions of normality and homogeneity, the next step is to test the main hypothesis



Graph 1. Comparison of Pretest and Posttest Grade Average Scores of control and experimental classes

The main findings of this study showed a significant spike in the average score of *the experimental* class posttest which reached 83.70 after using the Smartick application. This figure shows a much higher increase than the control class which only achieved an average of 66.50 through conventional learning. The difference in achievement of 17.20 points visually proves that adaptive digital media has a greater positive impact on the mastery of numbered material. Students in the experimental class seem more skilled in solving mathematical story problems that require a high level of reasoning and literacy skills. This is in line with the goal of mathematical literacy to train students to formulate, use, and interpret problems in a variety of contexts. The advantage of Smartick lies in its ability to personalize questions that suit the individual learning speed of students. This success is also supported by an attractive interface that reduces student boredom levels while studying.

2. Hypothesis Test Analysis

Table 4. Independent *Samples t-Test Test Results*

		Independent Samples Test								
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
pretest	Equal variances assumed	.493	.486	8.43	46	.000	7.666	.90947	5.83599	9.4973
	Equal variances not assumed			8.43	45.3	.000	7.666	.90947	5.83532	9.4980
posttest	Equal variances assumed	.212	.648	19.5	46	.000	17.20	.88153	15.4339	18.982
	Equal variances not assumed			19.5	45.7	.000	17.20	.88153	15.4336	18.983

Source : Research data processing results

Hypothesis testing was carried out with *the Independent Sample t-Test* which produced a significance value (2-tailed) of 0.000. Because the significance value is less than 0.05, the null hypothesis (H0) is rejected and the working hypothesis (H1) is accepted conclusively. These results confirm that there is a significant influence of the use of the Smartick application on students' mathematical literacy skills. The t-calculated values obtained far exceed the t-table, reinforcing the empirical evidence that Smartick is a highly effective independent variable. This

apparent difference in results proves that the artificial intelligence technology in Smartick is able to overcome the limitations of conventional lecture methods. This H_0 rejection answers the formulation of research problems as well as validates the use of digital technology at the madrasah ibtidaiyah level. Statistically, these findings have a very high level of confidence to generalize in similar primary education contexts.

3. Analisis N-Gain

Table 5. N-Gain Analysis Results

Classes	Average Pretest	Average Posttest	Maximum Score	N-Gain	Category N-Gain
Eksperimen	67,29	83,70	100	0,51	Medium
Control	59,62	66,50	100	0,17	Low

Source: Research data processing results

Based on the results of the analysis of the N-Gain index, a value of 0.50 was obtained for the experimental class and 0.17 for the control class. Referring to the categorization criteria put forward by Hake (1999), the N-Gain value of 0.51 is included in the medium category ($0.30 \leq g < 0.70$), while the value of 0.17 is in the low category ($g < 0.30$). The difference in the N-Gain index between the two groups of 0.34 points showed that the experimental class experienced a much more significant improvement than the control class. This proves that the use of the Smartick Indonesia application is able to optimize students' mathematical literacy achievements in the operation material of counting numbers in a more meaningful way than conventional learning. Although the improvement in the experimental class was in the medium category, this achievement still had an important pedagogical value, given that the effectiveness of learning was not solely determined by the high category, but by the consistency and meaningfulness of the improvement achieved by all students.

Discussion

Theoretically, the success of the use of Smartick is closely related to Lev Vygotsky's *theory of Zone of Proximal Development* (ZPD). Smartick functions as a digital *scaffolding* that provides cognitive assistance right when students have difficulty solving computational problems. When students give incorrect answers, the app provides instant feedback that guides students to find the correct concepts independently. This process allows each student to learn within their range of potential abilities without feeling pressured by material that is too difficult. System adaptivity ensures that the challenges provided are always within the range of students' understanding while still spurring cognitive development. By learning within the ZPD zone consistently, students'

mathematical comprehension structure is formed more strongly than that of students who study classically. This is the basis why the mathematics literacy score in the experimental class has increased much more rapidly.

A more in-depth analysis was carried out on the achievement of PISA mathematical literacy indicators, especially in the aspect of "formulating". Students in the experimental class showed rapid progress in turning real problems into logical mathematical sentences. Before treatment, the majority of students were stuck on numbers without understanding the proper counting operations to solve the problem. Through adaptive exercises at Smartick, students are trained to systematically identify key variables in the story of the number operation. This ability to formulate is a crucial first step for students before they undertake technical calculation procedures. The results of the *posttest* proved that 85% of the students of the experimental class managed to answer the questions in the formulating category correctly and correctly. This achievement reflects the increase in students' reasoning power in processing complex mathematical information.

In the "using" indicator, the accuracy of the calculation procedure of students in the experimental class experienced a very significant improvement in accuracy. Smartick's 15-minute daily routine helps students master multiplication and stacking techniques through meaningful repetition. The *gamification system* in the application provides additional motivation for students to stay thorough in order to earn points or digital awards. The researcher observed that the basic calculation errors that are often found in the *pretest* have been greatly reduced during the posttest. Students become more fluent in operating large-value enumerations involving thousands to millions. The dexterity in using this mathematical procedure is an important foundation for students to learn mathematics material at a higher level. The documentation of the results of the students' work shows more systematic and directed completion steps.

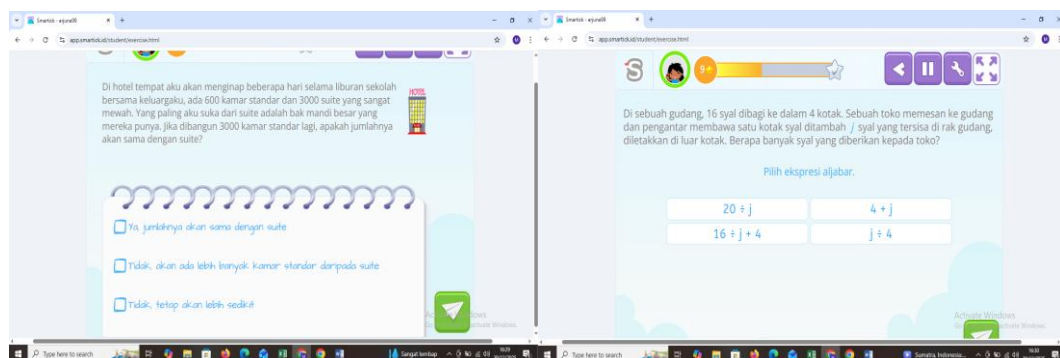


Figure 1. Screenshot documentation of questions in the Smartick App

The last indicator, "interpreting", shows that students in the experimental class are beginning to be able to explain the meaning of the results of the calculation back into the context of real-world solutions. Students are not only fixated on the final result of the number, but understand the implications of the answer to the initial problem posed. This interpretive ability reflects a deep and critical understanding of mathematical literacy as a whole.¹⁴ In the context of madrasah education, this ability is very important to build students' independence in solving daily problems. These findings prove that Smartick not only trains technical skills (arithmetic), but also logical and evaluative thinking skills. Students become more aware of the usefulness of mathematics as a tool to make informed decisions. The improvement in these three indicators confirms the overall effectiveness of the digital media interventions carried out by researchers. The qualitative findings from the analysis of students' daily journals provide perspective on changes in affective aspects during the research process. The majority of students revealed that learning math using Smartick felt like playing so that it lowered the level of math anxiety.¹⁵ This feeling of enthusiasm is a key factor that encourages students to continue to try more difficult questions without fear of failure. Students who were initially passive in class became more courageous to ask questions and discuss problem-solving strategies they found in the application. Students' *self-efficacy* increases as they successfully complete daily practice sessions with a good score. This intrinsic motivation that is built becomes the driving force for the increase in cognitive values that are recorded quantitatively. This daily journal is a very strong supporting evidence that technology has a positive impact on the psychological side of learning madrasah students.

The implementation of Smartick at MI Nahdlatul Ulama Candi also changes the role of teachers to more efficient and directed facilitators. Teachers don't have to spend too much time manually correcting routine exercises because the app provides student progress reports automatically. The report data from Smartick allows teachers to immediately know which students are still struggling on a particular topic to be given specific guidance. The synergy between teachers and technology creates a more dynamic learning environment that is responsive to the individual needs of students. This is in line with the principle of differentiated learning emphasized in the Independent Curriculum at the basic education level. The success of the experimental class proves that madrasah teachers have the readiness to adopt digital technology for the advancement of

¹⁴ Hartika Aulia et al., "Measurement of Mathematical Literacy in Everyday Life Contexts: A Case Study of High School Students," *AlphaMath: Journal of Mathematics Education* 10, no. 1 (May 2024), <https://doi.org/10.30595/alphamath.v10i1.21083>.

¹⁵ Sri Mulyani, Novi Andri Nurcahyono, and Hamidah Suryani Lukman, "Analisis Kemampuan Literasi Numerasi Siswa SMP Ditinjau Dari Kecemasan Matematika," *Jurnal PEKA (Pendidikan Matematika)* 8, no. 2 (January 2025), <https://doi.org/10.37150/jp.v8i2.3137>.

learning outcomes. The use of devices such as tablets or laptops in the classroom provides a modern learning experience for madrasah students.



Figure 2. Student documentation before and during learning using the Smartick application

This research is in line with previous studies that stated that technology-based interactive media significantly improve students' numeracy learning outcomes. However, the novelty of this research lies in the use of adaptive technology (AI) which has not been widely applied in the environment of the ibtidaiyah madrasah in Sidoarjo. Static media is helpful, but it is not able to provide a personalized challenge according to the level of ability of students as Smartick does. These findings make an important contribution to the literature on the use of artificial intelligence in Islamic basic education. Empirical evidence of a significance value of 0.000 and a *high N-Gain* lends legitimacy to the use of Smartick as an innovative teaching medium. This study confirms that to compete globally, madrasahs must start to be open to digital transformation in mathematics learning. Replication of this research in other materials is highly recommended to see the consistency of the effectiveness of this adaptive technology.

Despite showing very positive results, the researchers noted some technical challenges such as reliance on internet connections and hardware availability. The success of Smartick is highly dependent on the support of technology infrastructure in schools and the guidance of teachers in directing students. Students who have more stable internet access at home tend to show more consistent progress than students who rely solely on school facilities. This shows the importance of collaboration between madrasahs and parents in supporting children's digital literacy in the current era. These technical obstacles need to be managed properly so that the benefits of adaptive technology can be felt by all students equally. The researcher suggests that madrasahs start investing in digital infrastructure to support future learning models. This reflection is an important note for education practitioners who want to implement a similar system in their schools.

CONCLUSION

Based on the effectiveness analysis using the N-Gain Hake index, the use of the Smartick Indonesia application has proven to be very effective in improving the mathematical literacy skills of grade V students of MINU Durungbedug Sidoarjo Temple. The experimental class obtained an N-Gain value of 0.51 which was in the medium category, while the control class only achieved a value of 0.17 which was in the low category. This difference in index of 0.34 consistently strengthens the findings of the t-test which shows significant differences between the two groups, so it can be concluded that the Smartick Indonesia application is worthy of being recommended as an effective mathematics learning medium at the Madrasah Ibtidaiyah level.

The success of this research is a step forward for MI Nahdlatul Ulama Durungbedug Candi in creating a generation that excels in numeracy and technology. Mathematical literacy built through this media will be a valuable capital for students to face the next level of education as well as the increasingly complex challenges of the future. Therefore, this finding is recommended to be a reference for policymakers in madrasahs to integrate adaptive applications in the daily curriculum. Teachers are expected to be able to utilize *real-time data* from the application as a basis for personal student assistance, while the madrasah needs to support the sustainability of digital infrastructure to optimize the potential of student learning in an inclusive manner.

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