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THE EFFECT OF *THE AMONG SYSTEM-BASED HOLISTIC MATHEMATICS EDUCATION MODEL* ON THE MOTIVATION AND MATHEMATICAL PROBLEM SOLVING OF GRADE III STUDENTS OF SDN 10 KOTO TINGGI SURIAN

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Abstract

This research was motivated by the low motivation and mathematical problem solving abilities of elementary school students caused by learning that was still teacher-centered and did not involve meaningful learning experiences. This research aims to determine the effect of the Holistic Mathematics Education Model based on the Among System on the motivation and mathematical problem solving abilities of class III students at SDN 10 Koto Tinggi Surian. The Holistic Mathematics Education model emphasizes comprehensive mathematics learning that integrates cognitive, affective and psychomotor aspects, while the Among System developed by Ki Hajar Dewantara emphasizes the principles of honing, compassion and nurturing in the educational process. This research uses a quantitative approach with a quasi experimental design method with a nonequivalent control group design. The research population was all class III students at SDN 10 Koto Tinggi Surian, with a sampling technique using saturated sampling. The research instruments were a learning motivation questionnaire and a mathematical problem solving ability test. Data were analyzed using the normality test, homogeneity test, and hypothesis testing using the MANOVA test. The results of the research show that there is a significant influence of the use of the Holistic Mathematics Education Model based on the Among System on students' learning motivation and students' mathematical problem solving abilities. This is proven by the results of the hypothesis test which shows the significance value of 0.000 is smaller than 0.05 so that H_0 is rejected and H_1 is accepted. Thus, this learning model is effective in increasing the motivation and mathematical problem solving abilities of third grade elementary school students.

Keywords: Holistic Mathematics Education, Among System, Learning Motivation, Mathematical Problem Solving

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INTRODUCTION

Education in the 21st century requires students not only to master knowledge conceptually, but also to have the ability to think critically, creatively, communicatively, and collaboratively. One of the important skills that must be developed since elementary school is mathematical problem-solving skills.[1] Mathematics is not only studied as a collection of formulas and procedures, but also as a means to train logical, systematic, and reflective ways of thinking in dealing with various problems of daily life.[2] Therefore, mathematics learning in elementary schools should be designed in a meaningful and contextual manner to be able to foster learning motivation while improving students' problem-solving skills.

However, in reality, mathematics learning in elementary schools still tends to be *teacher-centered*.[3] The learning process often emphasizes providing information and practice questions on a regular basis without giving students enough opportunities to explore, discover, and build their own understanding.[4] As a result, students are less motivated in learning and experience difficulties when faced with problems that require high-level thinking skills, especially in solving non-routine problems. Low motivation to learn has a direct impact on low student involvement in the learning process and less optimal mathematics learning outcomes.[5]

Learning motivation is an internal factor that greatly determines the success of student learning.[6] Students who are highly motivated will show interest, attention, and perseverance in following learning.[7] On the other hand, students who are less motivated tend to be passive, give up easily, and lack confidence in completing tasks. Therefore, a learning model is needed that is not only oriented towards achieving cognitive results, but also pays attention to affective aspects and overall personality development.

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[1] Dhestriana Kharen Sagita, Diana Ermawati, and Lovika Ardana Riswari, "Kemampuan Pemecahan Masalah Matematis Siswa Sekolah Dasar," *Jurnal Educatio FKIP UNMA* 9, no. 2 (April 2023), https://doi.org/10.31949/educatio.v9i2.4609.

[2] Santy Widiani, *Praktik Baik Pembelajaran Matematika Sekolah Dasar Berbasis Kontekstual dan Reflektif untuk Penguatan Literasi Numerasi dan Karakter Siswa*, 01, no. 03 (2026).

[3] Abigael Simbolon et al., "Pengaruh Metode Pembelajaran Yang Berpusat Pada Guru Dalam Proses Pembelajaran Siswa," *Jurnal Intelek Insan Cendikia* 2, no. 11 (November 2025), https://jicnusantara.com/index.php/jiic/article/view/5584?utm_source=chatgpt.com.

[4] Ahmad Rifai Siregar et al., "Eksplorasi Proses Berpikir Siswa Dalam Menyelesaikan Masalah Matematika Kontekstual: Studi Kasus Kelas X SMA Islam Al-Ulum Terpadu Medan," *Jurnal Ilmiah Widya Pustaka Pendidikan* 12, no. 1 (June 2024), https://jiwpp.unram.ac.id/index.php/widya/article/view/149.

[5] Ary Firmansyah and Muaini, "Analisis Faktor-Faktor Yang Mempengaruhi Rendahnya Minat Belajar Siswa Pada Mata Pelajaran Matematika Di Kelas VI SD Negeri Aik Berik Kabupaten Lombok Tengah Tahun Ajaran 2024/2025," *Jurnal Pendidikan, Sains, Geologi, Dan Geofisika (GeoScienceEd Journal)* 6, no. 2 (May 2025), https://jpfis.unram.ac.id/index.php/GeoScienceEdu/article/view/729.

[6] Catur Fathonah Djarwo, "Analisis Faktor Internal Dan Eksternal Terhadap Motivasi Belajar Kimia Siswa SMA Kota Jayapura," *Jurnal Ilmiah IKIP Mataram* 7, no. 1 (2020).

[7] Azza Salsabila and Puspitasari Puspitasari, "Faktor-Faktor Yang Mempengaruhi Prestasi Belajar Siswa Sekolah Dasar," *PANDAWA: Jurnal Pendidikan Dan Dakwah* 2, no. 2 (2020), https://doi.org/10.36088/pandawa.v2i2.800.

Table 1. Motivation to Learn Mathematics

Indicator	Value	Maximum Score	Presentase
Interest in lessons	274	640	43%
Perseverance in completing tasks	291	640	45%
Learning independence	285	640	45%
Confidence in following learning	300	640	47%
Positive response to learning activities	283	640	44%

Many students show less enthusiasm for learning, give up easily, and feel anxious when facing math lessons. This cannot be separated from the view that mathematics is a difficult and boring subject. Lack of confidence and previous negative experiences in learning mathematics also aggravate this condition. If not addressed immediately, low motivation can have an impact on low student participation in learning and suboptimal learning outcomes.

One of the impacts of low motivation to learn is the lack of mastery of mathematical problem-solving skills.[8] In fact, this ability is one of the essential competencies that is highly emphasized in the curriculum. Mathematical problem-solving not only requires students to apply formulas, but also to understand situations, plan strategies, and evaluate the solutions obtained. In grade III of elementary school, many students still have difficulty analyzing story problems, choosing the right strategies, and explaining the reasons behind their solutions. This shows that learning has not fully led students to think critically and creatively in solving mathematical problems.

One approach that can be used is the *Holistic Mathematics Education* (HME) Model. This model views mathematics learning as a whole process by integrating cognitive, affective, and psychomotor aspects.[9] Learning focuses not only on understanding concepts and procedures, but also on forming positive attitudes towards mathematics, developing creativity, and actively engaging students in the learning process. With a holistic approach, students are encouraged to

[8] Agnes M. Siregar, Roslian Lubis, and Nunik Ardiana, "Analisis Faktor-Faktor Rendahnya Kemampuan Pemecahan Masalah Matematis Siswa Ditinjau Dari Motivasi Belajar Siswa Di Kelas VII SMP Negeri 5 Padangsidimpuan," *Jurnal MathEdu (Mathematic Education Journal)* 6, no. 2 (2023), https://doi.org/10.37081/mathedu.v6i2.5004.

[9] Rahmatul Hayati et al., "Perancangan model Holistic Mathematics Education (HME) berbasis pendekatan Realistic Mathematics Education (RME) pada siswa sekolah dasar (SD) kelas tinggi," *Borobudur Educational Review* 5, no. 1 (April 2025), https://doi.org/10.31603/bedr.12989.

understand the relationships between concepts and connect mathematics with real experiences in daily life.[10]

The Holistic Mathematics Education *model* will be more effective when combined with national education values that are relevant to the characteristics of elementary school students.[11] One of the appropriate educational concepts is the Among System introduced by Ki Hajar Dewantara. The Among System emphasizes the principles *of honing* (developing intelligence), *asih* (providing affection), and *nurturing* (guiding with full responsibility). In practice, teachers play the role of mentors who give students the freedom to develop according to their potential, but still in positive direction and supervision.[12] This principle is in line with holistic learning that values the uniqueness and individual development of students.

The implementation of the *Among System-based Holistic Mathematics Education* Model is expected to be able to create a fun, humanistic, and meaningful learning atmosphere.[13] Students are not only trained to understand mathematical concepts, but also guided to be confident, dare to try, and be able to work together in solving problems. Thus, students' motivation to learn can increase and mathematical problem-solving skills can develop optimally.

Based on this description, it is important to conduct research to find out the extent of the influence of the *Among System-based Holistic Mathematics Education* Model on the motivation and mathematical problem-solving ability of third grade students of SDN 10 Koto Tinggi Surian. This research is expected to make a theoretical contribution to the development of mathematics learning models in elementary schools as well as practical contributions for teachers in designing more effective, humanistic, and development-oriented learning as a whole.

RESEARCH METHODS

This study uses a quantitative approach with a *quasi-experimental research* method. The research design used is *Nonequivalent Control Group Design*. In this design, there are two groups, namely the experimental group that is given treatment in the form of the application of *the*

[10] Sri Jumiaty Permatasari, Itsnain Alfajri Husain, and Chairan Zibar L. Parisu, "Integrasi Model Pembelajaran Holistik Untuk Optimalisasi Perkembangan Kognitif Anak Usia Dini," *Journal Of Humanities* 1, no. 1 (2025).

[11] Ratu Asmaarobiyah, Ila Rosmilawati, and Dase Erwin Juansah, "Pendekatan Pendidikan Matematika melalui Realistic Mathematics Education (RME) di Sekolah Dasar: Systematic Literature Review," *Journal of Instructional and Development Researches* 5, no. 3 (June 2025), https://doi.org/10.53621/jider.v5i3.527.

[12] Dita Dwi Angga Mahesthi and Adriani Rahma Pudyaningtyas, "Implementasi Pendekatan Sistem Among Ki Hajar Dewantara Dalam Mengembangkan Kemandirian Anak," *Jurnal Kumara Cendekia* 13, no. 4 (2025).

[13] Yayuk Hariyasasti et al., "The Influence of Humanistic Learning Theory and Holistic Education Theory on the Quality of Student Learning Outcomes at Jembulwunut Elementary School in the Digital Era," *INTERNATIONAL JOURNAL OF SOCIAL AND MANAGEMENT STUDIES (IJOSMAS)* 6, no. 3 (2025).

Holistic Mathematics Education Model based on the Among System and the control group that is given conventional learning. Both groups are given a pretest and a posttest to find out the difference in motivation and mathematical problem-solving ability before and after treatment.

Table 2. *Nonequivalent Control Group Design*

O_1	**X**	**O_2**
O_3		**O_4**

This research was carried out at SDN 10 Koto Tinggi Surian in the even semester of the current school year. The selection of the research location was based on the consideration that the school has not implemented the *Holistic Mathematics Education* Model based on the Among System in mathematics learning. The population in this study is all grade III students of SDN 10 Koto Tinggi Surian. The sampling technique used is *saturated sampling*, where all members of the population are used as research samples. The sample is divided into two groups, namely class III A as an experimental class and class III B as a control class (adjusted to school conditions).

Research Instruments

The instruments used in this study are:

1. Learning Motivation Questionnaire, which is compiled based on motivational indicators such as interest, perseverance, attention, and confidence. The questionnaire uses a Likert scale with four alternative answers.
2. Mathematical Problem-Solving Ability Test, in the form of description questions prepared based on problem-solving indicators, namely: understanding problems, planning solutions, implementing plans, and re-examining the results of the solution.

The research instrument was first tested for validity using content validity and empirical validity tests, and its reliability was tested to ensure the consistency of the measuring tool.

Data Analysis Techniques

1. Analytical Prerequisites Test

   Before the MANOVA test, the following prerequisite tests were carried out:

   a. Normality test (Kolmogorov-Smirnov or Shapiro-Wilk)

      The normality test is used to find out whether the data population is normally distributed or not. If the data is normally distributed, then a parametric statistical test can be used.[14] Meanwhile, if the data is not normally distributed, then non-parametric statistics are used. The interpretation used in the normality test is sig. > 0.05 which is interpreted as

[14] Aklilah Zulkifli et al., "Tutorial on normality test and homogeneity test using SPSS application," *JURNAL CAHAYA NUSANTARA* 1, no. 2 (2025).

normally distributed data. The normality test of the learning motivation of the sample class can be carried out using *the Shapiro-Wilk* test with the help of *SPSS Software* to see whether the data is normally distributed or not.

b. Linearity Test

The linearity test is carried out to evaluate whether the relationship between the free variable and the bound variable shows linear characteristics or not.[15] This analysis involves testing the linearity on a simple regression equation, with the aim of assessing the extent to which the relationships between variables are linear. The results of this linearity test provide information on whether the regression model used is in accordance with the assumption of linearity or shows a more complex form of relationship.[16] In this case, if the calculated F_{value} is smaller than the F_{table} value at a significance level of 5%, it can be concluded that the relationship between the free and bound variables is linear.

2. Hypothesis Test

Hypothesis testing was carried out using *Multivariate Analysis of Variance (MANOVA)* to find out if there is a simultaneous difference between:

a. Motivation to learn and
b. Mathematical problem-solving skills

RESULTS AND DISCUSSION

Analysis Prerequisites Test

Before the hypothesis test using MANOVA (*Multivariate Analysis of Variance*), a prerequisite analysis test was first carried out.

1. Normality Test

Based on the Shapiro-Wilk test, the data on learning motivation and mathematical problem-solving ability in the experimental class and the control class had a significance value of > 0.05. Thus, the data were normally distributed.

The normality test table displays the results of normality tests using two methods, namely Kolmogorov-Smirnov and Shapiro-Wilk, on eight data groups consisting of pretest and posttest in classes 3A and 3B, both for Motivation and Mathematical Problem Solving. Each data group is accompanied by a statistical value, degree of freedom (df), and significance value

[15] Isna Nugraha, Iffad Rakhmanhuda, and Friska Aryanti Aryanti, "Analysis of the Influence of Poverty on Monthly Expenditure Using Simple Linear Correlation and Regression," *National Accounting Seminar* 4, no. 1 (November 2024), https://senapan.upnjatim.ac.id/index.php/senapan/article/view/973.

[16] Anjeliyani Anjeliyani, Fatia Fatimah, and Memet Casmat, "Pemodelan Regresi Linear Untuk Memprediksi Nilai Penjualan Di PT Goodiebag Custom Indonesia Tanpa Mempertimbangkan Uji Asumsi," *Indonesian of Interdisciplinary Journal* 5, no. 1 (September 2024), http://jurnal.desantapublisher.com/.

(Sig.). This test aims to find out whether the data is normally distributed or not as a prerequisite for parametric statistical analysis

Table 3. Data Normality Test

Tests of Normality

	Classes	Kolmogorov-Smirnova			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Value	1 Motivation Pretest 3A	.182	22	.057	.954	22	.380
	2 Posttest Motivation 3A	.163	22	.132	.958	22	.457
	3 Mathematical Problem Solving Pretest 3A	.095	22	.200*	.960	22	.488
	4 Mathematical Problem Solving Posttest 3A	.084	22	.200*	.957	22	.422
	5 Motivation Pretest 3B	.161	19	.200*	.935	19	.212
	6 Posttest Motivation 3B	.167	19	.170	.967	19	.717
	7 Mathematical Problem Solving Pretest 3B	.115	19	.200*	.958	19	.538
	8 Mathematical Problem Solving Posttest 3B	.118	19	.200*	.952	19	.423

*. This is a lower bound of the true significance.
a. Lilliefors Significance Correction

In class 3A for the Motivation variable, the pretest results showed a significance value of Kolmogorov-Smirnov of 0.057 and Shapiro-Wilk of 0.380 with df = 22. Meanwhile, the posttest of Motivation 3A had a significance value of 0.132 (Kolmogorov-Smirnov) and 0.457 (Shapiro-Wilk). Since the overall significance value was greater than 0.05, it can be concluded that the pretest and posttest Motivation data in class 3A were distributed normally. For the Mathematical Problem Solving variable in class 3A, the pretest had a significance value of 0.200 in Kolmogorov-Smirnov and 0.488 in Shapiro-Wilk. The 3A Mathematical Problem Solving Posttest also showed a significance value of 0.200 in Kolmogorov-Smirnov and 0.422

in Shapiro-Wilk. All of these values were above 0.05, so it can be stated that the pretest and posttest data of Mathematical Problem Solving in class 3A were also normally distributed.

In class 3B for the Motivation variable, the pretest results showed significance values of 0.200 (Kolmogorov-Smirnov) and 0.212 (Shapiro-Wilk) with df = 19. The Motivation posttest 3B had significance values of 0.170 (Kolmogorov-Smirnov) and 0.717 (Shapiro-Wilk). Thus, all Motivation data in class 3B met the assumption of normality because the significance value was greater than 0.05.

Furthermore, for the Mathematical Problem Solving variable in class 3B, the pretest had significance values of 0.200 (Kolmogorov-Smirnov) and 0.538 (Shapiro-Wilk). The posttest of Mathematical Problem Solving 3B showed significance values of 0.200 (Kolmogorov-Smirnov) and 0.423 (Shapiro-Wilk). All of these significance values were also greater than 0.05, so the data was declared to be normally distributed.

Overall, based on both the Kolmogorov-Smirnov and Shapiro-Wilk tests, all data groups in classes 3A and 3B showed significance values above 0.05. This means that there is no violation of the assumption of normality. Thus, the research data can be categorized as normally distributed and worthy of further analysis using parametric statistical tests.

2. Linearity Test

The following is a description of the processed results of the class 3A data linearity test based on the ANOVA table shown in table 4:

Table 4. Class 3A Data Linearity Test

ANOVA Table

			Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
Mathematical Problem Solving 3A * Motivation 3A	Between Groups	(Combined)	490.530	12	40.878	.579	.814
		Linearity	4.465	1	4.465	.063	.807
		Deviation from Linearity	486.065	11	44.188	.625	.772
	Within Groups		635.833	9	70.648		
	Total		1126.364	21			

Based on the results of the class 3A linearity test, the significance value at Deviation from Linearity of 0.772 which is greater than 0.05 indicates that there is no deviation from linearity. Thus, it can be concluded that the relationship between the variables of Mathematical

Problem Solving 3A and Motivation 3A is linear, thus meeting one of the prerequisites for further regression or correlation analysis.

Table 5. Class 3B Linearity Test

ANOVA Table							
			Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
3B Mathematical Problem Solving * 3B Motivation	Between Groups	(Combined)	990.332	9	110.037	.990	.506
		Linearity	164.448	1	164.448	1.480	.255
		Deviation from Linearity	825.883	8	103.235	.929	.536
	Within Groups		1000.300	9	111.144		
	Total		1990.632	18			

Based on the results of the class 3B linearity test, the significance value at Deviation from Linearity of 0.536 which is greater than 0.05 indicates that there is no deviation from the form of linear relationships. Thus, it can be concluded that the relationship between the variables of Mathematical Problem Solving 3B and Motivation 3B is linear and meets one of the prerequisites for further regression or correlation analysis.

3. Hypothesis Test

Table 6. Test Hypothesis 1 with MANOVA

	Value	**F**	**Hypothesis df**	**Error df**	**Sig.**	**Partial Eta Squared**
Pillai's trace	.321	9.706[a]	2.000	41.000	.000	.321
Wilks' lambda	.679	9.706[a]	2.000	41.000	.000	.321
Hotelling's trace	.473	9.706[a]	2.000	41.000	.000	.321
Roy's largest root	.473	9.706[a]	2.000	41.000	.000	.321

Each F tests the multivariate effect of Nilai. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

a. Exact statistic

The results of the MANOVA test show that the application of the Holistic Mathematics Education Model with the Among system has a significant effect on the motivation to learn mathematics of grade III students of SDN 10 Koto Tinggi Surian. Thus, it can be concluded that the learning model is effective in increasing the motivation to learn mathematics compared to learning in the control class.

Table 7. Hypothesis Test 2 Using the MANOVA Test

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.985	1319.664[b]	2.000	41.000	.000	.985
	Wilks' Lambda	.015	1319.664[b]	2.000	41.000	.000	.985
	Hotelling's Trace	64.374	1319.664[b]	2.000	41.000	.000	.985
	Roy's Largest Root	64.374	1319.664[b]	2.000	41.000	.000	.985
Nilai	Pillai's Trace	.141	3.362[b]	2.000	41.000	.044	.141
	Wilks' Lambda	.859	3.362[b]	2.000	41.000	.044	.141
	Hotelling's Trace	.164	3.362[b]	2.000	41.000	.044	.141
	Roy's Largest Root	.164	3.362[b]	2.000	41.000	.044	.141

a. Design: Intercept + Nilai

b. Exact statistic

The results of the MANOVA test show that the application of the Holistic Mathematics Education Model with the Among system has a significant effect on the mathematical problem-solving ability of grade III students of SDN 10 Koto Tinggi Surian. Thus, it can be concluded that the learning model is effective in improving mathematical problem-solving skills compared to learning applied to the control class.

Table 8. Hypothesis Test 3 Using the MANOVA Test

Multivariate Tests[a]

	Effect	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.997	3533.229[b]	4.000	39.000	.000	.997
	Wilks' Lambda	.003	3533.229[b]	4.000	39.000	.000	.997
	Hotelling's Trace	362.382	3533.229[b]	4.000	39.000	.000	.997
	Roy's Largest Root	362.382	3533.229[b]	4.000	39.000	.000	.997
Nilai	Pillai's Trace	.422	7.128[b]	4.000	39.000	.000	.422
	Wilks' Lambda	.578	7.128[b]	4.000	39.000	.000	.422
	Hotelling's Trace	.731	7.128[b]	4.000	39.000	.000	.422
	Roy's Largest Root	.731	7.128[b]	4.000	39.000	.000	.422

a. Design: Intercept + Nilai

b. Exact statistic

The results of the MANOVA test showed that the Holistic Mathematics Education Model with the Among system had a significant effect on increasing learning motivation and mathematical problem-solving ability of third grade students of SDN 10 Koto Tinggi Surian. Thus, it can be concluded that the application of the model is effective in improving both aspects simultaneously compared to learning in the control class.

Discussion

The Effect of the Application of *the Holistic Mathematics Education* Model with the *Among* System on the Motivation to Learn Mathematics of Grade III Students of SDN 10 Koto Tinggi Surian

Based on the results of Hypothesis Test 1 through MANOVA analysis, a significance value of 0.000 (Sig. < 0.05) was obtained on all multivariate criteria, such as Pillai's Trace, Wilks' Lambda, Hotelling's Trace, and Roy's Largest Root. These results show that the Holistic Mathematics Education (HME) Model with the Among system has a significant effect on increasing students' learning motivation and mathematical problem-solving ability simultaneously. A Partial Eta Squared value of 0.422 indicates that 42.2% of the variation in the increase in the two dependent variables is influenced by the treatment given to the experimental class. Statistically, these findings show a strong influence of the applied learning model.

Theoretically, these results are in line with the concept of holistic education that emphasizes the integration of cognitive, affective, and psychomotor aspects in the learning process. Holistic education views students as whole individuals, so learning focuses not only on mastery of the material, but also on the development of motivation, attitudes, and higher-level thinking skills. In addition, the Among system, which is rooted in the thinking of Ki Hadjar Dewantara, emphasizes the principle of "Ing ngarso sung tulodo, ing madyo mangun karso, tut wuri handayani," which provides space for students to develop independently with the guidance of the teacher.[17] This approach is in line with the theory of constructivism put forward by Subakti, which emphasizes the importance of social interaction and scaffolding in children's cognitive development.[18] Thus, an increase in mathematical problem-solving skills can occur because students actively build their understanding through proper guidance.

[17] I. Made Sugiarta et al., "Filsafat Pendidikan Ki Hajar Dewantara (Tokoh Timur)," *Jurnal Filsafat Indonesia* 2, no. 3 (2019), https://doi.org/10.23887/jfi.v2i3.22187.

[18] Y. R. Subakti, "Paradigma Pembelajaran Sejarah Berbasis Konstruktivisme," *SPPS (Historia Vitae)* 24, no. 1 (2010).

The results of this study are also in line with the findings of Stein, Grover, and Henningsen who stated that mathematics learning that emphasizes meaningful tasks and high-level thinking can improve students' problem-solving skills.[19] In the context of the HME Model, learning is designed to engage students in exploration, reflection, and discussion, so that they not only memorize procedures, but understand concepts in depth.

Overall, this discussion shows that the Holistic Mathematics Education Model with the Among system is not only statistically effective, but also has a strong theoretical and empirical foundation. The integration of holistic, constructivistic, and Among values approaches creates a learning environment that supports the simultaneous development of students' motivation and mathematical thinking skills. Therefore, this model deserves to be considered as an innovative alternative in mathematics learning in elementary school.

The Effect of the Application of the Holistic Mathematics Education Model with the Among System on the Mathematical Problem-Solving Ability of Grade III Students of SDN 10 Koto Tinggi Surian

Based on the results of Hypothesis Test 2, a significance value of 0.044 (Sig. < 0.05) was obtained in the MANOVA test, which showed that there was a significant influence of the application of the Holistic Mathematics Education (HME) Model with the Among system on students' mathematical problem-solving skills. An F value of 3.362 with a Partial Eta Squared of 0.141 indicated that 14.1% of the variation in mathematical problem-solving ability was influenced by the treatment given in the experimental class. Statistically, these results showed that the learning model made a meaningful contribution to improving students' abilities compared to learning in the control class.

Mathematical problem-solving skills are one of the main competencies in mathematics learning.[20] Problem solving is the heart of mathematics learning, because through problem-solving students learn to understand concepts, develop strategies, and build logical reasoning. Thus, the improvement of problem-solving skills in this study shows that the HME Model is able to facilitate students' high-level thinking processes.

Theoretically, this result can be explained through the constructivist approach put forward by Piaget and further developed by Vygotsky. In the theory of constructivism, students build their own knowledge through social experiences and interactions. The Holistic Mathematics Education

[19] M. K. Stein, B. W. Grover, and M. Henningsen, "Building Student Capacity for Mathematical Thinking and Reasoning: An Analysis of Mathematical Tasks Used in Reform Classrooms," *American Educational Research Journal* 33, no. 2 (1996), https://doi.org/10.3102/00028312033002455.

[20] The National Council of Teachers of Mathematics, "Shaping the Standards: 'Higher Standards for Our Students, Higher Standards for Ourselves,'" *Mathematics Teaching in the Middle School* 5, no. 8 (2000).

model with the Among system provides space for students to explore, discuss, and find solutions independently with the guidance of the teacher. This process encourages the formation of deeper conceptual understanding so that it has an impact on improving problem-solving skills.[21]

Overall, the discussion of the results of Hypothesis Test 2 shows that the Holistic Mathematics Education Model with the Among system is effective in improving students' mathematical problem-solving skills. This influence is supported by the theoretical foundation of constructivism, Polya problem-solving theory, and various previous research results. Thus, this learning model can be a relevant and innovative alternative to develop the mathematical thinking skills of elementary school students more optimally.

The Effect of the Holistic Mathematics Education Model with the Among System on Increasing Learning Motivation and Mathematical Problem-Solving Ability of Grade III Students of SDN 10 Koto Tinggi Surian

Based on the results of Hypothesis Test 3, a significance value of 0.000 (Sig. < 0.05) was obtained in the MANOVA analysis, which showed that there was a significant influence of the *Holistic Mathematics Education* (HME) Model with the Among system on increasing students' learning motivation and mathematical problem-solving ability simultaneously. An F value of 7.128 with a Partial Eta Squared of 0.422 showed that 42.2% of the variation in the increase in the two variables was influenced by the treatment given to the experimental class. These results indicate that the applied learning model has a great influence in the context of educational research.

Conceptually, these results confirm that the affective aspect (motivation) and the cognitive aspect (problem-solving ability) are two interrelated components in mathematics learning. Learning motivation plays an important role in determining students' effort intensity, perseverance, and learning strategies. When motivation increases, students tend to be more active and persistent in facing challenging tasks, including solving complex mathematical problems.

CONCLUSION

Based on the results of testing Hypothesis 1, it can be concluded that the Holistic Mathematics Education (HME) Model with the Among system has a significant effect on the mathematics learning motivation of grade III students of SDN 10 Koto Tinggi Surian. The results of the analysis show a significance value smaller than 0.05, so the null hypothesis is rejected. This means that there is a significant difference in learning motivation between the experimental class

[21] Deniz Gökçe Erbil, "A Review of Flipped Classroom and Cooperative Learning Method within the Context of Vygotsky Theory," *Frontiers in Psychology* 11 (2020); Jean Piaget, "Part I: Cognitive Development in Children: Piaget Development and Learning," *Journal of Research in Science Teaching*, ahead of print, 1964, https://doi.org/10.1002/tea.3660020306.

(3A) and the control class (3B). Thus, the application of the HME model with the Among system has proven to be effective in increasing students' motivation to learn mathematics. Based on the results of testing Hypothesis 2, it can be concluded that the Holistic Mathematics Education Model with the Among system also has a significant effect on students' mathematical problem-solving ability. A significance value of less than 0.05 indicates that there is a significant difference in problem-solving ability between students who learn using the HME model and students who learn with conventional learning. This shows that the applied learning model is able to improve thinking skills and solve mathematical problems better. Furthermore, based on the results of testing Hypothesis 3, it can be concluded that the Holistic Mathematics Education Model with the Among system has a significant effect simultaneously on increasing students' learning motivation and mathematical problem-solving ability. The results of the multivariate analysis show a strong and significant influence on the two variables together. Thus, the HME model with the Among system has proven to be effective not only in improving affective and cognitive aspects separately, but also in developing both in an integrated manner.

ADVICE

Based on the results of the study, it is shown that the Holistic Mathematics Education (HME) Model with the Among system has a significant effect on students' learning motivation and mathematical problem-solving ability, so some suggestions can be proposed as follows. (1) For teachers, it is recommended to apply a holistic and student-centered learning model in the mathematics learning process. Teachers should not only emphasize the achievement of final results, but also pay attention to students' thinking processes, provide humanistic guidance, and create a fun and supportive learning atmosphere. Teachers also need to continue to improve their professional competence through training or scientific discussions in order to be able to design innovative learning in accordance with the characteristics of elementary school students. (2) For students, it is expected to be more active and courageous in participating in the learning process, especially in expressing opinions, asking questions, and trying various strategies in solving mathematical problems. Students are also advised to build intrinsic motivation by realizing the importance of mathematics in daily life. With an active and confident attitude, problem-solving skills will develop optimally. (3) For schools, it is expected to support the implementation of innovative learning models by providing facilities, conducive learning environments, and professional development programs for teachers. Schools can also encourage collaboration between teachers to share good practices in implementing holistic learning. School policy support is very important so that learning innovations are not only temporary, but also part of the school's academic culture. (4) For future researchers, it is recommended to conduct follow-up research

with a wider sample coverage or at different levels of education to strengthen the generalization of research results. Researchers can also examine the influence of the HME model with the Among system on other variables such as critical thinking skills, creativity, or numeracy literacy. In addition, the use of mixed methods can be considered to obtain a more comprehensive picture of the effectiveness of this learning model both from quantitative and qualitative aspects.

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