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Exploring the Link Between Emotional Intelligence and Mathematical Problem-Solving Skills Among Grade V Elementary Students in Kepanjen Sub-district

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ABSTRACT

Emotional intelligence (EI) plays a crucial role in students' academic performance, particularly in mathematical problem-solving ability (MPSA). This study investigates the level of EI, the level of MPSA, and their relationship in fifth-grade students of Gugus V, Kepanjen District, during the 2021/2022 academic year. This quantitative, correlational study involved 183 fifth-grade students, with a purposive sample of 80 participants. Data collection employed tests to measure MPSA and questionnaires to assess EI. Statistical analysis was conducted using Pearson's product-moment correlation with SPSS 16.0. The results showed that first, the level of emotional intelligence of grade V elementary school students was mostly in the moderate category, with a percentage of 62.5%. Second, the level of mathematics problem-solving ability of fifth-grade students is mostly in the high category with a percentage of 52.5%. Third, the results of statistical data processing analysis obtained r_{xy} value > r_{table} value (0.386 > 0.286). While the significance value of the analysis results of *SPSS 16.0* significance level value of 0.01 (0.000≤0.01). These results suggest that higher EI is associated with improved MPSA among fifth-grade students. This underscores the importance of fostering both cognitive and emotional competencies in educational settings. There is a significant positive relationship between EI and MPSA in fifth-grade students. Enhancing EI alongside academic skills may support student success not only in mathematics but across other disciplines and real-life challenges.

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1. INTRODUCTION

Education is a transformative process aimed at equipping students with the ability to adapt to their environment and actively contribute to community life (Sapitri, 2019). Schools serve as a critical platform for enhancing the quality of human resources in Indonesia, playing a central role in students'

intellectual and emotional development (Sapitri, 2019). Among the factors influencing academic success, emotional intelligence (EI) has emerged as a pivotal component, particularly in mathematical problem-solving. EI impacts students' ability to navigate cognitive challenges in mathematics through mechanisms such as emotion regulation, enhanced motivation, and reflective thinking. These interconnected processes enable students to approach complex mathematical problems with resilience and adaptability, fostering both academic achievement and broader personal growth.

Students with high emotional intelligence possess the ability to recognize and effectively manage negative emotions, such as anxiety, frustration, or fear, when confronted with challenging mathematical problems. Research highlights that such negative emotions can disrupt cognitive performance by impairing concentration and memory, ultimately hindering problem-solving abilities (Schukajlow, Rakoczy, & Pekrun, 2023; Pehkonen et al., 2004). Therefore, the ability to regulate emotions is crucial in helping students maintain focus and composure, enabling them to approach mathematical challenges with clarity and confidence.

Thus, emotional intelligence plays a significant role in optimizing students' ability to solve mathematical problems. It enables students to manage stress, maintain focus, and approach problems systematically even in high-pressure situations. Through effective emotion management, students can reduce the cognitive load caused by negative emotions, allowing for increased mental clarity and problem-solving efficiency. Furthermore, emotional intelligence fosters intrinsic motivation, encouraging perseverance and a positive attitude toward learning challenges. Reflection ability, another key component of emotional intelligence, helps students evaluate their strategies and outcomes, leading to continuous improvement in their problem-solving skills. Combined with enhanced cognitive efficiency, these emotional and psychological competencies empower students to navigate academic challenges with confidence and achieve more optimal results in learning mathematics.

In line with educational objectives, students are expected to achieve strong learning outcomes, enabling them to develop their inherent abilities in intelligence, skills, spiritual strength, and emotional self-regulation. Achieving good learning outcomes depends on several supporting factors, one of which is intelligence. Rahma (2017) defines intelligence as a multidimensional skill encompassing the ability to adapt quickly and effectively to new situations, utilize abstract concepts efficiently, recognize relationships, and learn from them swiftly.

Traditionally, intelligence has been narrowly focused on arithmetic, logical, and verbal abilities, often measured through IQ tests that prioritize linguistic and logical-mathematical competencies (Rahma, 2017). While these tests are valuable in predicting academic success, they fail to capture the broader scope of human intellect, which is not one-dimensional or confined to a single number. Intelligence Quotient (IQ) plays a role in facilitating learning and supporting optimal academic performance (Sapitri, 2019), but it is only one aspect of a comprehensive intelligence framework.

Kosasih and Sumarna (as cited in Rahma, 2017) categorize intelligence into three components: Intelligence Quotient (IQ), Emotional Quotient (EQ), and Spiritual Quotient (SQ). Of these, emotional intelligence (EQ) emerges as a critical determinant of learning success. Psychological research underscores that academic achievement is not solely influenced by IQ but also significantly shaped by emotional intelligence. This highlights the importance of managing emotions effectively, as EQ contributes to resilience, motivation, and focus, all of which are essential for academic and personal success.

Several studies have examined the relationship between emotional intelligence (EI) and academic success. Goleman (2018) emphasizes the importance of emotional regulation in improving academic performance, while research by Supriadi, Mardiyana, and Subanti (2015) and Suyani (2019) demonstrates that students with higher EI excel in mathematical problem-solving tasks. Similarly, R., Inda I., Y., Ahmad, and N. (2019) argue that problem-solving requires a structured, planned approach that integrates both cognitive and emotional competencies, further highlighting the relevance of EI in academic contexts.

In elementary schools within Gugus V Kepanjen District, challenges related to low motivation and EI have been identified as significant barriers to effective mathematical problem solving, particularly in Grade V mathematics. Observations and interviews with teachers reveal that while the teaching processes generally adhere to standard practices, students often lack persistence and accuracy when tackling mathematical problems independently. Teachers observed that students with low EI struggle to develop and execute problem-solving strategies, frequently relying on their peers instead of attempting the tasks themselves. Interviews with six Grade V students from different schools also highlighted consistent difficulties in solving mathematical problems, particularly in topics like calculating the volume of cubes and beams.

Existing studies provide strong evidence that EI plays a crucial role in mathematical problem-solving ability. For instance, Suyani (2019) found that students with high EI perform significantly better in problem-solving tasks compared to those with lower EI. Similarly, Rospitasari et al. (2017) and Mahmudah and Lestariningsih (2018) suggest that students with higher EI navigate complex mathematical challenges more effectively, while moderate levels of EI can still pose obstacles to learning progress. Additionally, research by Pekrun (2014), MacCann et al. (2019), and Anglim et al. (2022) underscores the importance of EI in fostering motivation, focus, and resilience, all of which are essential for academic success in mathematics.

Despite the extensive literature on EI and its relevance to academic outcomes, there is a notable lack of research examining its role in mathematical problem-solving among elementary school students, particularly in the Indonesian context. This study seeks to address this gap by investigating the relationship between EI and mathematical problem-solving abilities among Grade V students in Gugus V Kepanjen District. By focusing on students' capacity to understand problems, devise solutions, and evaluate outcomes, this study aims to shed light on how EI influences their mathematical performance.

This research contributes to the growing understanding of the interplay between emotional and cognitive factors in elementary mathematics education. The findings are expected to inform educational practices by emphasizing the importance of fostering EI to enhance students' mathematical problem-solving skills, thereby supporting their overall academic success and preparing them for future challenges.

2. METHODS

This study employs a quantitative approach to investigate the relationship between emotional intelligence and mathematical problem-solving ability, as quantitative methods provide precise measurement of variables and facilitate statistical analysis to explore correlations (Sugiyono, 2017). Specifically, a correlational research design is utilized to examine the strength and direction of the relationship between these two variables. Correlational research is particularly suited for identifying the degree to which variables are related, whether strongly or weakly, positively or negatively. In this context, the study aims to determine the nature and magnitude of the relationship between emotional intelligence and mathematical problem-solving ability among fifth-grade elementary school students in Gugus V, Kepanjen District, during the 2021/2022 academic year.

The participants in this study consisted of all fifth-grade students from SD Gugus V, Kepanjen District, Malang Regency, during the even semester of the 2021/2022 academic year, amounting to a total of 183 students. The study employed a purposive sampling method, also referred to as judgmental or consideration sampling. As defined by Sugiyono (2017), purposive sampling is a method of selecting participants based on specific criteria or considerations. In this case, the selection criteria were determined by the highest scores obtained from the questionnaire and test instruments. The following calculation was used to determine the number of students included in the research sample:

$$S = 15\% + \frac{1000 - n}{1000 - 100} \cdot (50\% - 15\%)$$

(Riduwan, 2015)

Description:
S = number of samples taken
n = number of population members
From the data obtained:
$S = 15\% + \frac{1000 - 170}{1000 - 100} \cdot (50\% - 15\%)$
$S = 15\% + \frac{830}{900} \cdot (35\%)$
$S = 15\% + 0{,}92 \cdot (35\%)$
$S = 15\% + 32{,}20\%$
$S = 47{,}20\%$

Thus, the sample size was $170 \times 47{,}20\% = 80{,}24 \approx 80$ Class V respondents from primary schools in Gugus V, Kepanjen sub-district.

Table 1. Population and Sample Members

No	Place	Population Member	Counting	Sample Member
1	SD NU Hasanuddin Dilem 02	32 student	$(32 - 2) \times 47.2 = 14.16$	14 student
2	SD Negeri 1 Ngadilangkung	37 student	$(37 - 1) \times 47.2 = 16.99$	17 student
3	SD Negeri 02 Ngadilangkung	31 student	$(31 - 1) \times 47.2 = 14.16$	14 student
4	SD Negeri Mojosari	36 student	$(36 - 2) \times 47.2 = 16.04$	16 student
5	SD Negeri Jatirejoyoso	13 student	$(13 - 1) \times 47.20 = 5.66$	6 student
6	SD Negeri 01 Dilem	34 student	$(34 - 6) \times 47.2 = 13.21$	13 student
Amount		**183 student**	**Amount**	**80 student**

Research instruments are used to collect data needed for research (Sugiyono, 2017). There are two instruments in this study, namely emotional intelligence instruments and mathematics problem solving ability instruments. The lattice of emotional intelligence instruments will be outlined below.

Table 2. Emotional Intelligence Grid

No	Component	Indicators	Item Number		Amount
			Favorable	Unfavorable	
1	Recognising self-emotion	Recognising and understanding one's own emotions and the causes of emotions	1, 3	2, 4	4
2	Managing self-emotion	Controlling emotions and expressing emotions appropriately	5, 7	6, 8	4
3	Motivating yourself	Have a sense of responsibility, be able to focus on the task at hand, and be able to control oneself	9, 11	10, 12	4
4	Recognising the emotions of others	Sensitive to other people's feelings, listening to other people's problems	13, 15	14, 16	4
5	Fostering relationships with others	Cooperate and communicate well	17, 19	18, 20	4
		Total Amount			**20**

(Suyani, 2019).

Table 2 provides an overview of the Emotional Intelligence Grid, detailing the components, indicators, and distribution of items used to measure emotional intelligence. The grid categorizes emotional intelligence into five main components: recognizing self-emotion, managing self-emotion, motivating oneself, recognizing the emotions of others, and fostering relationships with others. Each component is assessed through a combination of favorable and unfavorable items, providing a balanced approach to evaluating both strengths and challenges in emotional intelligence. These components align with the framework proposed by Suyani (2019), emphasizing the multidimensional nature of emotional intelligence and its relevance to academic and social contexts.

This detailed breakdown of emotional intelligence measurement complements the focus of this study by linking emotional competencies to students' ability to solve mathematical problems. As shown in Table 3, the lattice of mathematical problem-solving ability aligns with specific cognitive indicators, such as understanding problems, developing and implementing plans, and verifying solutions. This structure ensures that both emotional and cognitive dimensions are systematically evaluated, providing a comprehensive understanding of their interrelationship and impact on academic performance.

Table 3. Lattice of Ability to Solve Mathematics Story Problems in the Form of Description

Component	Indicator	Basic Competence	Question indicator	Cognitive	Question No.
1. Comprehend the problem thoroughly to ensure the calculation process is accurate 2. Grasp the problem and follow the correct calculation process, but the resulting calculation is incorrect. 3. Understand the problem, with the answer being partially correct in certain aspects of the calculation process 4. Comprehend the problem, but all the answers are incorrect	1. Writing Known, Asked, Answer 2. Develop a problem-solving plan 3. Solve according to the problem solving plan 4. Rechecking the problem solving result	3.5 Explain, and determine the volume of spatial structures using volume units (such as unit cubes) as well as the relationship between powers of three and square roots	Determine the volume ratio of a beam.	C4 (level 3)	1
			Determine the volume of a block	C4 (level 3)	2
			Predict the length of the ribs of a large cube if the number of unit cubes is known	C6 (level 3)	3
			Determining the width of a block	C4 (level 3)	4
			Predicting the number of unit cubes. in a large cube	C6 (level 3)	5
Total Amount					**5**

(DIKDASMEN, 2019).

Instrument trials in this study consisted of validity and reliability tests. There are two validity tests here, namely the first validity of the questionnaire, the calculation of the instrument validity test using calculations and processing using statistical data processing software, namely SPSS. Furthermore, the correlation is calculated based on the provisions with 5% significance and degrees of freedom $df = n\text{-}2$. If $r_{xy} > r_{tabel}$ table, it means that the item (question item) is declared valid. Conversely, $r_{xy} < r$ table then

the item (item) is invalid. Second, the validity of the mathematics test questions is calculated using SPSS, and then, the correlation is calculated based on the provisions that if $r_{xy}<r_{table}$ with a significance of 5% and degrees of freedom df = n-2, it means that the item (item of a question) is declared valid. Conversely, if $r_{xy}<r_{tabel}$ then the item is invalid.

The reliability test is carried out to obtain the level of accuracy (reliability or persistence) of the data collection tool (instrument) used. The technique used to measure the Questionnaire instrument and the Mathematics Problem Solving Test instrument is to use the Crocbach's Alpha technique with the help of statistical data processing software, namely *SPSS*. The results of the calculation of the SPSS 16 program are consulted with the value of the Product Moment Table with df = n-2, and significance at 5%. Then the decision rule is if $r_{11} < r_{table}$ if $r_{11}>r_{table}$ means reliable, while if if $r_{11} < r_{table}$ means not reliable.

Data collection in this study was carried out using test and questionnaire methods. The research time was carried out for 3 months. The data analysis technique uses variable analysis (x) and variable (y), and the prerequisite test consists of a normality test and a linearity test. The normality test uses the Kolmogorov-Smirnov test. If the number of samples (N) < 30 the test result used is Shapiro-Wilk. This research uses the help of SPSS. According to (Priyatno, 2018) the criteria for testing data normality are as follows: (1) If the sig value. 0.05 then the data is not normally distributed; (2) If the sig value. > 0, 05 then the data is normally distributed. The data linearity test can be seen in the ANOVA Table output in the Deviation from Linearity column. According to (Priyatno, 2018) the test criteria are as follows: (1) If the sig value. Deviation from Linearity <0.05 then the variable has a non-linear relationship; (2) If the sig value. Deviation from Linearity > 0.05 then the variables have a linear relationship.

The hypothesis test used is the correlation test which reads 'there is a significant correlation between emotional intelligence and the mathematical problem-solving ability of grade V elementary school students in Gugus V Kepanjen District in the 2021/2022 academic year'. The x variable and the y variable were tested using the product moment correlation analysis technique using the help of the SPSS application (Sudijono, 2018). Steps taken after testing for normality and linearity. If the data is not normally distributed, what alternative statistical method to use is the Kruskal-Wallis test (Hilbe, 2014).

3. FINDINGS AND DISCUSSION

3.1 Instrument Validity and Reliability

Based on the results of the emotional intelligence questionnaire instrument test using the SPSS 16 programme, with N = 13 students, at df (n-2) = (13-2) = 11 and α = 2%, the r_{table} value = 0.602 was obtained. So that the question items are said to be valid if $r_{xy} > r_{table}$. The results of the validity of the emotional intelligence questionnaire instrument test are shown in the table below.

Table 4. Results of the Validity Test of Emotional Intelligence Questionnaire

No	r_{xy}	r_{table}	Description
1	0.783	0.602	Valid
2	0.910	0.602	Valid
3	0.824	0.602	Valid
4	0.910	0.602	Valid
5	0.699	0.602	Valid
6	0.693	0.602	Valid
7	0.743	0.602	Valid
8	0.637	0.602	Valid
9	0.835	0.602	Valid
10	0.770	0.602	Valid

11	0.897	0.602	Valid
12	0.646	0.602	Valid
13	0.920	0.602	Valid
14	0.978	0.602	Valid
15	0.920	0.602	Valid
16	0.874	0.602	Valid
17	0.827	0.602	Valid
18	0.921	0.602	Valid
19	0.921	0.602	Valid
20	0.897	0.602	Valid

Based on the analysis of the validity of the emotional intelligence questionnaire, which consisted of 20 statement items, all items were found to be valid. Detailed results are provided in Appendix 15. The reliability test of the emotional intelligence questionnaire, conducted with a sample of N = 13 students, yielded a degree of freedom (df) of (n-2) = (13-2) = 11. At a significance level of α = 5%, the critical value of rtable was determined to be 0.602. The questionnaire items are considered reliable if $r_{xy} > r_{table}$. The results of the reliability analysis for the emotional intelligence questionnaire are presented in the table below. appendix 16 and are shown in the table below.

Table 5. Reliability Results of the Emotional Intelligence Questionnaire Pilot Test

Reliability Statistics	
Cronbach's Alpha	N of Items
.974	20

Based on the test results conducted using the SPSS 16 programme, it was found that the emotional intelligence questionnaire instrument was reliable because $r_{xy} > r_{table}$ with an r_{xy} value of 0.974 > r_{table} 0.602. This indicates a high level of internal consistency in the instrument, confirming its suitability for measuring emotional intelligence. Such reliability ensures that the data collected will be consistent and accurate, supporting the validity of the study's findings.

Based on the results of the Mathematics Problem Solving Ability Test trial using the SPSS 16 program, with N = 13 students, so that df = (n-2) = (13-2) = 11 and α = 5%, the r_{table} value = 0.602 is obtained. So that the question items are said to be valid if $r_{xy} > r_{table}$.

The results of the validity of the Mathematics Problem Solving Ability instrument test are shown in the table below:

Table 6. Test Validity Results of the Maths Problem Solving Ability Test Trial

No	r_{xy}	r_{table}	Description
1	0.715	0.602	Valid
2	0.614	0.602	Valid
3	0.752	0.602	Valid
4	0.725	0.602	Valid
5	0.707	0.602	Valid

Based on the results of the validity analysis of the Mathematical Problem Solving Ability Problem with 5 statement items, it was found that all questions were valid, for complete results can be seen in appendix 17. Meanwhile, the results of the reliability of the Mathematical Problem Solving Ability test instrument that has been carried out with N = 13 students, so that at df = (n-2) = (13-2) = 11 and α = 5%, the value of r_{table} = 0.602 is obtained. So that the question items are said to be reliable if $r_{xy} > r_{table}$.

The results of the reliability of the Mathematical Problem Solving Ability instrument test can be seen in appendix 18 and are shown in the table below.

Table 7. Reliability Results of Mathematics Problem Solving Ability Test Trial

Reliability Statistics

Cronbach's Alpha	N of Items
.735	5

Based on the results of the reliability test conducted using the SPSS 16 program, it was found that the Mathematical Problem Solving Ability instrument was reliable because $r_{xy} > r_{table}$ with a value of r_{xy} 0.735> r_{table} 0.602.

Description of data from emotional intelligence questionnaire research results from 80 respondents obtained descriptive analysis results that have been processed using the SPSS (Static Program For Social Science) version 16.0 for windows application. as follows:

Table 8. Data Analysis Results of Emotional Intelligence Variables

Statistics

Emotional Intelligence		
N	Valid	80
	Missing	0
Mean		59.6500
Median		60.0000
Mode		62.00
Std. Deviation		6.91192
Variance		47.775
Sum		4772.00

The histogram illustrating the research data on emotional intelligence is displayed in the figure below, providing a clear visual representation of the data distribution for better understanding and analysis.

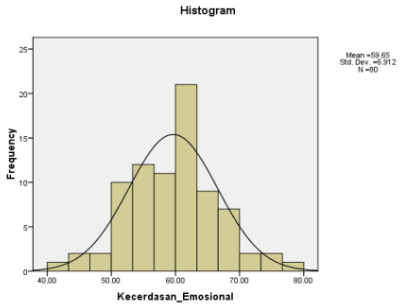

Figure 1. Histogram of emotional intelligence variables

The histogram in Figure 1 illustrates the distribution of emotional intelligence scores among the participants, providing a visual representation of the data variability. It shows that most students fall within the medium category of emotional intelligence, as indicated by the highest frequency of scores concentrated around the medium range. This observation is further supported by the data in Table 9, which categorizes emotional intelligence into high, medium, and low levels. The majority of students, 62.5%, are classified as having medium emotional intelligence, while 15% demonstrate high emotional intelligence, and 22.5% fall into the low category. This distribution highlights the prevalence of moderate emotional intelligence among the participants, which may play a significant role in their mathematical problem-solving abilities.

Table 9. Emotional Intelligence Categories

No	Value Interval	Amount	Percentage	Description
1	67-78	12	15%	High
2	55-66	50	62.5%	Medium
3	43-54	18	22.5%	Low

The average emotional intelligence score among students was 59.65, with the majority of students falling in the moderate category (62.5%). This suggests that most students possess an adequate level of emotional intelligence, though a notable proportion (22.5%) exhibit low emotional intelligence, which may have implications for their problem-solving abilities.

Based on the answers to the Mathematics Problem Solving Ability Questionnaire from 80 respondents, the results of descriptive analysis were obtained which have been processed using the SPSS (Statisitical Program For Social Science) version 16.0 for windows application as follows.

Table 10. Analysis Results of Data on Mathematical Problem-Solving Ability Variables

Statistics		
Ability_To_Solve_Mathematics Problems		
N	Valid	80
	Missing	0
Mean		86.9375
Median		90.0000
Mode		95.00
Std. Deviation		9.85637
Variance		97.148
Sum		6955.00

The histogram representing the research data for Mathematics Problem-Solving Ability essay questions is shown in the figure below. This visual depiction highlights the distribution of scores, enabling a clearer interpretation of the students' performance. It serves as a valuable tool for identifying trends and patterns in their mathematical problem-solving abilities.

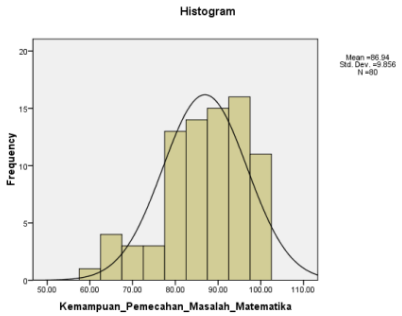

Figure 2. Histogram of Mathematics Problem Solving Ability Variable

Table 11. Category of Mathematical Problem Solving Ability

No	Value Interval	Amount	Percentage	Description
1	86-100	42	52.5%	High
2	73-85	30	37.5%	Medium
3	60-72	8	10%	Low

The average maths problem solving ability score was 86.93, with the majority in the high category (52.5%). This indicates that most had a high level of mathematical problem-solving ability, although a small proportion (10%) showed low mathematical problem-solving ability, which may have implications for their problem-solving ability.

3.2 *Main Research Results*

Data analysis in this study tested normality, as shown in the results in the table below.

Table 12. Normality Test Results

One-Sample Kolmogorov-Smirnov Test

		Emotional Intelligence	Ability to Solve Mathematics Problems
N		80	80
Normal Parameters[a]	Mean	59.6500	86.9375
	Std. Deviation	6.91192	9.85637
Most Extreme Differences	Absolute	.079	.147
	Positive	.079	.093
	Negative	-.065	-.147
Kolmogorov-Smirnov Z		.710	1.315
Asymp. Sig. (2-tailed)		.694	.063

a. Test distribution is Normal.

From the table above, it can be observed that the sample size (N) is 80 (N > 30), leading to the use of the Kolmogorov-Smirnov test for analysis. For the emotional intelligence variable, the significance value obtained from the SPSS 16 analysis is 0.694, which exceeds the threshold significance level of 0.05

(0.694 > 0.05). Therefore, it can be concluded that the emotional intelligence variable follows a normal data distribution. This indicates that the data is suitable for further parametric statistical analysis.

Linearity test is used as a prerequisite test for analysis in this study. The distribution of variable data is declared linear if the significance value of the SPSS 16 analysis results > the 5% significance level value. The results of the linearity test can be seen in the table below.

Table 13. Linearity Test Results

ANOVA Table

			Sum of Squares	Df	Mean Square	F	Sig.
Math Problem Solving Ability * Emotional Intelligence	Between Groups	(Combined)	2653.953	25	106.158	1.142	.334
		Linearity	1145.483	1	1145.483	12.320	.001
		Deviation from Linearity	1508.471	24	62.853	.676	.852
	Within Groups		5020.734	54	92.977		
	Total		7674.687	79			

The results from the SPSS 16 analysis, specifically the Deviation from Linearity column, indicate a significance value of 0.852, which exceeds the threshold of 0.05 (0.852 > 0.05). This confirms that there is a linear relationship between the emotional intelligence variable and the mathematical problem-solving ability variable. Additionally, the normality test results show that the data for both emotional intelligence and mathematical problem-solving ability are normally distributed. Consequently, the product-moment correlation test was employed to assess the relationship between these two variables. The study's hypotheses are formulated to evaluate this relationship systematically and provide insights into their interdependence.

Ha: There is a significant relationship between emotional intelligence and math problem solving ability in fifth grade students of elementary schools in Gugus V Kepanjen District in the 2021/2022 academic year.

Ho: There is no significant relationship between emotional intelligence and mathematical problem solving ability in fifth-grade students of SD Gugus V, Kepanjen District in the 2021/2022 academic year.

The results of the correlation calculation between emotional intelligence and math problem solving ability using SPSS 16 can be seen as follows.

Table 14: Correlation Test Results Between Emotional Intelligence and Mathematical Problem Solving Ability

Correlations

		Emotional Intelligence	Ability to Solve Mathematics Problems
Emotional Intelligence	Pearson Correlation	1	.386**
	Sig. (2-tailed)		.000
	N	80	80
Ability to solve math problems	Pearson Correlation	.386**	1
	Sig. (2-tailed)	.000	
	N	80	80

**. Correlation is significant at the 0.01 level (2-tailed).

Based on the results of the analysis using the SPSS 16 program, the r xy value is 0.386 with a sample size of 80 students so that the r table value at the 1% significance level is 0.286. Ha is accepted if r xy> r

table and the significance of the SPSS 16 results < 1% significance level. Based on the results of these calculations, it can be seen that the rxy value is 0.386> the r table value of 0.286 and the SPSS 16 analysis results are 0.000 ≤ the significance level value of 0.01 (0.000 ≤ 0.01). If the results of the correlation between emotional intelligence and mathematics problem solving are in the moderate category with a correlation coefficient of r=0.386, the meaning is as follows: (1) Moderate Positive Relationship: The value of r=0.386 indicates a moderately significant but not strong positive relationship between emotional intelligence and maths problem solving ability. In other words, improvements in emotional intelligence tend to be associated with improvements in maths problem solving, but this relationship is not very strong; (2) Medium Correlation Category: In the context of correlation coefficient interpretation, r values between 0.30 to 0.50 are generally categorised as moderate correlations. This means that emotional intelligence has a moderate influence on maths problem solving ability, but many other factors may contribute; (3) Contextual Interpretation: This moderate correlation could mean that emotional intelligence plays an important role in maths problem solving, but is not the only determining factor. Other factors, such as material comprehension, logic and analytical skills, may also play a role in influencing maths problem solving.

Thus, it can be concluded that the hypothesis which reads "There is a significant positive correlation between emotional intelligence and mathematical problem-solving ability in fifth grade students of elementary schools in Gugus V Kepanjen District in the 2021/2022 academic year" is accepted and it is stated that there is a significant positive correlation between emotional intelligence and mathematical problem-solving ability. In accordance with previous research (Mahmudah & Lestariningsih, 2018; Supriadi et al., 2015) stated that the findings from these two studies suggest that emotional intelligence plays an important role in maths problem-solving ability. Students who are better able to manage their emotions tend to be more effective in dealing with complex mathematical tasks. The sample size used for both studies is less than the research I conducted, this provides differences and variations in calculations.

3.3 Discussion

Analysis of the emotional intelligence questionnaire responses from 80 respondents reveals that 12 students (15%) have high emotional intelligence, falling within the value interval of 67–78. A majority of the students, 50 individuals (62.5%), exhibit moderate emotional intelligence, with scores ranging from 55 to 66. Additionally, 18 students (22.5%) are categorized as having low emotional intelligence, within the value interval of 43–54. These findings indicate that the emotional intelligence levels of most students are concentrated in the moderate category, accounting for 62.5% of the respondents. This suggests that while emotional intelligence is generally balanced among the group, there is potential to enhance it further to support better academic and personal outcomes.

According to Supriadi et al. (2015), individuals with moderate emotional intelligence approach problem-solving by employing a thought process focused on developing understanding. This is evident in their ability to identify sufficient conditions (known information) and necessary conditions (information being sought) and to confirm that the known information is adequate to address the questions posed. When creating a problem-solving plan, these individuals utilize a reasoning process centered on forming opinions. This is reflected in their capacity to establish connections between the known and the unknown, identify the relevant concepts or materials, and devise alternative steps to solve the problem. During the execution of the problem-solving plan, they engage in a thought process aimed at forming or drawing conclusions, as seen in their ability to follow the planned steps and apply appropriate calculation algorithms to solve the problem. Similarly, in the re-evaluation phase, they employ a reasoning process that involves drawing conclusions to verify the accuracy and validity of their solution.

Based on the answers to the math problem-solving ability test with 80 respondents, it was found that the research subjects who had high mathematical problem solving ability were 42 students with a percentage of 52.5% in the value interval 86-100. Meanwhile, students who have moderate math

problem solving ability are 30 students with a percentage of 37.5% in the score interval 73-85. Meanwhile, students who have low math problem-solving skills are 8 students with a percentage of 10% in the 60-72 score interval. So it can be concluded that the level of Mathematics Problem Solving Ability of fifth grade elementary school students in Gugus V Kepanjen District is mostly in the high category with a percentage of 52.5%.

Polya's problem-solving model, as cited by In'am (2014), outlines four key steps for solving mathematical problems: understanding the problem, devising a strategy for solving it, implementing the solution, and reviewing the results. The research data indicates that a significant proportion of students exhibit a high level of mathematical problem-solving ability when assessed using Polya's procedure. Specifically, 42 students, representing 52.5% of the sample, achieved a high category level in problem-solving proficiency. This highlights the effectiveness of the Polya model in evaluating and enhancing students' problem-solving skills. These findings suggest that structured approaches like Polya's can play a crucial role in fostering analytical thinking and improving mathematical performance among students.

The hypothesis test used to answer the problem formulation is the product moment correlation test with the help of statistical data processing software, namely SPSS (Static Program For Social Science) version 16.0 for windows. Ha is accepted if the rxy value> r table value (0.386> 0.286). While the significance value of the SPSS 16.0 results ≤ 1% significance level. (0,000 ≤ 0,01). So it can be concluded that the hypothesis which reads "There is a significant relationship between emotional intelligence and mathematical problem solving ability in fifth-grade elementary school students of Gugus V Kepanjen District in the 2021/2022 academic year" can be accepted and it is stated that there is a significant relationship between emotional intelligence and mathematical problem solving ability.

This is supported by the results of research conducted by (Mahmudah & Lestariningsih, 2018) which states that if students who have high emotional intelligence will find it easier to solve math problems and students who have moderate emotional intelligence will result in a little disruption of progress to learn well. Furthermore, the results of research conducted by (Supriadi et al., 2015) which states that students who have high emotional intelligence are able to carry out the problem solving thought process well. Mathematical problem solving based on Polya's steps (in Supriadi, et al. 2015: 8) includes students' thinking processes in: (1) understanding the problem, (2) making a solution plan, (3) implementing the solution plan, (4) checking the answer agai

In line with this, (Supriadi et al., 2015) argue that subjects with high levels of emotional intelligence in understanding the problem are able to determine sufficient conditions (known things) and necessary conditions (things that are asked) and are able to determine that the known things are sufficient to answer the things that are asked. In making a problem solving plan, the subject is able to determine the relationship between known things and the things asked, the concepts or materials needed, and alternative problem-solving steps. In implementing the problem-solving plan, the subject is able to use the steps that have been planned and the right calculation algorithm to answer the problem. In the stage of re-examining the answer, the subject is able to double-check and feel confident in the problem-solving steps that have been prepared.

The analysis of mathematical problem-solving abilities based on Polya's steps (Supriadi et al., 2015) revealed varied performance levels among the students. Of the participants, 42 students (52.5%) demonstrated high mathematical problem-solving abilities, successfully completing all four indicators: (1) understanding the problem, (2) creating a solution plan, (3) executing the solution plan, and (4) reviewing the answer. Meanwhile, 30 students (37.5%) exhibited moderate problem-solving abilities, fulfilling three indicators: understanding the problem, making a solution plan, and implementing the plan. A smaller group of 8 students (10%) showed low problem-solving abilities, meeting only two indicators: understanding the problem and planning the solution. These findings suggest that the majority of Grade V students in Gugus V Kepanjen District fall into the high category for mathematical problem-solving ability, with 52.5% achieving this level.

However, the study has limitations that could affect its generalizability and validity. The sample is restricted to one district, which may not represent broader populations. Additionally, the use of a small pilot test (N=13) for instrument validation might have influenced the reliability or validity of the results. Future research could expand on these findings by exploring how varying levels of emotional intelligence impact other academic domains or investigating the interplay between emotional intelligence and other variables such as teaching methods or cognitive intelligence. Such studies could provide a more comprehensive understanding of the factors that influence students' academic performance and inform strategies for holistic educational development.

4. CONCLUSION

The study concludes that most Grade V students in Gugus V Kepanjen District possess moderate emotional intelligence, with 62.5% of students falling into this category, while 15% exhibit high emotional intelligence and 22.5% have low emotional intelligence. Similarly, the majority of students (52.5%) demonstrate high mathematical problem-solving abilities, followed by 37.5% with moderate abilities and 10% with low abilities. Statistical analysis revealed a significant positive relationship between emotional intelligence and mathematical problem-solving ability, as indicated by a r_{xy} value of 0.386 exceeding the r-value of 0.286, with a significance level of p=0.000p=0.000 ($p \leq 0.01 p \leq 0.01$). These findings suggest that emotional intelligence is an important factor in supporting students' mathematical problem-solving skills.

The research has practical implications for educational practices, emphasizing the need to integrate emotional intelligence development into teaching strategies to enhance students' academic outcomes. However, the study is limited by its specific focus on a single district, which may restrict the generalizability of its findings. Additionally, the use of a small pilot test for instrument validation may have impacted the reliability of the measurements. Future research should explore the relationship between emotional intelligence and other academic domains, examine the influence of teaching methods on this relationship, and investigate other contributing variables, such as cognitive intelligence or socioeconomic factors, to provide a more comprehensive understanding of student performance.

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