The Correlation Between Family Environment and Mathematics Learning Outcomes of Tenth-Grade High School Students'

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Abstrak

Penelitian ini bertujuan untuk menganalisis hubungan antara lingkungan keluarga dengan hasil belajar matematika siswa kelas X di salah satu SMA Teluk Gelam, Ogan Komering Ilir. Penelitian ini menggunakan pendekatan kuantitatif dengan desain korelasional. Populasi sekaligus sampel penelitian adalah seluruh siswa kelas X di salah satu SMA Teluk Gelam yang berjumlah 30 siswa, dipilih menggunakan teknik cluster random sampling. Pengumpulan data dilakukan melalui dua instrumen, yaitu angket lingkungan keluarga dengan skala Likert yang terdiri dari 14 butir pernyataan tertutup serta dokumentasi nilai Ujian Tengah Semester sebagai indikator hasil belajar siswa. Angket telah diuji validitas menggunakan metode Corrected Item-Total Correlation dan uji reliabilitas menggunakan Cronbach's Alpha dengan nilai 0.823. Analisis data dilakukan menggunakan uji korelasi Rank Spearman berdasarkan hasil uji normalitas Shapiro-Wilk yang menunjukkan bahwa salah satu variabel tidak berdistribusi normal. Hasil penelitian menunjukkan koefisien korelasi Spearman sebesar 0,002 dengan nilai signifikansi 0,990. Hasil tersebut menunjukkan bahwa tidak terdapat hubungan yang signifikan antara lingkungan keluarga dan hasil belajar matematika siswa. Kondisi ini mengindikasikan bahwa hasil belajar matematika siswa kemungkinan lebih dipengaruhi oleh kombinasi faktor lain, seperti motivasi belajar, kemampuan awal, kualitas pembelajaran, dan lingkungan sekolah.

Keyword: Hasil_Belajar; Korelasi; Lingkungan_Keluarga; Matematika; Siswa_SMA.

Abstract

This study investigates the relationship between family environment and mathematics achievement of 10th-grade students at a high school in Teluk Gelam, Ogan Komering Ilir. A quantitative approach with a correlational design was employed, with 30 students selected as the total sample using cluster random sampling technique. Data collection was conducted using two instruments: a family environment questionnaire with a Likert scale consisting of 14 closed-ended items, and documentation of mid-semester exam scores as an indicator of student learning outcomes. The questionnaire's validity was tested using the Corrected Item-Total Correlation method, and its reliability was assessed using Cronbach's Alpha, yielding a value of 0.823. Data analysis was performed using Spearman's Rank Correlation test based on the results of the Shapiro-Wilk normality test, which indicated that one of the variables was not normally distributed. The results of the study showed a Spearman correlation coefficient of 0.002 with a significance value of 0.990. These results indicate that there is no significant relationship between the family environment and students' mathematics learning outcomes. This suggests that students' mathematics learning outcomes are likely more influenced by a combination of other factors, such as learning motivation, prior ability, the quality of instruction, and the school environment.

Keyword: Academic_Achievement; Correlation; Family_Environment; Mathematics; High_School_Students.

INTRODUCTION

The mathematical competence of students in Indonesia is still a concern in the field of mathematics education in Indonesia. Based on the results of the Organization for Economic Cooperation and Development (OECD). the mathematics performance of Indonesian students' is still below the international average and ranks low. This condition indicates that the mathematical performance of Indonesian students' is still not optimal. Therefore, more comprehensive efforts are needed to improve students' mathematical abilities, both through school learning and support from their environment. Education is not only conducted in schools but also in the child's surrounding environment (Pirchio et al., 2020). Essentially, learning is an activity that requires a specific environment and atmosphere, students' learning potential can be optimally realized when the surrounding conditions are conducive (Hanipah et al., 2022) A conducive and supportive environment can be an important factor in developing a child's academic abilities, including mathematical

DOI: https://doi.org/10.26486/mma8fz91
W : http://ejurnal.mercubuana-yogya.ac.id/index.php/mercumatika E : mercumatika@mercubuana-yogya.ac.id

skills. One of them is the family environment (Hadian et al., 2022). Previous research also shows that the family environment affects students' academic achievement and development (Gu et al., 2024; Luo, 2024; Utami, 2022a; Victorino et al., 2025)

One of the main external factors that can influence students' academic achievement is their family environment, particularly through the availability of learning resources and the active involvement of parents in their children's education process Click or tap here to enter text.. The family's economic condition is related to the parents' ability to provide adequate learning facilities such as books, study desks, and access to other learning resources Click or tap here to enter text.. Meanwhile, parental attention to children's learning activities, such as accompanying them with homework, providing motivation, and monitoring their academic progress, has been proven to significantly contribute to students' learning success Click or tap here to enter text.. Therefore, the family's economic condition and parental involvement together shape a learning environment that can either help or hinder students' academically, including in mathematics.

The family environment is the first educational environment that forms the foundation of a child's learning development. Zhao & Zhao (2022) explain that the family environment is multidimensional, encompassing parental involvement, family harmony, parental expectations, and the family's socioeconomic status. In this regard, research in Indonesia shows that aspects of the family environment that influence students' learning outcomes include parenting styles, relationships among family members, a safe and comfortable home atmosphere, the family's economic status, and parental attention to children's learning activities (Jannah & Pujiastuti, 2021). Additionally, socio-economic factors within the family environment, including the type of work parents do, income level, parents' education level, and parental involvement in the child's learning, affect students' academic abilities Click or tap here to enter text.. The parenting style applied in accompanying children in their learning, which directly affects the child's motivation and their academic performance Click or tap here to enter text.. A harmonious family relationship will create conditions that support the child in learning comfortably, while a calm and conducive home atmosphere helps the child concentrate on understanding learning materials, including mathematics.

The family environment is an external factor that affects students' academic achievements. Parents, as the main members of the family environment, have a strong influence on children's growth and development because the first source of learning for children is their parents. Parents are also the first to instill the right educational values. The most fundamental need of a child is family, one of which is parental education Click or tap here to enter text.. Students from supportive and attentive families tend to be more confident, while students' from less supportive families tend to show more activity in the learning process (Palangda & Suyono, 2025). This highlights the importance of considering the family setting as one of the determining factors in efforts to improve students' mathematics learning outcomes.

Parents play an important role in enhancing students' academic achievement, self-confidence, and social skills Click or tap here to enter text. The relationship between parents and children is also known to affect the overall development of the child, including cognitive, emotional, and social aspects that support the learning process Click or tap here to enter text. Beyond the parent-child relationship, the home environment can also influence a student's academic success, for example, a quiet home environment helps students focus better while studying, whereas a noisy home environment does not provide the calm students need to study Click or tap here to enter text.. These aspects are very important in mathematics learning, where students are required to understand concepts and solve problems effectively.

Parental involvement does not only influence students' academic achievement, but also to their overall growth and educational progress Click or tap here to enter text.. Therefore, every parent should strive to ensure that their children receive the best possible education Click or tap here to enter text.. Moreover, parental involgrowthvement can support students in continuing to higher levels of education and contribute to the development of their self-regulated learning Click or tap here to enter text.. Nevertheless, while the broad impact of parental involvement on students' development is well recognized, studies specifically linking the family environment to mathematics learning outcomes at the high school level remain limited.

Although research on the influence of the family environment on students' academic achievement has been extensively conducted, previous studies have generally examined the relationship between family environment and students' learning outcomes at the elementary or junior high school levels, with limited attention to high school students' mathematics learning outcomes (Gu et al., 2024; Khanolainen et al., 2020;

Otani, 2020; Silviawati & Kurniawan, 2023) Thus, there are still research gaps that need to be filled. Based on this, this study aims to examine the correlation between students' family environment and their mathematics learning outcomes, particularly among tenth-grade high school students in Indonesia

METHOD

This study employs a quantitative method with a correlational design, which aims to examine the relationship between the family environment as the independent variable (X) and student learning outcomes as the dependent variable (Y). Rather than manipulating variables, this research empirically investigates the connection between family environment conditions and students' academic performance. Therefore, the correlational design was selected as the most appropriate approach for this study.

In this study, the family environment is operationally defined as the conditions and support provided by the family to students' in their learning activities. The measurement of the family environment was conducted using a questionnaire consisting of closed-ended and open-ended questions. The score of the Mid-Semester Examination of 10th-grade high school students' in Teluk Gelam is used as an indicator of students' academic achievement in this study.

This research was conducted at a high school in Teluk Gelam, Ogan Komering Ilir. Sampling was performed using the cluster random sampling technique. In this technique, the available classes are considered as clusters, so the sample obtained in this study was one class selected at random from the entire population of 10th-grade students at a high school in Teluk Gelam, the sample consisted of 30 students, 14 of whom were male and 16 of whom were female. All students in the selected class served as respondents. Data collection was conducted over one week, by using two research instruments in the form of Likert-scale questionnaires consisting of fourteen closed-ended questions and five open-ended questions to measure the family environment, as well as documentation of Mid-Semester Exam scores as student learning outcome data. The filling out of the questionnaire was conducted directly in the classroom and distributed by the teacher online via Google Form. In the initial stage, the questionnaire was distributed online through Google Form shared via the class WhatsApp group with the teacher's assistance. However, because the number of respondents obtained was still limited, the researcher continued data collection by distributing the questionnaire offline to increase the number of respondent participation.

The questionnaire used to measure family environment indicators for students' employs a Likert scale and is based on four main indicators: Learning facilities and environment, Parental support, Parental expectations and attitudes, and Parental supervision.

Table 1. Family Environment Questionnaire Indicator

Indicator	Question Number
Facilities and Learning Environment	1, 2, 3, 4, 5
Parental Support	6, 7, 8, 9
Parents expectations and attitudes	10, 11, 12
Parental supervision	13, 14

Before the data is further analyzed, for a questionnaire to be considered a standard instrument, it must be tested for validity and reliability. Validity ensures that an instrument accurately measures its target and functions as intended (Widiana et al., 2020) To determine whether the submitted questionnaire is valid or not, the researcher uses the Corrected Item-Total Correlation method dengan bantuan SPSS. This test is applied with a 5% significance level be applied, if $r_{value} > r_{table}$ the item is declared valid, and conversely if $r_{value} < r_{table}$, the item is declared invalid and will be discarded. From the test, it was found that all the items on the family environment questionnaire were proven valid, for more details, it will be attached in the following table:

Table 2. Validation Test Results

	Corrected Item-Total Correlation	
Q01	.336	Valid
Q02	.469	Valid
Q03	.609	Valid
Q04	.697	Valid
Q05	.344	Valid
Q06	.498	Valid

Q07	.558	Valid
Q08	.426	Valid
Q09	.338	Valid
Q10	.330	Valid
Q11	.482	Valid
Q12	.495	Valid
Q13	.434	Valid
Q14	.468	Valid

According to Click or tap here to enter text., reliability reflects how consistent and stable the scores generated by an instrument. To assess reliability, the Cronbach's Alpha method was applied using SPSS software. The analysis revealed that the questionnaire obtained a reliability coefficient of 0.823, which exceeds the minimum threshold of 0.60 required for an instrument to be considered reliable. Thus, it is true that the family environment questionnaire has proven to be good and consistent, making the questionnaire ready to be used in this research.

Table 3. Results of The Reliability Test

Reliability Statistics	
Cronbach's Alpha	N of Items
.823	14

After the instrument is declared valid and reliable, the collected data undergoes several statistical stages. In the first step, a normality test is conducted as a prerequisite to determine to determine whether the data follows a normal distribution, so that the most appropriate correlation method can be determined based on the characteristics of the data. If the data is normally distributed, the Pearson test is applied to analyze the correlation, whereas if the data does not meet the normality assumption, the Spearman test is employed as a more suitable non-parametric approach (Roflin & Zulvia, 2021).

Table 4. Test of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Mid-semester score	.223	30	.001	.880	30	.003
Questionnaire score	.112	30	.200*	.937	30	.074

Based on the Shapiro-Wilk normality test, the family environment variable obtained a significance value of 0.074, which exceeds the threshold of 0.05, indicating that the data is normally distributed. Meanwhile, the learning outcome variable measured by the Mid-Semester Examination yielded a significance value of 0.003, which falls below 0.05, indicating a non-normal distribution. With this prerequisite test, the Spearman rank correlation test was selected as the appropriate method for the correlation analysis in this study.

Spearman rank correlation test is used to examine the relationship between variable X and variable Y. This test was chosen due to the test is based on the type of data that is ordinal scale from the Likert scale and he failure to satisfy the normality assumption. The following formula is applied in conducting the Spearman rank correlation test.

$$\rho = 1 - \frac{6\,\Sigma\, d_i^2}{n(n^2-1)}$$

Where:
r_s = Spearman Rank correlation coefficient
d_i = difference between the ranks of each pair of observations
n = number of samples

The obtained Spearman Rank correlation coefficient is then interpreted to determine the strength and direction of the relationship between family conditions and student learning outcomes. All data processing in this study was conducted using SPSS software version 26. The statistical hypotheses used in this study are:

RESULTS AND DISCUSSION

1. RESULT

This data was collected at one of the high schools in Teluk Gelam, where we used a questionnaire as an indicator of the students' family environment with ordinal scale data. In addition, the students' Midterm Exam scores are used here as an indicator of the students' mathematical abilities, which are on an interval scale. Because one of the data is ordinal, a non-parametric statistical test will be applied to see the relationship between the two variables, specifically using the Spearman correlation test with a significance level of $\alpha = 0.05$.

The instrument used in this study is a questionnaire consisting of 14 closed-ended statements grouped into several indicators, namely, facilities and learning environment, parental support, parental expectations and attitudes, and parental supervision. The details of the questionnaire items used in this study are presented in Table 5 below.

Table 5. Questionnaire Items

No.	STATEMENT	INDICATORS
1.	I have a comfortable place or desk where I ca	Facilities and Learning Environment
	homework.	
2.	My parents or guardians make sure I have	Facilities and Learning Environment
	school supplies and textbooks I need.	
3.	I have adequate internet access or learning r	Facilities and Learning Environment
	when studying at home.	
4.	The atmosphere inside the house is quiet en	Facilities and Learning Environment
	that I can concentrate while studying.	
5.	I feel safe and comfortable at home.	Facilities and Learning Environment
6.	My family respects my time when I'm	Parental support
	seriously.	
7.	Parents or guardians often ask me about the	Parental support
	difficulties I face in school.	
8.	There is a family member who encourages me	Parental support
	motivates me to study hard.	
9.	My parents or guardians monitor my academi	Parental support
	performance (such as test scores or assignmen	
	progress).	
10.	My parents or guardians hope that I will be ab	Parents' expectations and attitudes
	continue my education at a higher level.	
11.	My parents or guardians still appreciate my ef	Parents' expectations and attitudes
	even though my midterm grades aren't the bes	
12.	I feel comfortable talking to my family if I'm	Parents' expectations and attitudes
	trouble at school.	
13.	My parents or guardians remind me to study i	Parental supervision
	spend too much time on my phone or going ou	
14.	There is a clear distinction at home between ti	Parental supervision
	spent helping with chores and time spent stud	

Based on the table 5, it is known that each indicator has several statements used to measure the condition of the students family environment more specifically.

Table 6. Descriptive Analysis

		Mid-semester exam	Questionnaire score
N	Valid	30	30
	Missing	0	0
Median		47.5000	60.5000
Range		35.00	29.00
Percentiles	25	45.0000	53.7500
	50	47.5000	60.5000
	75	56.2500	66.0000

In Table 6, it can be seen that the results of the descriptive analysis using SPSS, the sample consists of 30 respondents. Variable (Y) the questionnaire scores have a median value of 60.5 with a range of 29, while variable (X) the mid-semester exam scores of class X students have a median value of 47.5 with range of 35.

The results of the bivariate analysis conducted between the variable (X) mid-semester exam scores and (Y) questionnaire scores using the Spearman Rank Correlation test can be seen in Table 7.

Table 7. Spearman Correlatoin

			Mid-sem	Questionnaire
Spearman's rho	Mid-semester	Correlation Coefficient	1.000	.002
		Sig. (2-tailed)	.	.990
		N	30	30
	Questionnaire s	Correlation Coefficient	.002	1.000
		Sig. (2-tailed)	.990	.
		N	30	30

The following results were obtained based on the Spearman Rank correlation test on 30 students, with a significance level of $\alpha = 0.05$ ($\rho_{table} \approx 0.361$). As a result of the correlation between the questionnaire scores and the mid-semester exam score variable, the researcher found that the correlation coefficient $\rho_{calculated} = 0.002 < \rho_{table} = 0.361, p - value = 0.990 > 0.05$ This indicates that there is no significant relationship between the Mid-Semester Exam Score and the respondents' Questionnaire Score

2. DISCUSSION

Based on the table above, the test of Spearman correlation yielded a result of 0.002 with a significance level of 0.990 (> 0.05). Therefore, the null hypothesis fails to be rejected, leading to the conclusion that there is no connection between the family environment and students' education outcomes as measured by mid-semester exam scores. The correlation coefficient results in SPSS, which are close to zero, also indicate that the connection between the two variables, namely the family environment questionnaire results and students' middle semester exam scores, is very weak. Thus, in this study, there is no effect from the family environment on students' learning outcomes. However, this contradicts earlier studies that showed a strong influence between the family environment and students' learning outcomes (Utami, 2022).

In accordance with the written opinion stating that a family environment that provides support both emotionally and socially, as well as creating a safe, conducive, enjoyable, and stress-free home atmosphere, has a significant impact on fostering students learning motivation. Intrinsic motivation and a great will to study in the end have a favourable effect on students' academic performance (Darmawan & Safiani, 2025). However, in this study, the relationship between the two was not found to be significant.

The differences in results could be caused by several conditions, namely the family environment conditions among each student are not very noticeable, the limited sample size (only 30 people), and the possibility that the questionnaire scores do not have significant differences among each respondent, which could also lead to a low correlation coefficient obtained. These conditions result in a very weak relationship between the variables. In addition, student achievement is likely influenced not only by family environment

factors but also, to a greater extent, by internal factors, including psychological and physical factors, aptitudes and interests, and motivation to learn, furthermore, student achievement is also impacted by other external factors like the school environment and the peer group (Parni, 2023) .

The variation in family environment conditions is a key factor behind the low correlation found in this study. As shown in the descriptive analysis (Table 6), the high variability in scores, indicated by a range of 29.00, reflects the diverse home situations of the respondents. Referring to the instrument items regarding study facilities and atmosphere (Items 1–5), there is a stark contrast between students who have adequate resources and those who face technical constraints or household distractions. Furthermore, differences in parental support, expectations, and supervision patterns (Items 6–14) suggest that each student experiences a unique level of domestic engagement. Because these response patterns are highly inconsistent and do not follow a uniform trend, the linear relationship between the family environment and mathematics learning outcomes remains very weak. This reinforces the notion that at the high school level, academic performance is likely influenced by more dominant internal or external factors beyond the immediate family sphere.

The findings of this study show that although the family environment is an important factor in student education, the family environment does not always have an important effect on each students learning outcomes. Therefore, greater attention is needed from the school, especially teachers, in developing learning strategies and creating an educational environment that can enhance students' learning motivation and outcomes.

CONCLUSION

The study's findings indicate that there is no meaningful connection between the family environment and the math learning outcomes of pupils in the tenth grade at one of Teluk Gelam's high schools. This is reinforced by the results of the Spearman Rank correlation test, which obtained a correlation coefficient value of 0.002 with a significance value of 0.990 (> 0.05), therefore H_0 is accepted.

The study's findings show that the aspects of the family environment, which include the learning environment and facilities, support, expectations, and attitudes of parents, as well as parental supervision, do not have a significant relationship with students' mathematics learning outcomes as assessed by the Mid-Semester Examination scores. This finding also addresses the research objective, which is to analyse the connection between the aspect of the family environment and students' mathematical abilities, where no significant relationship was found in this research.

Theoretically, the condition of the family environment has a significant impact on enhancing kids' learning outcomes, but the findings of this study indicate that this influence is not always consistent. This is likely due to other factors such as learning motivation, each student's ability, as well as the school and friendship environment, so improving learning outcomes needs to be done comprehensively by considering these various factors.

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