



# CONTRIBUTION OF ACADEMIC SELF-CONCEPT, STUDENT DISCIPLINE AND LEARNING MOTIVATION TO STUDENTS' MATHEMATICS LEARNING OUTCOMES

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## Article Info

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## ABSTRACT

This study aims to describe and analyze the contribution of variables: (1) academic self-concept, (2) student discipline, (3) learning motivation, and (4) academic self-concept, student discipline, and learning motivation both simultaneously to the learning outcomes of Mathematics students in grade V of SDN Cluster II, Abiansemal District, Badung Regency. The sample in this study amounted to 124 students. The sample determination technique uses probability sampling/random sampling techniques. This research was designed in the form of ex post facto research. Data were collected using questionnaires on academic self-concept, student discipline, learning motivation and learning outcome documents. The data were analyzed by simple and multiple linear regression. Research results: (1) academic self-concept makes a positive and significant contribution to Mathematics learning outcomes with a regression coefficient of 0.449; (2) student discipline makes a positive and significant contribution to Mathematics learning outcomes with a regression coefficient of 0.379; (3) learning motivation makes a positive and significant contribution to Mathematics learning outcomes with a regression coefficient of 0.540; and (4) simultaneously, academic self-concept, student discipline, and learning motivation make a significant contribution to Mathematics learning outcomes with a determination coefficient of 96.6%, while the remaining 3.4% is influenced by other factors outside the research model. Based on these findings, it can be concluded that academic self-concept, student discipline, and learning motivation are factors that significantly contribute to Mathematics learning outcomes.

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## 1. INTRODUCTION

Mathematics is one of the subjects that must be studied at the elementary school level is still considered difficult, boring and scary for some students [1]. Mathematics is very significant to get a view that tends to be difficult and most students agree that learning mathematics requires a harder process and struggle compared to others [2]. The success of learning Mathematics at the elementary school level can be influenced by various factors. The factors in question, namely the Internal that comes from within the students and factors External that comes from the outside environment. The main internal factors include academic self-concept, learning discipline, and learning motivation. Students with positive academic self-concept, good discipline, and high

learning motivation tend to be better prepared to face learning challenges and able to achieve more optimal learning outcomes than students who are weak in one of these aspects. If these factors are met, it will result in an increase in student learning outcomes [3].

Students' confidence in their capacity to learn, known as academic self-concept, has a great influence on their attitudes and learning outcomes. Academic self-concept plays an important role in shaping students' confidence in their ability in the academic field. This concept includes an individual's perception of his or her competence in the academic field, and has consistently been shown to have a positive effect on learning achievement, especially in Mathematics. Where students with a positive academic self-concept will have higher confidence in following lessons, dare to try to solve problems, and do not give up easily when facing difficulties. In contrast, students with negative academic self-concept tend to be hesitant, afraid of failure, and ultimately passive in learning. This condition certainly has a direct impact on mathematics learning outcomes.

Each student has a different process to be able to find information. Responsibility for tasks is one of the indicators of discipline, students who are independent in learning have the responsibility to review themselves in any aspect, both in achieving a goal, and in focusing on what is assigned to them. It is not only the academic self-concept and student discipline that affect the learning outcomes of Mathematics. A student who has a strong desire to excel or a desire to achieve high achievement will certainly try their best in learning activities so as to obtain optimal learning results. So, in other words, motivation can affect the learning outcomes obtained [4], [5].

Motivation has been widely associated with learning techniques as it relates to all cognitions, behaviors, attitudes, and emotions that enhance the acquisition, understanding, and transfer of new knowledge or abilities [6]. In addition to motivation, there is a learning discipline, where a student has the will of someone who appears with his own consciousness to follow the rules that apply in learning activities [7], [8]. Students must be disciplined in learning both at school and at home. Students must also be diligent and persistent while studying at school. Not only that, but learning discipline has uses or benefits in achieving student learning outcomes so that students have good learning skills, such as organizing their lives, building personalities, and following the rules that apply when students have a very disciplined attitude at school. Discipline is an effort to control the individual and behavior of a person or a group of people by increasing loyalty and unity to rules based on support and self-awareness [9].

Based on this description, learning motivation affects mathematics learning outcomes and the rest is influenced by other factors. Theoretically, academic self-concept, discipline, and motivation to learn are three factors that are closely interrelated. A positive academic self-concept will build students' confidence, discipline will help them manage the learning process, while motivation will be a driving force in achieving learning goals. The three if developed optimally are believed to be able to significantly improve Mathematics learning outcomes. Therefore, the researcher wants to find out how much the contribution of academic self-concept, student discipline, and learning motivation affects student learning outcomes, especially in the field of mathematics in SD Cluster II, Abiansemal District, Badung Regency. So the research title (Christian & Pahlevi, 2021) "Contribution of Academic Self-Concept, Student Discipline and Learning Motivation to Mathematics Learning Outcomes of Grade V Students of SDN Cluster II, Abiansemal District, Badung Regency" was formulated so that if it is empirically proven that academic self-concept, student discipline and learning motivation contribute to Mathematics learning outcomes.

## 2. RESEARCH METHODS

This research is a type of research *ex post facto* by digging up pre-existing facts [10]. The research seeks the contribution of academic self-concept, student discipline and learning motivation to mathematics learning outcomes. This research was carried out at SDN Cluster II, Abiansemal District, Badung Regency. The time for this research is approximately 8 months starting from November 2024 to June 2025 which starts from making a title and making a draft proposal. The population in this study is all grade V students of SDN Cluster II, Abiansemal District, Badung Regency which consists of 8 schools. The number of students in grade V of SDN Cluster II, Abiansemal District, Badung Regency is 146 students. The sample taken with an error rate of 5% was 106 people.

The data collection methods in this study are divided into two, namely the test method and the non-test method. As for this study, a non-test method is used, which functions to measure and evaluate aspects related to the realm of students' attitudes and skills. The preparation of instruments in this study refers to the grid developed from the conceptual definition and operational definition of each variable. The instrument that has been prepared is then tested first to measure the quality of the question item or statement through the analysis of validity, differentiation, difficulty, and reliability. Descriptive statistical analysis is one of the data analysis techniques that will be used to describe the data that has been collected by researchers. Inferential statistical analysis techniques are carried out useful to test research hypotheses in a way that is, analyzing sample data. This data analysis stage consists of a prerequisite test for analysis and a hypothesis test.

### 3. RESULT AND ANALYSIS

#### Normality Test

The normality test is carried out to find out whether the data of each variable is distributed normally so that it can be used in parametric analysis. The results of the normality test in this study are as follows:

**Table 1.** Normality Test

One-Sample Kolmogorov-Smirnov Test		Unstandardized Residual
N		124
Normal Parameters, b	Red	0.0000000
	Std. Deviation	2.24204250
Most Extreme Differences	Absolute	0.054
	Positive	0.038
	Negative	-0.054
Test Statistic		0.054

Based on the results of the Kolmogorov-Smirnov normality test on the residual data, a significance value of 0.200 was obtained. This value is greater than the significance limit of 0.05, so it can be concluded that the residual data is normally distributed. Thus, the assumption of normality is fulfilled and the data is feasible for use in subsequent parametric statistical analysis, such as regression or other hypothesis tests.

#### Linearity Test

A linearity test was performed to determine whether the relationship between the independent variable and the dependent variable formed a straight-line pattern (Linear) [11]

**Table 2.** Linearity Test

			ANOVA Table				
			Sum of Squares	df	Mean Square	F	Sig.
Learning Outcomes * Learning Motivation	Between Groups	(Combined) Linearity	17297.728	30	576.591	66.638	0.000
		Deviation from Linearity	17031.264	1	17031.264	1968.341	0.000
			266.463	29	9.188	1.062	0.400
	Within Groups		804.692	93	8.653		
	Total		18102.419	123			

Based on the results of the linearity test in the ANOVA table, a significance value on the Linearity component of 0.000 was obtained, which shows that there is a significant linear relationship between the variables of Learning Motivation and Learning Outcomes. Meanwhile, the significance value on the Deviation from Linearity component is 0.400, which is greater than 0.05. This shows that there are no significant deviations from linearity.

#### Multicollinearity Test

The multicollinearity test was performed to find out if there is a correlation between independent variables in the regression model [12]. The results of the multicollinearity test in this study are as follows:

**Table 3.** Multicollinearity Test

Models	Unstandardized Coefficients		Standardized Coefficients		T	Sig.	Collinearity Statistics	
	B	Std. Error	Beta				Tolerance	VIVI D
	1 (Constant)	1.516	1.300					
Academic Self-Concept	0.449	0.097	0.457		4.645	0.000	0.290	3.966
Learning Discipline	0.379	0.127	0.192		2.991	0.003	0.690	4.431
Learning Motivation	0.540	0.115	0.346		4.707	0.000	0.530	8.987

a. Dependent Variable: Learning Outcomes

Based on Table 4.5, the variables of Academic Self-Concept, Learning Discipline, and Learning Motivation have Tolerance values of 0.290, 0.690; and 0.530, respectively, and VIF values of 3,966; 4,431; and 8,987. The entire Tolerance value is greater than 0.10 and the VIF value is still below the maximum limit of 10. This shows that there is no multicollinearity among independent variables in the regression model. Thus, it can be concluded that each independent variable has an independent contribution to the Learning Outcomes and the regression model meets the assumption of multicollinearity.

#### Heterokedasticity Test

The heterokedasticity test was performed to find out whether there was a residual variance disparity in each independent variable value

**Table 4. Heterokedasticity Test**

Models		Coefficient			t	Sig.
		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta		
1	(Constant)	1.286	0.792		1.623	0.107
	Academic Self-Concept	-0.029	0.059	-0.259	-0.499	0.619
	Learning Discipline	0.161	0.077	0.707	2.086	0.390
	Learning Motivation	-0.071	0.070	-0.396	-1.020	0.310

a. Dependent Variable: ABS\_RES

The overall significance value is greater than 0.05 indicating that there is no significant influence between the three independent variables on the residual absolute value. Thus, it can be concluded that the regression model does not experience heterokedasticity and meets classical assumptions regarding the similarity of residual variance.

#### Autocorrelation Test

The autocorrelation test was performed to find out whether there was a relationship or correlation between the residual in one observation and the residual in the other observation in the regression model.

**Table 5. Autocorrelation Test**

Runs Test	
	Unstandardized Residual
Test Value <sup>a</sup>	0.10645
Cases < Test Value	62
Cases >= Test Value	62
Total Cases	124
Number of Runs	67
Z	0.721
Asymp. Sig. (2-tailed)	0.471

a. Median

Based on the results of the Runs Test, a value of  $Z = 0.721$  was obtained with a significance of Asymp. Sig. (2-tailed) = 0.471. The significance value is greater than 0.05, so it can be concluded that the residual in the model is random. Thus, there is no indication of autocorrelation in the regression model. This suggests that the autocorrelation assumptions have been met, making the model feasible for use in further analysis.

#### Hypothesis Testing

Multiple linear regression tests are used to analyze the influence of more than one independent variable on dependent variables [13].

**Table 6. Multiple Linear Regression Test**

Models		Coefficient			T	Sig.
		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta		
1	(Constant)	1.516	1.300		1.166	0.246

Academic Self-Concept	0.449	0.097	0.457	4.645	0.000
Learning Discipline	0.379	0.127	0.192	2.991	0.003
Learning Motivation	0.540	0.115	0.346	4.707	0.000

a. Dependent Variable: Learning Outcomes

Based on the results of the multiple linear regression test in Table 4.8, a constant value of 1.516 was obtained, which means that when the three independent variables were zero, the Learning Outcome was at 1.516. The Academic Self-Concept variable has a coefficient value of 0.449, t calculation of 4.645, and a significance value of 0.000, so it can be concluded that Academic Self-Concept has a positive and significant effect on Learning Outcomes. The Learning Discipline variable has a coefficient of 0.379, t calculation 2.991, and a significance value of 0.003, which shows that Learning Discipline also has a positive and significant effect on Learning Outcomes. Furthermore, the Learning Motivation variable obtained a coefficient of 0.540, t calculated 4.707, and a significance of 0.000, which means that Learning Motivation has a positive and significant influence on Learning Outcomes. Overall, the three independent variables were proven to play a role in improving student learning outcomes.

### F Test

The F test or simultaneous test is used to find out whether all the independent variables in the regression model together have a significant influence on the dependent variables.

**Table 7. F Test**

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Models	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	17484.129	3	5828.043	1131.127	.000b
Residual	618.291	120	5.152		
Total	18102.419	123			

Based on the results of the F test in Table 4.9, the F value was obtained at 1131,127 with a significance value of 0.000. Since the significance value is much smaller than 0.05, it can be concluded that the regression model used is significant simultaneously. This means that the variables of Academic Self-Concept, Learning Discipline, and Learning Motivation together have a significant influence on Learning Outcomes. Thus, the regression model built is feasible to be used to predict Learning Outcomes based on these three variables.

### T test

The t-test is used to determine the influence of each independent variable partially on the dependent variable in a multiple linear regression model

**Table 8. T test**

Models	Coefficient			T	Sig.
	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta		
(Constant)	1.516	1.300		1.166	0.246
1 Academic Self-Concept	0.449	0.097	0.457	4.645	0.000
Learning Discipline	0.379	0.127	0.192	2.991	0.003
Learning Motivation	0.540	0.115	0.346	4.707	0.000

a. Dependent Variable: Learning Outcomes

Based on Table 8, the results of the t-test show that: Academic Self-Concept has a t-value of 4.645 with a significance value of  $0.000 < 0.05$ . This shows that Academic Self-Concept has a significant effect on Learning Outcomes. This means that the better the student's academic self-concept, the higher the learning outcomes achieved. Learning Discipline has a t-value of 2.991 with a significance value of  $0.003 < 0.05$ . This means that Learning Discipline also has a significant effect on Learning Outcomes. Thus, improving student learning discipline contributes positively to improving learning outcomes. Learning Motivation has a t-value of 4.707 with a significance value of  $0.000 < 0.05$ . These results show that Learning Motivation partially has a significant effect on Learning Outcomes. Students with higher learning motivation tend to have better learning outcomes.

Overall, the three independent variables were shown to have a partial significant effect on learning outcomes.

### Determination Coefficient Test

The determination coefficient test ( $R^2$ ) is used to determine how much ability an independent variable is to explain the variation in changes in the dependent variable.

**Table 9.** Determination Coefficient Test

Model Summary <sup>b</sup>				
Models	R	R Square	Adjusted R Square	Std. Error of the Estimate
I	.983 <sup>a</sup>	0.966	0.965	2.270

a. Predictors: (Constant), Learning Motivation, Learning Discipline, Academic Self-Concept  
b. Dependent Variable: Learning Outcomes

Based on Table 4.11, the R Square value is 0.966. This shows that 96.6% of the variation in learning outcomes can be explained by three independent variables, namely Academic Self-Concept, Learning Discipline, and Learning Motivation. Meanwhile, the remaining 3.4% were influenced by other variables outside the research model. The Adjusted R Square value of 0.965 also indicates that after adjustment for the number of variables, the model remains to have very strong explanatory capabilities. In addition, a Std. Error of the Estimate of 2,270 indicates that the model's prediction error rate is relatively small. Overall, this regression model can be said to be very good, because independent variables are able to explain almost all the variations in learning outcomes.

### Discussion

#### Contribution of Academic Self-Concept to Mathematics Learning Outcomes of Grade V Students of SDN Cluster II, Abiansemal District, Badung Regency

The results of the study show that there is a significant contribution between academic self-concept to the learning outcomes of Mathematics students in grade V of SDN Cluster II, Abiansemal District, Badung Regency. Based on partial regression analysis, a regression coefficient of  $B = 0.449$  was obtained with a calculated t-value = 4.645 and a significance of  $p = 0.000$  ( $p < 0.05$ ). These findings show that academic self-concept has a positive and significant influence on Mathematics learning outcomes [14]. Operationally, this result means that when the academic self-concept score increases by one unit, then the mathematics learning outcome increases by 0.449 units, assuming that the other variables in the model are in a fixed condition. The results of this study are in accordance with the findings of previous research which stated that positive self-concept is an important factor in various situations in learning, especially the mastery of students' knowledge competencies in Mathematics learning. Thus, the formulation of the first problem is clearly answered that the concept of academic self-concept makes a real contribution to students' academic achievements, especially in the subject of Mathematics.

Theoretically, these findings are consistent with Bandura's theory of self-efficacy and cognitive motivation theory which emphasizes that an individual's perception of his or her abilities has a major influence on academic performance. Academic self-concept is understood as expectations which are mental representations of a person's ability in the academic field students who believe in their abilities tend to be more ready to accept challenges, more diligent in completing assignments, and better able to overcome learning obstacles [15]. Self-concept has an important role in optimizing mathematics learning outcomes where self-concept with mathematics learning outcomes has a significant effect [16]. So a person who has a positive academic self-concept is more enthusiastic, full of confidence and tends to be positive about something, as well as towards the failures experienced in learning Mathematics, can accept himself as he is, be grateful for his strengths and sincere about his shortcomings [17].

In the context of elementary school, these findings also underline the importance of the role of teachers in building a positive academic self-concept in students through a supportive learning approach, providing constructive feedback, and strengthening student success. Simple interventions such as giving students the opportunity to succeed in gradual assignments, rewarding effort, and creating a learning environment that is safe for trial and error, can go a long way in shaping academic self-concept. Thus, the results of this study not only strengthen the existing theoretical foundation, but also provide practical implications for teachers and schools in an effort to improve Mathematics learning outcomes through the development of students' psychological aspects.

#### Contribution of Student Discipline to Mathematics Learning Outcomes of Grade V Students of SDN Cluster II, Abiansemal District, Badung Regency

The results of the study showed that learning discipline made a positive and significant contribution to the learning outcomes of Mathematics students in grade V of SDN Cluster II, Abiansemal District, Badung Regency. Based on the results of partial regression analysis, the value of the coefficient  $B = 0.379$  with t calculated = 2.991 and the significance value of  $p = 0.003$  ( $p < 0.05$ ) were obtained. The results of this study are in accordance with

previous research which stated that discipline is significant in supporting their learning outcomes [9]. This shows that the higher the level of discipline of students in following the learning process and carrying out their academic obligations, the higher the mathematics learning outcomes achieved. Statistically, these findings confirm that learning discipline is one of the important factors that play a role in improving academic performance, especially in subjects that require continuous practice such as Mathematics. Discipline has several elements, including obeying rules, norms, and laws that apply as a tool to influence, change, and foster a person's personality in order to obey these rules. High learning discipline will encourage students to get good Mathematics learning outcomes. This is because to get good grades, rules of conduct are needed that support the student learning process [18]

### **Contribution of Learning Motivation to Mathematics Learning Outcomes of Grade V Students of SDN Cluster II, Abiansema District, Badung Regency**

The results of the study showed that learning motivation made a significant and very strong contribution to the learning outcomes of Mathematics students in grade V of SDN Cluster II, Abiansema District, Badung Regency. Based on partial regression analysis, the value of the coefficient  $B = 0.540$  with  $t = 4.707$  and the significance value of  $p = 0.000$  ( $p < 0.05$ ) was obtained. This coefficient value is the highest compared to other independent variables, so it can be concluded that learning motivation is the most influential predictor in improving mathematics learning outcomes. These findings provide an affirmative answer to the formulation of the problem that learning motivation has a significant contribution to students' academic achievement. The results of this study are in accordance with previous research which stated that student motivation is a strong predictor of academic achievement [19], [20]. The findings suggest that learning motivation is a significant predictor of academic achievement, with cognitive motivation showing the strongest positive correlation. Students who show higher cognitive motivation characterized by intrinsic interest and curiosity—tend to achieve better academic results. In addition, achievement motivation also showed a moderate positive correlation with performance, suggesting that a sense of accomplishment contributes to students' academic success [21].

In the context of Mathematics learning, learning motivation has a very strategic role. Mathematics is known as a subject that requires perseverance, problem-solving skills, and a multi-level understanding of concepts. Motivated students are not only more willing to take on difficult tasks, but also more persistent in seeking out different strategies to understand abstract concepts. They are usually willing to do additional exercises, repeat material that they have not yet understood, and actively ask questions when faced with obstacles. These attitudes directly contribute to improved learning outcomes.

Viewed from a practical perspective, these findings provide an important picture for teachers and schools to prioritize the development of students' learning motivation. Increased motivation can be done through the preparation of clear and meaningful learning objectives, the use of interesting learning methods, the provision of constructive feedback, and the creation of a supportive and non-intimidating learning environment. When students feel valued, accompanied, and given the opportunity to succeed, their motivation to learn will grow naturally. Thus, increased motivation will not only have an impact on Mathematics learning outcomes, but will also strengthen students' long-term learning character.

In addition, these results also emphasize the importance of collaboration between teachers and parents in fostering student motivation. Parental support at home, such as providing conducive learning spaces, providing emotional encouragement, and monitoring children's learning routines, can strengthen motivation instilled in school. When the home and school environment are mutually supportive, students will have a strong motivational foundation to deal with challenging Maths learning.

### **Contribution of Academic Self-Concept, Student Discipline and Learning Motivation to Mathematics Learning Outcomes of Grade V Students of SDN Cluster II Abiansema District, Badung Regency**

A simultaneous test (Test F) was conducted to find out whether academic self-concept, student discipline, and learning motivation together make a significant contribution to the mathematics learning outcomes of grade V students of SDN Cluster II, Abiansema District, Badung Regency. The results of the analysis showed that the three variables simultaneously had a significant effect on learning outcomes, with values  $F = 1131.127$  and  $p = 0.000$ . A very small significance value ( $p < 0.05$ ) confirms that the regression model used has a very high predictive power and does not occur by chance.

In addition, the determination coefficient  $R^2 = 0.966$  indicates that 96.6% of the variation in Mathematics learning outcomes can be explained by the variables of academic self-concept, student learning discipline, and learning motivation. The results of this study are in accordance with the statement that self-concept is a psychological construct with many dimensions that affect the nature of self-experience, including cognition, emotions, and motivation (García-Martínez et al., 2022). Self-discipline and learning motivation have an influence on improving student learning outcomes [23]. Therefore, it can be concluded that academic self-concept, learning discipline, and learning motivation have a very important role in determining the learning outcomes of Mathematics students in grade V of SDN Cluster II, Abiansema District, Badung Regency. The suggestion for further research is that the next research is suggested to add other variables such as mathematics anxiety, parental

support, teaching quality, or learning environment, and apply it to schools with different characteristics so that the research results are more general and comprehensive

#### 4. CONCLUSION

Based on the results of the analysis of the problem formulation studied, it can be concluded that academic self-concept, learning discipline, and learning motivation have a very important role in determining the learning outcomes of Mathematics students in grade V of SDN Cluster II, Abiansamal District, Badung Regency. The findings of the study show that: Academic self-concept has an indirect influence on learning outcomes. Learning discipline has been proven to have a direct and significant influence on Mathematics learning outcomes. Furthermore, learning motivation also has a positive and significant influence on Mathematics learning outcomes, so that the higher the learning motivation that students have, the higher the learning outcomes achieved. Overall, the intervariable relationship model tested in this study proved to be very strong, confirming that the success of learning Mathematics in elementary school students in the context of this study was greatly influenced by internal student factors, both in terms of psychology and behavior. As for suggestions for further research, it is recommended to add other variables such as mathematics anxiety, parental support, teaching quality, or learning environment, and apply them to schools with different characteristics so that the results of the research are more general and comprehensive.

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