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THE INFLUENCE OF LEARNING MOTIVATION AND LEARNING CONCENTRATION ON UNDERSTANDING OF MATHEMATICS CONCEPTS

Yayan Alpian[1*], Tarpan Suparman[2], Tika Nurjanah[3], Sri Wulan Anggraeni[4], Mahpudin[5], Ujiati Cahyaningsih[6]

[1,2,3,4] Universitas Buana Perjuangan Karawang
[5,6] Universitas Majalengka
[1] yayan.alpian@ubpkarawang.ac.id

Abstract

The background of this research is the common understanding of mathematical concepts caused by several factors, including online learning, less optimal learning, students finding mathematics challenging to understand, lack of student motivation in learning, and low levels of student learning concentration. This study aims to determine the effect of learning motivation and concentration on understanding mathematical concepts. The method used is a survey with multiple correlation techniques. The sample was taken by random sampling technique, which consisted of 84 students of class V elementary schools in the Tanjungpura-Tanjungmekar Karawang cluster. The instruments used were questionnaires to measure learning motivation and concentration and tests to gauge understanding of mathematical concepts. Data analysis used multiple linear regression statistics with the help of the SPSS 25 application. The results showed (1) there was an effect of learning motivation and study concentration simultaneously (simultaneously) on understanding mathematical concepts 114,921, (2) there was an effect of learning motivation on understanding concepts of mathematics of 0.786, (3) there is an effect of learning concentration on understanding mathematical concepts of 0.784. This can be interpreted that the higher the learning motivation and concentration of learning, the better the understanding of mathematical concepts; conversely, the lower the learning motivation and concentration, the less good the understanding of mathematical concepts is. In conclusion, students who have good learning motivation and concentration are expected to be able to provide examples to other students in the learning process, which can improve their understanding of mathematical concepts
Keywords: *Learning motivation; learning concentration; math comprehension*

Abstrak

Penelitian ini dilatarbelakangi oleh rendahnya pemahaman konsep matematika yang disebabkan beberapa faktor di antaranya pembelajaran secara daring, pembelajaran kurang maksimal, siswa menganggap matematika sulit untuk dipahami, kurangnya motivasi siswa dalam belajar serta tingkat konsentrasi belajar siswa rendah. Penelitian ini bertujuan untuk mengetahui pengaruh motivasi belajar dan konsentrasi belajar terhadap pemahaman konsep matematika. Metode yang menggunakan yaitu survei dengan teknik korelasi berganda. Sampel diambil dengan teknik *random sampling,* yaitu berjumlah 84 orang siswa kelas V sekolah dasar se-gugus Tanjungpura-Tanjungmekar Karawang. Instrumen yang digunakan berupa kuisioner untuk mengukur motivasi belajar dan konsentrasi belajar dan tes untuk mengukur pemahaman konsep matematika. Analisis data menggunakan statistik regresi linier berganda dengan berbantuan aplikasi SPSS 25. Hasil penelitian menunjukkan (1) terdapat pengaruh motivasi belajar dan konsentrasi belajar secara bersama-sama (simultan) terhadap pemahaman konsep matematika sebesar 114,921, (2) terdapat pengaruh motivasi belajar terhadap pemahaman konsep matematika sebesar 0,786, (3) terdapat pengaruh konsentrasi belajar terhadap pemahaman konsep matematika sebesar 0,784. Hal ini dapat diartikan semakin tinggi motivasi belajar dan konsentrasi belajar maka semakin baik pula pemahaman konsep matematika, sebaliknya motivasi belajar dan konsentrasi belajar rendah maka semakin kurang baik pula pemahaman konsep matematika. Kesimpulan, siswa memiliki motivasi belajar dan konsentrasi belajar yang baik diharapkan dapat memberikan contoh kepada siswa yang lainnya dalam proses pembelajaran yang dapat meningkatkan pemahaman konsep matematika.
Kata Kunci: Mot*i*vasi Belajar; Konsentrasi Belajar; Pemahaman Konsep Matematika

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Introduction

When pupils cannot understand or misunderstand mathematical concepts, failure frequently occurs during mathematics learning (Novitasari, 2016). One of the significant issues in primary school mathematics education nowadays is that kids still need to understand mathematical ideas. According to Alzanatul Umam & Zulkarnaen (2022), learning mathematics is intimately tied to conceptual comprehension because when working on mathematical problems, pupils must first understand a concept. According to Fauzi et al. (2022), pupils who struggle with mathematics do so because they do not grasp inquiries about their capacity to understand mathematical concepts.

Understanding is a fundamental quality that students must possess to attain maximum ultimate outcomes in any subject taught by the teacher. Understanding is to create prospective abilities inside oneself that can handle difficulties encountered. According to Siyam (2014), understanding is a level of skill with which pupils are required to understand meanings or concepts, circumstances, and facts that they are familiar. Inextricably linked to learning mathematics, students must know mathematical principles to have superior comprehension abilities and be practical in addressing problems properly.

Understanding is a critical component of learning mathematics. A student must grasp mathematical concepts since good concepts allow pupils to solve issues quickly and use them in everyday life (Angra Meta Ruswana, 2018; Rochim et al., 2021). Understanding mathematical concepts is one of the aims of each material supplied by the teacher since the teacher serves as a guide for the student to reach the intended concept (Santoso, 2017). Understanding mathematical concepts is a fundamental foundation for problem-solving in mathematics and everyday life (Fitri & Aima, 2017; Pohan et al., 2020; Sunarto et al., 2021).

Learning motivation and learning concentration are two characteristics that influence the understanding of mathematical concepts. The desire of a student to participate in the learning environment is referred to as motivation (Di Serio et al., 2013; Wei et al., 2015). Learning implementation will be ideal with motivation to learn and concentrate on learning. Good student learning motivation, teacher directives, motivation, and students' eagerness to learn are all factors that assist student learning concentration (Dores et al., 2019). According to the findings of a study conducted by Halimi et al. (2021), the decline in learning outcomes in mathematics scores was caused by several factors, including a lack of student motivation in mathematics lessons, with students preferring to play with their friends rather than receive lessons from the teacher in class.

One of the essential aspects of achieving learning objectives is learning motivation. Students will be motivated to continue studying due to learning motivation (Abramovich et al., 2019; Puspitarini & Hanif, 2019). Students with solid learning motivation will undoubtedly be encouraged to learn as much as possible to better their comprehension of mathematical subjects. Of course, each student has a unique learning drive; there are students with high, medium, and low learning motivation, all of which must influence the outcomes. According to Sarmiati et al. (2019), eager students will be engaged in the learning process by actively asking questions, providing comments, taking notes, creating resumes, finishing subject content, practicing, working on practice questions, and evaluating, suited to learning expectations.

Learning attention is vital in developing optimum knowledge of mathematical topics and promoting the drive to learn in kids. Learning concentration is an act that focuses students' thoughts, attention, and awareness to understand and grasp subjects and educational processes by blocking or setting aside anything unrelated to learning tasks (Rumapea et al., 2022). Therefore, the concentration level of student learning considerably influences the learning process's success. According to Anggraini & Dewi (2022), learning focus is significant in the learning process since concentration is an aspect that helps pupils learn. If pupils cannot concentrate on the current lesson, it will impact the students' understanding of the lesson, affecting learning objectives. According to Mayasari (2017), concentration significantly impacts learning since someone who struggles with concentration may perceive learning as a loss of time, energy, and money. As a result, to study well, students must develop the habit of concentrating. Concentration is essential in achieving learning goals; as stated by Ardila & Hartanto (2017), low concentration of student learning will impact the learning process, resulting in a reduction in the absorption of understanding of mathematical concepts experienced by students.

According to Cahani et al. (2021), students with low learning concentration meet just one indicator, students with moderate learning concentration meet two hands, and students with high learning concentration meet all indicators of capacity to understand mathematical concepts. Riinawati, (2021) findings reveal that learning concentration is directly associated with student accomplishment during the Covid-19 epidemic at the Karang Mekar 4 School in Banjarmasin, as evidenced by students who concentrate on learning pretty well and who acquire superior learning outcomes. Damayanti & Rufiana (2021) research found a link between understanding mathematical concepts in geometric material and student learning motivation. Students with inadequate basis have a poor experience of mathematical topics. Students with a moderate amount of motivation understand mathematical concepts better than students with a low level of motivation. Highly motivated students have a better understanding of subjects. According to Afrilia et al. (2022), video-animation-based learning medium can boost elementary school pupils' learning motivation. Another study, "Effect of Brain Gym in Increasing the Learning Concentration of 6th Grade on Online Learning During the Covid-19 Pandemic," conducted by Anggraini & Dewi (2022), concluded that brain gyms could increase the learning concentration of class VI school students every week, with the concentration increasing significantly after the brain gymnastic intervention. Conclusion: During the COVID-19 pandemic, primary schools can create brain gyms to help children improve their attentiveness to online learning.

Based on earlier studies, researchers researched mathematical concept understanding in public elementary school children. However, the peculiarity of this study is that it investigates the influence of learning motivation and concentration on fifth-grade students' knowledge of mathematical ideas simultaneously. Because previous research only addressed understanding mathematical concepts associated with methods, teaching media, learning motivation associated with methods or media learning, and learning concentration associated with brain gymnastics, many studies have been conducted on junior high and high school students. As a result, this study aimed to see how learning motivation and concentration simultaneously affected fifth-grade elementary school kids' knowledge of mathematical ideas.

Research Methods

The methodology utilized in this study is quantitative. The quantitative method can be defined as a method based on the philosophy of positivism that examines a specific sample or population. Generally, the sampling technique is random, the data collection technique uses research instruments, and the quantitative data analysis tests a predetermined hypothesis (Sugiyono, 2018). Furthermore, according to Wekke (2019), the correlation approach is used in this study to look for a relationship or effect between two or more variables, namely the independent and dependent variables, utilizing the multiple correlation method. With a total of 511 students, the population in this study was all fifth graders at SDN in the Tanjungpura-Tanjungmekar Karawang cluster for the 2021/2022 academic year. The sampling technique was random sampling with the slovin formula, with a 10% error rate, and the sample was 84 pupils from class V SDN in the Tanjungpura-Tanjungmekar Falkirk cluster.

A questionnaire was used to measure learning motivation and concentration in this study. In addition, a test instrument to examine the understanding of mathematical ideas was delivered to respondents, who were fifth-grade students at SDN in the Tanjungpura-Tanjungmekar Karawang cluster. Analysis precondition tests, particularly the standard assumption test and hypothesis testing using the SPSS version 25 application with a significance level of 0.05, are examples of data analysis procedures.

Results and Discussion

The purpose of this study is to determine the influence of learning motivation and learning focus on the knowledge of mathematical concepts at the same time.

The normality test was used to determine whether the data received from the research results to measure learning motivation, learning concentration, and mathematical concept understanding were normal or not. The Kolmogorov-Smirnov sample was used to perform a normality test. The normalcy test results are shown in Table 1 below:

Table 1. Normality Test Results

		Learning Motivation	Learning Concentration	Understanding Mathematical Concepts
N		84	84	84
Normal Parameters[b]	Mean	73,6786	68,7857	32,9524
	Std. Deviation	13,43988	10,29922	4,81440
Most Extreme Differences	Absolute	,071	,075	,070
	Positive	,049	,070	,067
	Negative	-,071	-,075	-,070
Test Statistic		,071	,075	,070
Asymp. Sig. (2-tailed)		.200[c,d]	.200[c,d]	.200[c,d]

a. Test distribution is Normal.
b. Calculated from data.
c. Lilliefors Significance Correction.
d. This is a lower bound of the true significance.

By looking at the test results column of learning motivation, learning concentration, and grasp of mathematical ideas with a significance value of more than 0.05 in the table above, it is clear that all variables in this study are normally distributed.

This multicollinearity test determines whether or not learning motivation and learning concentration (independent variables) are linearly connected. The tolerance value or VIF value

Jurnal Cakrawala Pendas Vol. 9, No. 1, January 2023, pp. 153-163

can be used to detect the incidence of multicollinearity. Multicollinearity does not arise if the tolerance value is more significant than 0.10 and the VIF value is more important than 10.0. table 2 summarises the findings of the multicollinearity test:

Table 2. Multicollinearity Test

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	5,401	1,882		2,870	,005		
	Learning Motivation (X1)	,170	,027	,475	6,241	,000	,556	1,800
	Learning Concentration (X2)	,218	,036	,467	6,138	,000	,556	1,800

a. Dependent Variable: Understanding Mathematical Concepts (Y)

The multicollinearity test table for learning motivation and learning concentration above shows a tolerance value of 0.556 and a VIF value of 1.800, indicating that the tolerance value is more significant than 0.10. Furthermore, the VIF value is greater than 10.0, implying no multicollinearity between the learning motivation and concentration variables (independent variable).

The autocorrelation test was used to determine whether or not there is a relationship between learning motivation, learning concentration, and mathematical concept understanding. There is autocorrelation if the Durbin Watson value is dL, no autocorrelation if the dU value is Durbin Watson value or 4-dU, and it cannot be concluded if the Durbin Watson value is dL and dU or Durbin Watson value (4-dL) and (4-dU). To determine whether or not autocorrelation exists, look at the Durbin-Watson value in table 3 below:

Table 3. Autocorrelation Test

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	,860[a]	0,739	0,733	2,488	0,739	114,921	2	81	0,000	1,913

a. Predictors: (Constant), Learning Concentration, Learning Motivation
b. Dependent Variable: Understanding Mathematical Concepts

The Durbin Watson value is 1.913 with a sig level of 5%, the number of samples is 84 (n), and the number of independent variables is 2 (k = 2), yielding a dU value of 1.6942 and a value (4- dU) = 2.3058. As a result, the value of dU Durbin Watson is 1.6942 1.913, and the importance of Durbin Watson (4-dU) is 1.913 2.3058, indicating that there is no autocorrelation.

a. The heteroscedasticity test is used to determine whether or not there are variance dissimilarities. The premise for decision-making in the heteroscedasticity test is that if the sig value is 0.05, heteroscedasticity does not occur. If the sig value is 0.05, heteroscedasticity happens. The heteroscedasticity test results are shown in Table 4 below:

Table 4. Heteroscedasticity Test

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	3,381	1,047		3,228	,002
	Learning Motivation (X1)	,009	,015	,084	,574	,568
	Learning Concentration (X2)	-,029	,020	-,216	-1,473	,145

a. Dependent Variable: Abs_res

According to the findings of the heteroscedasticity test, the sig value of the learning motivation variable was 0.568, and that of the learning concentration variable was 0.145. Therefore, the significance of the variables learning motivation and concentration is 0.05. This leads to the conclusion that there is no heteroscedasticity between variables.

The hypothesis in this study is that there is an effect of learning motivation and learning concentration on understanding mathematical concepts. Provisions for accepting or rejecting the idea is to pay attention to the acquisition of f or f-count with f-table at the 5% significance level. For example, if f-count > f-table at a significance level of 5%, Ho is rejected, and Ha is accepted. To see whether there is an effect of learning motivation and learning concentration on understanding mathematical concepts, see the table below:

Table 5. F Test (Simultaneous Test)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1422,500	2	711,250	114,921	.000[b]
	Residual	501,310	81	6,189		
	Total	1923,810	83			

a. Dependent Variable: Understanding Mathematical Concepts (Y)

b. Predictors: (Constant), Learning Concentration (X2), Learning Motivation (X1)

Based on the ANOVA output table above, in the F test, the sig value is 0.000; this means that learning motivation and learning concentration simultaneously (simultaneously) affect the understanding of mathematical concepts. Statistically, it is known that the sig value is 0.000 <0.05. Furthermore, see how much % the effect of learning motivation and learning concentration simultaneously (simultaneously) on understanding mathematical concepts can be seen in the value of R Square in the following table:

Table 6. Determination Test

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.860[a]	,739	,733	2,48777

a. Predictors: (Constant), Learning Concentration (X2), Learning Motivation (X1)

Based on the R Square value in the model summary table, the R Square value is 0.739, meaning that learning motivation and concentration simultaneously affect mathematical concepts' understanding by 73.9%. In comparison, the remaining 100% -73.9% = 26, 1% is influenced by other variables outside of learning motivation and concentration.

Jurnal Cakrawala Pendas Vol. 9, No. 1, January 2023, pp. 153-163

Table 7. Multiple Linear Test Results

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	5,401	1,882		2,870	,005
	Motivasi Belajar (X1)	,170	,027	,475	6,241	,000
	Konsentrasi Belajar (X2)	,218	,036	,467	6,138	,000

a. Dependent Variable: Understanding Mathematical Concepts (Y)

Based on table 7 above shows that the partial results of the hypothesis test obtained sig. for learning motivation of 0.005 <0.05 so that Ho is rejected and Ha is accepted, meaning that learning motivation has a partial effect on understanding mathematical concepts. Therefore, it can be interpreted that the higher the learning motivation will increase the understanding of mathematical concepts.

Learning motivation has an impact on mathematical idea understanding. Students with learning motivation will constantly be passionate and active in participating in the learning process, as evidenced by their desire to ask questions about subjects they do not understand and daring to come to the front of the class and answer questions presented by the teacher. Conversely, students who are not motivated to learn are less likely to engage in the learning process. Students with solid learning motivation for mathematics classes approach, appreciate, and expect mathematics lessons; as a result, students play an emotionally active role in the learning process, making learning more meaningful and learning attempts more effective (Lestari, 2015). Thus, student learning motivation is vital in more effective and meaningful learning attempts, specifically an increased understanding of learning—students with a strong drive and high motivation to get the best learning outcomes. Students motivated to learn can raise their curiosity, think critically, and gain a better understanding. Learning motivation is influenced by various elements, including internal factors such as the desire to achieve and external influences such as encouragement from teachers and peers to be more excited about learning. Students must have these elements to gain a better understanding.

According to Kamaluddin (2017), one of the elements that underpin excellent student performance is motivation, which influences concentration, memory, and conduct quality, such as dexterity, persistence, and sincerity. Of course, this significantly impacts student learning results, such as grasping mathematical concepts. Students that are highly motivated to learn to achieve better learning outcomes. According to Utami et al. (2017), motivation in learning activities can be a driving force for students to discover the concepts of the material being studied so that students truly understand the ideas of the explored material rather than simply memorizing it. According to this study, students with substantial learning motivation also had a good comprehension of mathematics. In contrast, students with low learning drive had a shared understanding of mathematics.

According to Sholihah (2016), the intensity of a student's motivation will significantly determine the level of achievement of his learning outcomes; someone with a high power of learning motivation will also have higher learning outcomes, while someone with low learning intensity will have lower learning outcomes. As a result, pupils who persevere based on learning motivation can get good results.

According to the explanation above, the influence of learning motivation on understanding mathematical concepts is statistically demonstrated to be accurate, implying that

if students have a high reason, their knowledge of mathematics would also increase. Therefore, this hypothesis states that for pupils to understand mathematical topics optimally, they must have a high level of learning motivation.

According to table 10, the partial results of the hypothesis test achieved sig. for learning motivation of 0.000 0.05, indicating that H0 is rejected and Ha is accepted, meaning that learning concentration has a partial effect on grasping mathematical concepts. Therefore, it can be interpreted that the higher the concentration level, the greater the knowledge of mathematical concepts.

They are learning that attention influences the understanding of mathematical concepts. Therefore, students who concentrate during the learning process can readily absorb and accept the lessons given by the teacher and solve learning problems. Still, students who need to focus during learning need help understanding the lessons conveyed by the teacher (Fridaram et al., 2021). On the other hand, students focused on education will pay attention during the learning process, show interest in learning, exhibit verbal and psychomotor reactions, and comprehend what the teacher is saying. Therefore, students with high levels of learning concentration are anticipated to meet learning objectives. However, internal factors, such as pupils' mature readiness to participate in learning and environmental influences, such as noisy surroundings and chatty friends, affect learning concentration. Therefore, students must have mature preparedness in education and be unconcerned about the environment that interferes with learning concentration to comprehend mathematics (Sukri & Purwanti, 2016) fully.

According to Pujiati & Mohammad Kanzunnudin (2018), various factors can contribute to a student's inability to understand mathematical concepts, one of which is that the material presented needs to be mastered. As a result, pupils with low learning concentration understand mathematics poorly, whereas students with intense concentration grasp mathematics well. In addition, soft focus results in low-quality activities, leading to a lack of seriousness in learning and understanding the topic (Adinata, 2017). This suggests that pupils with low learning concentration may engage in less strenuous learning activities, hurting mathematical knowledge. According to the argument above, the favorable influence of the learning concentration variable on mathematical knowledge is statistically established. This demonstrates that if kids have a high level of learning concentration, they will also have a high level of mathematical understanding. Therefore, this hypothesis states that to maximise pupils' grasp of mathematics, they must have a high learning concentration.

Conclusion

Based on the study and discussion above, it is possible to conclude that learning motivation and concentration influence mathematical concept understanding. Furthermore, students with high levels of learning motivation and concentration are predicted to be able to provide examples to other students during the learning process, which can boost knowledge of mathematical topics in particular and learning outcomes in general. As a result, schools must provide infrastructure and establish a suitable learning environment for students to study to boost students' motivation and concentration on their studies.

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