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Enhancing Students' Learning Motivation Through the Implementation of the Discovery Learning Model

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Abstract: The implementation of this study aims to examine how students' learning motivation develops during the discovery learning process supported by authentic assessment. Low motivation significantly contributes to poor engagement, reduced persistence, and lower learning outcomes. The research employs a descriptive qualitative design. Data analysis is conducted for all collected data, encompassing both quantitative and qualitative sources. Based on the N-Gain calculation, the experimental class had an average N-Gain of 0.53, which is considered moderate, while the control class had an average N-Gain of 0.29, which is considered low. This indicates that applying the Discovery Learning model in the experimental class led to a greater increase in learning motivation than that of conventional learning in the control class.

Keywords: Discovery learning; Learning motivation

Introduction

Learning motivation remains a central determinant of students' academic success (Humairoh et al., 2024). However, in many educational settings today, motivation among learners continues to decline, particularly due to instructional practices that are still dominated by teacher-centered approaches. When the learning environment is monotonous and information flows only from the teacher to the student, learners tend to become passive receivers rather than active participants (Lisanty et al., 2025). Recent studies suggest that low motivation significantly contributes to poor engagement, reduced persistence, and lower learning outcomes (Alesi et al., 2024). This situation highlights an urgent need for innovative learning models that can stimulate students' curiosity and foster their active involvement.

In the past, discovery-oriented instruction was viewed as time-consuming and difficult to implement due to limited teaching resources and traditional classroom norms (Nadia et al., 2024). As a result, teachers often prioritized direct instruction for efficiency (Brenner, 2022). However, current educational demands have shifted drastically. The rapid advancement of technology and access to information has reshaped students' characteristics; they are more exploratory, independent, and prefer interactive experiences (Bronwen Hale, 2015). Modern learners expect learning that is meaningful and encourages inquiry (Marliani et al., 2024). Research shows that contemporary students demonstrate higher motivation when engaged in student-centered and problem-based learning environments (Goodwin, 2024). Thus, the conventional lecture method is no longer sufficient to meet students' motivational needs.

In recent years, schools in Jayapura have faced significant challenges in fostering student motivation and conceptual understanding, particularly in science subjects. Many students struggle to grasp abstract scientific concepts, apply critical thinking, and solve problems independently. This situation is compounded

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by traditional teacher-centered approaches, which limit student engagement and reduce opportunities for active exploration and deeper learning. Empirical research supports the idea that Discovery Learning, a model in which students construct their own understanding through exploration, questioning, and problem-solving can substantially increase both learning motivation and achievement (Ali et al., 2025). Most existing studies have been conducted in urban or well-resourced regions, focusing on general learning outcomes or cognitive achievement, while limited attention has been given to students' learning motivation as a distinct variable in science subjects within eastern Indonesia, particularly Jayapura. By addressing this gap, the present study seeks to provide empirical insights that are both locally relevant and theoretically meaningful. In another study, applying Discovery Learning in mathematics helped students improve their problem-solving skills and increase their motivation compared to traditional expository teaching methods.

Several prominent learning theories strongly support the need for discovery-based approaches (Kerimbayev et al., 2023). Bruner's Discovery Learning Theory posits that students learn most effectively when they construct knowledge through exploration and problem-solving, resulting in a deeper understanding and stronger motivation (Agusti et al., 2024). In addition, Self-Determination Theory emphasizes that learners become more motivated when they experience autonomy, competence, and relatedness, three elements that are inherently present in discovery learning (Oktavianda et al., 2024). Research confirms that learning environments promoting autonomy and inquiry significantly enhance motivation levels (Yang et al., 2022).

Despite the theoretical and empirical evidence, many teachers still hesitate to implement discovery learning due to concerns about classroom management, time allocation, and assessment complexity (Guo et al., 2025). This gap between theory and practice presents an important area of investigation. Understanding how discovery learning can effectively enhance students' motivation is crucial because motivation is not only an emotional factor but also a predictor of long-term academic performance (Guo et al., 2025). Addressing this problem is essential to support educational improvements aligned with 21st century learning competencies (Wahyuddin et al., 2023). Therefore, an in-depth study is needed to examine the impact of the Discovery Learning model on students' learning motivation (Silaban et al., 2023).

The urgency of this study is closely related to recent curriculum reforms in Indonesia that emphasize student-centered learning and the development of higher-order thinking skills. The implementation of the Merdeka Belajar curriculum requires teachers to design learning experiences that actively engage students, encourage exploration, and foster intrinsic motivation, particularly in science subjects (Kementerian Pendidikan, 2022). However, classroom practices in many regions, including Jayapura, have not fully aligned with these curricular demands, as instruction often remains dominated by conventional, teacher-centered approaches. This condition limits students' opportunities to actively construct knowledge and weakens their motivation to learn science (Zheng et al., 2025). Students must now adapt to hybrid learning systems that require more independence and initiative. Studies show that discovery based instruction leads to higher adaptability, improved problem-solving skills, and enhanced motivation in post pandemic learning scenarios (Taber, 2018). In contrast, students who remain in passive learning environments tend to experience learning loss. Hence, strengthening motivation through discovery learning is highly relevant to the current educational challenges (Lawa, 2022). Given the persistent challenges in student motivation, Discovery Learning offers both theoretical and practical solutions. Theoretically, it aligns with constructivist principles that encourage knowledge construction through exploration and inquiry (Nurani & Suyanta, 2024). Practically, it helps educators design engaging learning activities such as experiments, inquiry tasks, and problem-solving scenarios that increase motivation (Low et al., 2026) . By examining how this model enhances students' motivation, the research aims to provide evidence based recommendations for improving classroom practices. Therefore, the study titled "Enhancing Students' Learning Motivation Through the Implementation of the Discovery Learning Model" emerges as a timely and relevant response to current educational needs.

Method

This study employed a quasi-experimental research design, utilizing a non-equivalent control group design. The research population consists of all eighth-grade students enrolled in junior high schools in Jayapura. This population is selected because students at this level are developmentally appropriate for inquiry-based learning and commonly experience motivational challenges in science learning. From this population, the sample was drawn using a purposive sampling technique to ensure comparable academic and contextual characteristics. Two junior high schools were involved in the study as representative institutions. Within each school, two intact classes were selected, one class was assigned as the experimental group and received instruction through the Discovery Learning model, while the other class served as the control group

and was taught using conventional teaching methods. The total sample size of 20 students at Abepura High School was adjusted to the general sample size in experimental educational research for adequate statistical power.

To rigorously demonstrate the impact of the Discovery Learning model on students' learning motivation, this study adopted an experimental research design that allows for causal inference. The design involves a comparison between a treatment group, which was taught using the Discovery Learning model, and a control group, which received instruction through conventional teaching methods. By ensuring that both groups shared similar initial characteristics and learning conditions prior to the intervention, any differences observed after the implementation could be attributed to the instructional model applied.

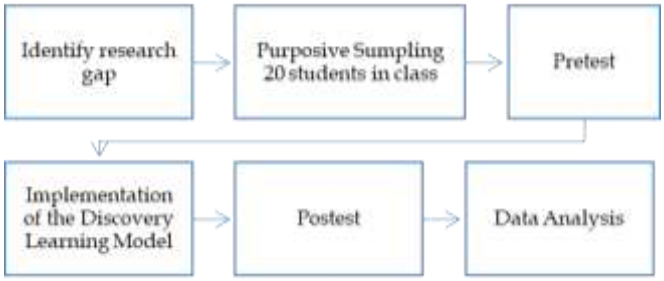

Figure 1. Research flow

Three complementary data collection techniques were used: questionnaires measuring students' learning motivation using a structured Likert scale instrument, observations documenting behavioral indicators such as participation, persistence, curiosity, and task engagement during Discovery Learning activities, and semi-structured interviews conducted with selected students and teachers to obtain deeper insights into changes in motivation and learning experiences.

One of the essential components of a research study is the availability of reliable instruments that can be used to collect and gather research data according to the needs of the study. The test instruments take the form of observation results obtained after participants receive treatment or experience the cooperative learning model of the group investigation type. Presentation is a part of communication in which the delivery process must ensure that the speaker and the audience share the same understanding. A presentation is also a form of communication that is carried out integratively through voice, visuals, and body language.

Descriptive statistics are required to determine the mean, median, standard deviation, variance, range, data frequency, charts, and other necessary information (Dwiyanti & Setyasto, 2025). This analysis is conducted using SPSS 17 by distributing the pretest–posttest data from both classes into the descriptive column of the SPSS 17 program. The analysis produces the mean, median, standard deviation, variance, range, frequency, charts, and other relevant information. This test aims to determine whether the sample is normally distributed. The normality test is conducted using SPSS. All tests are performed by distributing the data of each variable, namely presentation skills and the cooperative learning questionnaire, into the SPSS 17 program under the Explore menu.

Result and Discussion

Statistical Distribution of Learning Motivation

The statistical distribution of learning motivation data reflects the level of student motivation spread before and after the implementation of the discovery learning model. The statistical distribution of students' learning motivation can be seen in Table 1.

Table 1. Statistical Distribution of Learning Motivation in the Experimental Class

	Minimum	Maximum	Mean	Std. Deviation
Pretest	56.00	76.00	68.15	5.86
Postest	80.00	92.00	85.1	3.64

Table 1 presents descriptive statistics on students' learning motivation in the experimental class before and after the implementation of the discovery learning model. Based on the analysis, the learning motivation scores during the pretest ranged from 56 to 76, with a mean of 68.15 and a standard deviation of 5.86. This indicates that, before the implementation of the discovery learning model, students' learning motivation was in the moderate range, with relatively high variation in scores among individuals. After the learning was conducted using the discovery learning model, the posttest results showed a significant increase. The minimum score increased to 80, and the maximum score reached 92. The mean score for students' learning motivation also increased to 85.15, while the standard deviation decreased to 3.65.

This pattern of improvement aligns with previous research showing that Discovery Learning can effectively raise both motivation and academic outcomes. For instance, Nurrokhmah, Krissandi, and Sarwi (2023) found that applying Discovery Learning to mathematics instruction significantly increased students' motivation and achievement in primary school (Farida Nurrokhmah et al., 2021). Similarly, the use of Discovery Learning combined with a virtual laboratory has been shown to raise students' motivation and cognitive achievement in a physics context (Adyan et al., 2019). Moreover, a classroom action research study implementing Discovery Learning in junior high science

found that student engagement, motivation, and academic performance improved after two cycles (Azhar et al., 2023). These converging findings suggest that the significant increase in motivation observed in your study is consistent with the broader literature on Discovery Learning (Bingen et al., 2025). It underscores the potential of this model to foster more active, self-directed, and emotionally engaged learners, particularly when well implemented. This decrease in standard deviation indicates that the distribution of students' learning motivation scores became more homogeneous, or, in other words, there was a more even spread of increases in learning motivation among students after the implementation of the learning model. Meanwhile, the pretest and posttest results for the control class are presented in Table 2.

Table 2. Statistical Distribution of Learning Motivation in the Control Class Descriptive

	Minimum	Maximum	Mean	Std. Deviation
Pretest	40.00	73.00	64.95	7.64
Postest	70.00	82.00	76.70	4.18

Table 2 presents descriptive statistics on students' learning motivation in the control class before and after learning. During the pretest, students' learning motivation ranged from 40 to 73, with a mean of 64.95 and a standard deviation of 7.65. This value indicates that students' pre-learning motivation was classified as moderate, but there was significant variation among individuals. After the learning intervention, the posttest results showed an increase in learning motivation. The minimum score increased to 70, the maximum to 82, and the mean to 76.70. Furthermore, the standard deviation decreased to 4.18, indicating that the distribution of learning motivation became more homogeneous, even among students. One of the relevant and effective approaches in boosting students' enthusiasm and learning motivation is the Discovery Learning model. This model emphasizes students' independent search for and discovery of information, so that they do not just passively receive material but are also actively involved in the learning process (Pallikkavaliyaveetil & Chandrasekaran, 2026). The learning motivation for each indicator is presented in the figure below.

Attention

During the analysis of learning motivation based on the attention indicator, the researcher directly observed students' engagement throughout the learning process, including their focus on the teacher's explanations, responses to instructional stimuli, and consistency in participating in each stage of the learning activities.

Figure 2. Comparison of attention indicators of the experimental class and the control class

The pie charts above show the comparison of the attention indicator between the experimental and control classes. In the experimental class, most students show a high level of attention. This is indicated by 45% of students being in the strong category and 43% in the very strong category, totaling 88% of students in this class categorized as having high attention to learning. Meanwhile, 12% of students are in the moderate category, and none are in the weak or very weak categories. Conversely, in the control class, student attention is more evenly distributed across various categories. A total of 35% of students are in the moderate category, 25% in the strong category, 23% in the weak category, and 17% in the very strong category. No students were included in the very weak category. When summed, only 42% of students have high attention (strong or very strong), which is much lower than in the experimental class.

This comparison shows that students in the experimental class have higher attention levels than those in the control class. This indicates that the learning method used in the experimental class, most likely Discovery Learning, significantly increases student attention during the learning process (Al-Bataineh et al., 2026). This finding is consistent with earlier research showing that Discovery Learning can significantly enhance students' attentiveness: for example, Lasmono (2024) reported that students' motivation including their

attention was significantly higher after using Discovery Learning. In primary school, Prasetyo et al. (2021) found that implementing Discovery Learning increased students' active engagement and on-task attention. Meanwhile, Sri Wahyuni (2023) demonstrated that using Discovery Learning combined with video media strongly enhanced students' motivation and focus in biology lessons.

Relevance

The pie charts above show the comparison of the relevance indicator between the experimental and control classes. In the experimental class, most students show a high level of relevance. This is indicated by 45% of students being in the strong category and 43% in the very strong category, totaling 88% of students in this class categorized as having high relevance to learning. Meanwhile, 12% of students are in the moderate category, and none are in the weak or very weak categories. Conversely, in the control class, student relevance is more evenly distributed across various categories. A total of 35% of students are in the moderate category, 25% in the strong category, 23% in the weak category, and 17% in the very strong category. No students were included in the very weak category. When summed up, only 42% of students have high relevance (strong or very strong), which is much lower than in the experimental class. This comparison shows that students in the experimental class pay more attention than those in the control class. This indicates that the learning method used in the experimental class, most likely Discovery Learning, significantly increases student attention during the learning process.

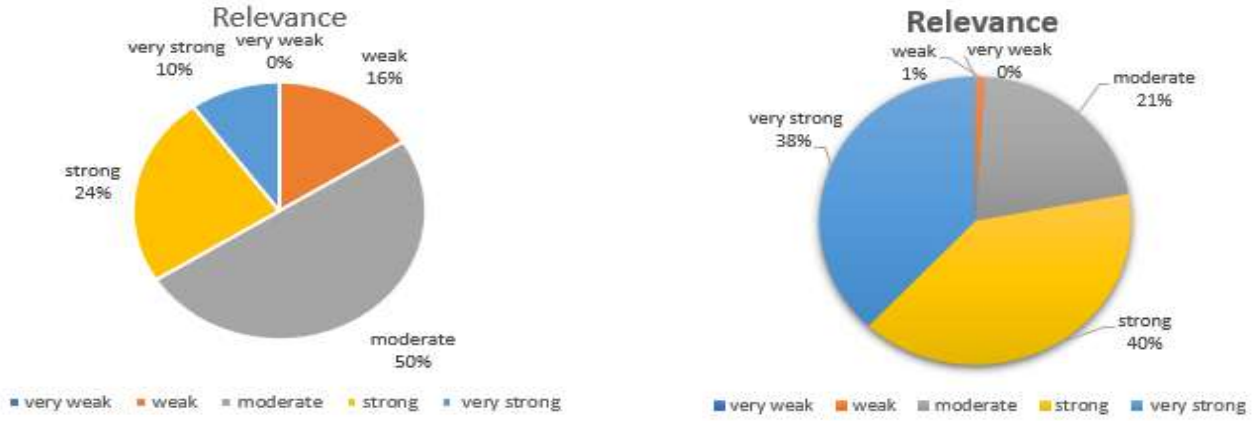

Figure 3. Comparison of the Relatedness indicator in experimental and control classes

On the relevance indicator, students actively engaged in the learning process by responding to contextual examples, relating new concepts to their prior knowledge, and participating in discussions that emphasized the usefulness of the material, showing that they were able to recognize the relevance of the lesson to their lives and learning goals.

Self-Confidence

The pie charts for the Self-Confidence indicator compare the experimental and control classes. In the experimental class, most students show a high level of self-confidence. This is indicated by 49% of students being in the very strong category and 35% in the strong category, for a total of 84% in the high self-confidence category. Meanwhile, 15% of students are in the moderate category, and only 1% are in the weak category. No students fall into the very weak category. Conversely, the distribution of students' self-confidence in the control class appears more even. A total of 36% of students are in the strong category, 32% in the moderate category, 14% in the weak category, and 18% in the very strong category. No students are in the very weak category. When combined, only 54% of students are categorized as having high self-confidence (strong or very strong), which is much lower than in the experimental class. These results indicate that students in the experimental class have higher self-confidence than those in the control class. This indicates that the learning approach used in the experimental class, most likely the Discovery Learning model, can create a learning environment that encourages students to express their opinions, participate actively, and believe in their own abilities.

In these processes, students demonstrated active participation in the learning process by confidently expressing their ideas, asking questions when they encountered difficulties, and responding to the teacher's questions without hesitation. Students showed independence in completing learning tasks and were willing to present their work in front of the class.

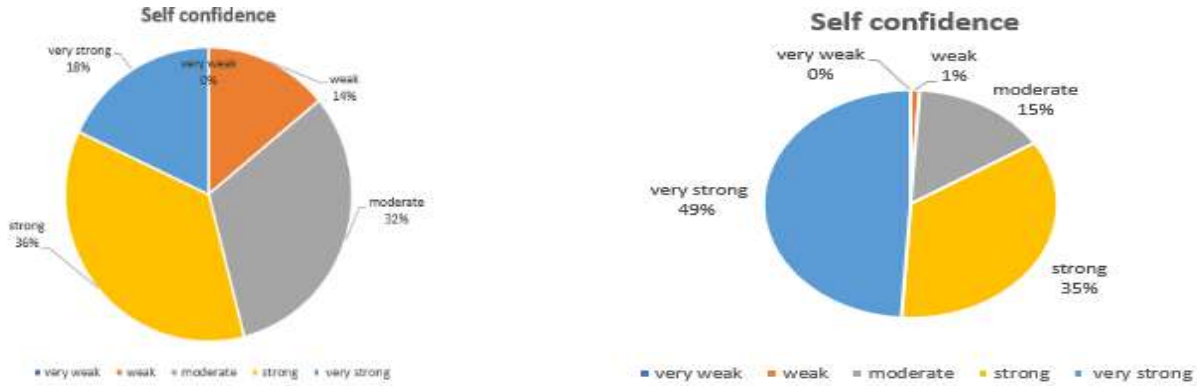

Figure 4. Comparison of the Self-Confidence indicator in experimental and control classes

Satisfaction

The charts above compare the learning Satisfaction indicator between students in the experimental and control classes. Based on the pie charts, it is evident that students in the experimental class are more satisfied than those in the control class. In the experimental class, 44% of students are in the strong category, and another 44% are in the very strong category, for a total of 88% who are highly satisfied with the learning process. The remaining 12% of students are in the moderate category. There are no students in the weak or very weak categories, indicating that all students in the experimental class feel at least a moderate level of satisfaction. Conversely, in the control class, the distribution of satisfaction levels is lower. A total of 62% of students are in the moderate category, 15% in the weak category, 11% in the strong category, and only 12% in the very strong category. Thus, only 23% of students report a high level of satisfaction (strong or very strong), and the majority report only moderate satisfaction or even dissatisfaction. This comparison shows that the learning approach used in the experimental class, most likely the Discovery Learning model, positively influences students' learning satisfaction. Students feel more engaged, active, and understand the material more meaningfully, which contributes to the high level of satisfaction with the learning activities they participate in.

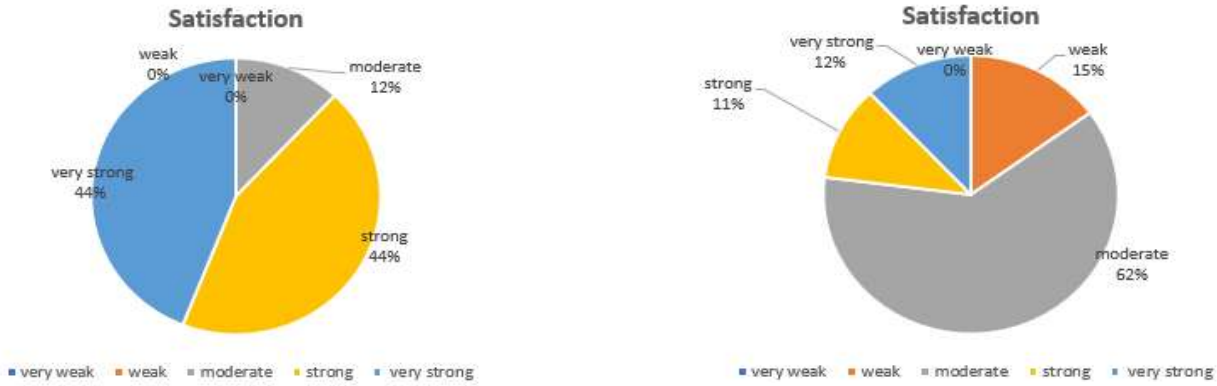

Figure 5. Comparison of the Satisfaction indicator in experimental and control classes

Improvement of Learning Motivation

Table 3 presents the average pretest and posttest scores for the four indicators of learning motivation, namely Attention, Relevance, Self-Confidence, and Satisfaction, along with their gain values and categories. The Attention indicator increased significantly, from an average pretest score of 64.6 to 87.4 in the posttest. The gain value obtained was 0.64, which falls into the moderate category. This indicates that, after the learning intervention, students' attention to the material and the learning process increased noticeably.

Table 3. Categories of Learning Motivation Improvement in the Experimental Class

Indicator	Average		Gain	Category
	Pretest	Posttes		
Attention	64.6	87.4	0.64	moderate
Relevance	68.2	85	0.53	moderate
Self Confidence	69.8	84.4	0.48	moderate
Satisfaction	70	83.8	0.46	moderate
Average			0.53	moderate

Furthermore, the Relevance indicator improved from an average score of 68.2 to 85, with a gain of 0.53, which is also categorized as moderate. This suggests that

students' perceptions of the material's relevance to real-life applications and their personal experiences improved throughout the learning process. For the Self Confidence indicator, there was an increase from 69.8 to 84.4, with a gain value of 0.48, which is categorized as moderate. This indicates that the learning approach enhanced students' confidence in participating in the learning process (Xu et al., 2025). The final indicator, Satisfaction, improved from a pretest score of 70 to 83.8, with a gain of 0.46, also in the moderate category. This improvement indicates that students were more satisfied with the learning experience. Overall, all motivation indicators achieved gain values within the moderate category, indicating that the learning model implemented Discovery Learning had a positive impact on various aspects of students' learning motivation.

Improvement of Learning Motivation

Based on the data above, the average increase in learning motivation in the control class was measured across four indicators: Attention, Relevance, Confidence, and Satisfaction. The data include the average pretest and posttest scores, along with the gain values and their categories. The Attention indicator shows an increase from a pretest score of 59.4 to a posttest score of 69.4. The resulting gain value is 0.25, which falls into the moderate category. This indicates that students experienced an improvement in their attention to the learning process, although the increase was not highly significant. For the Relevance indicator, the average pretest score of 65.4 increased to 79, yielding a gain of 0.39, which is also categorized as moderate. This suggests that students' sense of connection to the learning material developed fairly well during the learning process in the control class.

Table 4. Categories of Learning Motivation Improvement in the Control Class

Indicator	Average		Gain	Category
	Pretest	Posttest		
Attention	59.4	69.4	0.25	moderate
Relevance	65.4	79	0.39	moderate
Self Confidence	67.8	74.2	0.20	low
Satisfaction	67.2	78.4	0.34	moderate
Average			0.29	low

The Confidence indicator increased from 67.8 to 74.2, with a gain of only 0.20, which falls into the low category. This relatively small improvement indicates that the learning method used in the control class was less effective in fostering students' confidence during the learning process. Meanwhile, the Satisfaction indicator increased from an average score of 67.2 to 78.4, with a gain of 0.34, which is still categorized as moderate. This suggests that students in the control class were reasonably satisfied with the implemented learning approach, although the increase was not substantial. Overall, the improvement in learning motivation in the control class falls within the moderate category, except for the Confidence indicator, which showed only a low increase. This indicates that the learning activities in the control class did not optimally influence all aspects of students' learning motivation.

Discussion

Theoretically and practically, the Discovery Learning model significantly contributes to improving student motivation for learning (Chahal et al., 2026), particularly in attention, relevance, self-confidence, and satisfaction. This process captures students' attention because it involves challenging, contextually relevant cognitive activities (Knauf Narouie et al., 2026). Furthermore, students feel directly connected to the material because they are engaged in the search for meaning, rather than simply passively receiving information (Erden et al., 2025). Learning based on real problems and concrete situations in discovery learning makes the material feel relevant to students' daily lives.

Furthermore, discovery learning can boost students' self-confidence by giving them space to experiment, generate hypotheses, and discover answers on their own, thereby strengthening their sense of competence and belief in their potential. Every small success in finding information or solving a problem reinforces this confidence (Wang et al., 2025). Furthermore, this model contributes to student satisfaction by fostering a sense of value and active engagement in the learning process. Learning environments that place students at the center of learning activities tend to create a fun, challenging, and meaningful atmosphere, thereby fostering satisfaction with the learning experience.

Research by Sartono et al. (2023) shows that based on the results of the average calculation, the students' mathematical understanding ability after getting the discovery learning model increased by 40.4%. Thus, it can be concluded that students' mathematical understanding ability can be improved by using the discovery learning model. Furthermore, the connection between the subject matter and students' real lives is more pronounced (Shi et al., 2025), as Discovery Learning often links abstract concepts to concrete experiences through guided inquiry. Meanwhile, studies by Febriana et al., 2023) show that after the data were normal and homogeneous, the t-test was carried out with the results obtained $t$count = 2.38 and t table = 1.67. Because the t value is greater than the t table, it can be concluded that student learning outcomes by applying the discovery learning model are better than student learning outcomes by implementing learning

using the Scientific approach in class VIII students at SMPN 31 Padang. Thus, Discovery Learning is not only effective cognitively but also effectively, which plays a significant role in shaping long-term learning motivation.

Conclusion

Based on the N-Gain calculation, the experimental class had an average N-Gain of 0.53, considered moderate, while the control class had an average N-Gain of 0.29, considered low. This indicates that applying the Discovery Learning model in the experimental class led to a greater increase in learning motivation than conventional learning in the control class.

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