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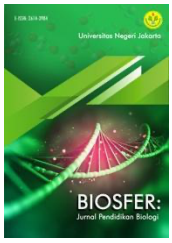

The correlation of self-efficacy and learning motivation with cognitive learning outcomes in high school student learning biology

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ABSTRACT

Learning outcomes reflect students' mastery of the material taught. However, low self-efficacy and minimal motivation to learn can be inhibiting factors in achieving optimal learning outcomes.This phenomenon was seen in some class XI MIPA students at a public school in Magelang City, who showed a lack of self-confidence when facing material that was considered difficult and appeared less involved in discussions or other class activities. Based on these conditions, this study aims to examinethe relationship between self-efficacy and learning outcomes, learning motivation and learning outcomes, and the combination of self-efficacy and learning motivation with student learning outcomes.The research approach used was quantitative with a correlational method. The population in this study were all students of grade XI MIPA, which was taken using a simple random sampling technique to obtain a sample of 101 students. Data collection was carried out using instruments in the form of questionnaires to measure self-efficacy and learning motivation, and tests to measure learning outcomes. The results of the data analysis showed that there was a significant, strong, and positive relationship between self-efficacy and learning outcomes, learning motivation and learning outcomes, and self-efficacy and learning motivation on student learning outcomes.

INTRODUCTION

Education plays an important role in developing individual potential through skills, insight, and character (Ujud et al., 2023). In addition to being a means of self-development, education is also an indicator of learning success as reflected in student learning outcomes (Nabillah & Abadi, 2019). However, the results of the 2022 PISA survey showed that Indonesia was ranked 69th out of 81 countries, indicating low learning outcomes globally. This is a challenge for the national education system and encourages the need for a study of the factors that influence it.

In general, learning outcomes reflect cognitive, affective, and psychomotor changes in students after participating in learning (Somayana, 2020). Learning outcomes also serve as the basis for evaluating various contributing factors (Andriani & Rasto, 2019). One influential internal factor is self-efficacy, which is an individual's belief in their ability to complete a task (Suarni & Priyatmo, 2021). Self-efficacy reflects self-awareness, which plays a crucial role in daily activities (Flammer, 2015). Self-efficacy is a person's confidence in their ability to succeed in performing a task or facing a certain challenge (Fajar & Aviani, 2022). This concept focuses on how individuals evaluate their ability to perform an action (Waddington, 2023). Students with high self-efficacy tend to be confident, persistent, and independent in completing learning tasks (Alqurashi, 2016).

Apart from self-efficacy, learning motivation is also an important variable that influences learning outcomes. Learning motivation refers to a person's reasons for being actively involved in the learning process with the aim of achieving certain understanding, skills, or achievements (Hafid, 2017). Learning motivation relates to the extent to which students are driven, persistent, and engaged in learning activities (Gunawan, 2018). Even if students have intellectual limitations, high motivation can still encourage them to be active in learning. Both internal and external motivation can increase student engagement and enthusiasm for learning (Andriani & Rasto, 2019). Thus, learning motivation is not only an initial driving force, but also a force that maintains the intensity of effort throughout the learning process (Cleopatra, 2015).

An interview with a biology teacher of class XI MIPA at a public school in Magelang City revealed that many students still doubt their abilities, especially when facing difficult tasks. Passive attitudes, talking during lessons, and playing with cellphones reflect low learning motivation which has an impact on academic achievement. The average biology score in the 2024/2025 Odd Semester Mid-Term Exam only reached 61, which is still below the KKM, indicating obstacles in the learning process, both in terms of the environment and students' mental readiness.

Previous studies examining the relationship between self-efficacy and learning motivation on learning outcomes have yielded varying findings, both in terms of the strength of the relationship and its consistency. The results of this study, as revealed by Ugwuanyi et al. (2020), indicate that in 89 secondary schools in Nigeria, there is a strong relationship between self-efficacy and learning motivation and physics learning outcomes. Similar findings were also expressed by Monika and Adman (2017), who found a strong relationship between these two variables and the learning outcomes of private vocational high school students in West Bandung Regency. However, Kamilatika (2022) reported that in one vocational high school in Kaligondang, the relationship found was only moderate. Meanwhile, Sibarani & Ambarita (2022) showed that in one high school in Medan, the relationship between self-efficacy and learning motivation and learning outcomes was relatively low. These differences in results indicate a gap in findings that requires further investigation. To reduce bias, this study was conducted under normal learning conditions, with a clearly defined learning model and instruments that had been tested for validity and reliability. Therefore, this study aims to explore the relationship between self-efficacy and learning motivation with students' cognitive learning outcomes, especially on the excretory system material.

METHODS

Research Design

This research is a quantitative research using the correlation method to determine the direction and strength of the relationship between variables (Sugiyono, 2019).

Population and Sample

Table 1.
Population and Sample Table

Classroom	Number of Students	Sample
XI Science 1	32	22
XI Science 2	33	28
XI Science 3	35	25
XI Science 4	35	26
Total	**135**	**101**

The population of this study consisted of 135 grade 11 MIPA students. The sample was taken using a simple random sampling technique, which provides equal opportunities for all members of the population (Sumargo et al., 2024). With the Slovin formula and an error rate of 0.05, a sample of 101 students was obtained.

Instrument

This research instrument uses a questionnaire related to self-efficacy and learning motivation. Self-efficacy measurement is based on indicators from Bandura (1997), which include magnitude, strength, and generality. Meanwhile, learning motivation measurement is based on indicators from Porter & Lawler (1968), which include expectancy, instrumentality, and valence. Additionally, other instruments are used, including cognitive learning outcome tests on excretory system material. Interview instruments are also used to obtain more detailed responses from teachers and students. The instrument used has undergone validity and reliability testing, ensuring its suitability for measuring the research variables. Validity testing was conducted to ensure that the questionnaire items accurately represent the constructs being measured, while reliability testing demonstrated high consistency when used under different conditions. Therefore, this research instrument can be relied upon to produce accurate data that aligns with the research objectives.

Procedure

The research procedure included an initial stage, beginning with observations and requesting permission from the school. Then, a research proposal and instruments were developed to ensure the research was suitable for presentation at a proposal seminar. The implementation stage included distributing questionnaires and multiple-choice questions. Data analysis techniques were then used to analyze the data obtained using SPSS.

Data Analysis Techniques

Data analysis used quantitative descriptive methods. Data were obtained from self-efficacy questionnaires, learning motivation, and cognitive learning outcome tests. Prerequisite tests include normality, linearity, heteroscedasticity, and multicollinearity. Hypothesis testing was conducted through simple linear regression to see the relationship between each predictor variable and learning outcomes, as well as multiple linear regression to analyze the relationship between self-efficacy and learning motivation simultaneously on cognitive learning outcomes.

RESULTS AND DISCUSSION

The Relationship Between Self-efficacy and Learning Outcomes

The relationship between self-efficacy and student learning outcomes can be seen in the model summary table generated from the simple linear regression analysis. The calculation results are presented in Table 2.

Table 2.
Summary Model Table of Self-efficacy with Learning Outcomes

R	R Square	Adjusted R Square	Standard Error of the Estimate
0.666	0.444	0.438	11,0269

The research results in Table 2 show a strong positive relationship between self-efficacy and cognitive learning outcomes, with a correlation coefficient of 0.666. This indicates that the higher a student's confidence in their abilities, the better their academic achievement. Self-efficacy helps students set goals, choose learning strategies, and manage time and effort effectively (Alqurashi, 2016).

These results are reinforced by research conducted by Susanti and Aula (2016), who found a positive relationship between self-efficacy and the learning outcomes of seventh-grade students at a Sarolangun Islamic Junior High School (MTs). This relationship is also supported by Albert Bandura's social cognitive theory, which states that self-efficacy, or an individual's belief in their ability to complete a task, is related to how individuals think, feel, and act. According to Bandura (1997), individuals with high levels of self-efficacy will be more confident in facing challenges, have greater perseverance, and be more resilient in the face of failure.

Based on Table 2, self-efficacy contributes 0.444 44.4% to student learning outcomes, while 55,6% is influenced by other factors outside this study. Yulianto (2019) emphasized that although self-efficacy significantly influences academic success, learning achievement is strongly influenced by a combination of factors. This aligns with the findings of Nurlia et al. (2017), who showed that, in addition to self-efficacy, factors such as learning style, independence in learning, and learning interest also play a significant role in determining academic success. Therefore, improving self-efficacy requires a holistic approach that encompasses motivation, learning methods, and the learning environment. Details of the self-efficacy regression coefficient values are presented in Table 3.

Table 3.
Table of Self-efficacy Coefficients with Learning Outcomes

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-2,150	6,411		-0.335	0.738
Self-efficacy	0.938	0.106	0.666	8,883	0,000

Table 3 shows the self-efficacy regression coefficient of 0.938 with a constant of -2.150, which means that every one-point increase in self-efficacy increases learning outcomes by 0.938 points. This confirms that self-efficacy plays a significant role in academic achievement. Students with high self-efficacy tend to be optimistic, bold in setting goals, and resilient in the face of difficulties, while those with low self-efficacy tend to be passive, reluctant to ask questions, and avoid challenges.

In the context of learning, self-efficacy not only influences students' mental attitudes but also serves as a key driver of active engagement and initiative in the learning process. As explained by Sarifudin (2024), self-confident students tend to be more persistent in finding solutions to academic obstacles, are less likely to give up, and are able to maintain motivation over the long term. Research by Zulfa et al. (2022) also confirms that high levels of self-efficacy are closely related to students' ability to remain focused and productive despite facing difficulties, which positively impacts their learning outcomes.

The primary factor shaping self-efficacy is mastery experience. Lusi et al. (2023) emphasize that consistently completing learning tasks can strengthen students' self-confidence, increasing their confidence in their own abilities. Furthermore, vicarious experience plays a crucial role, as students gain motivation and confidence by observing the success of peers or figures they admire (Rafa, 2022). Through this observation, students can model effective learning behaviors and strategies and internalize the belief that they, too, are capable of achieving similar successes.

The Relationship between Learning Motivation and Learning Outcomes

The relationship between learning motivation and student learning outcomes can be seen from the model table. Summary resulting from simple linear regression analysis. The calculation results are presented in Table 4.

Table 4.
Summary Model Table of Learning Motivation with Learning Outcomes

R	R Square	Adjusted R Square	Standard Error of the Estimate
0.646	0.418	0.412	11,2803

Table 4 shows a positive correlation of 0.646 between learning motivation and learning outcomes of class XI MIPA students. This indicates that the higher the learning motivation, the greater the chance of achieving optimal academic results. This finding aligns with the results of a study by Esterina et al.

(2022) examining elementary school students, as well as Sulfemi's (2018) study at the junior high school level, both of which found a significant positive correlation between learning motivation and academic achievement. This confirms that learning motivation is a crucial factor driving academic success across all levels of education. The link between learning motivation and learning outcomes is also supported by Porter & Lawler's (1968) motivation theory, which states that motivation is determined not only by the desire for results but also by an individual's perception of the relationship between effort, performance, and results.

In this study, learning motivation contributed 0.418 or 41.8% to the variability of learning outcomes, while the remainder, namely 58.2%, was influenced by other factors that were not the focus of the study, such as support from family, interaction with peers, and school environmental conditions. This finding is reinforced by research by Sarmiati et al. (2019), which emphasized that academic achievement is the result of a combination of students' intrinsic motivation and socio-emotional factors derived from their environment. Positive interactions with supportive families, motivating peers, and inspiring teachers can increase learning motivation and simultaneously strengthen students' ability to persist and adapt during the learning process.

Self-motivation to learn can be seen as an internal drive that drives students to actively learn, overcome difficulties, and consistently achieve academic goals. High levels of motivation not only make students more diligent and focused but also increase mental resilience in facing academic challenges. Conversely, low motivation is often associated with passive behavior, lack of persistence, and low interest in learning, which can significantly reduce learning outcomes. Further information regarding the learning motivation regression coefficients can be seen in Table 5.

Table 5.
Table of Coefficients of Learning Motivation with Learning Outcomes

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1,345	6,344		0.212	0.833
Motivation to learn	0.889	0.106	0.646	8,427	0,000

Table 5 shows a constant of 1.345 and a regression coefficient of learning motivation of 0.889, which indicates that every one-point increase in learning motivation will increase learning outcomes by 0.889 points. This reinforces the crucial role of motivation as a key driver of student engagement, persistence, and focus during the learning process. However, observations in grade 11 Mathematics and Natural Sciences students indicate that motivation remains low, evident in passivity, lack of concentration, and distraction during learning, which negatively impacts academic achievement.

Learning motivation functions not only as a driving force but also as a mental strength to overcome academic obstacles (Amalia & Maknun, 2021). Factors influencing motivation are divided into internal and external (Andeka et al., 2021). Internal factors include interest, positive attitudes, self-confidence, and academic goals (Harefa et al., 2022), while external factors include support from family, teachers, the school environment, and peers (Agustina & Kurniawan, 2020). A supportive environment and appropriate learning approaches play a significant role in strengthening motivation and promoting students' academic success.

The Relationship between Self-efficacy and Learning Motivation with Learning Outcomes

The relationship between self-efficacy and learning motivation and learning outcomes was analyzed using multiple linear regression, the results of which can be seen in the model summary table. The calculation results are presented in Table 6.

Table 6.
Summary Model Table of Self-efficacy and Learning Motivation with Learning Outcomes

R	R Square	Adjusted R Square	Standard Error of the Estimate
0.695	0.483	0.472	10,6848

Table 6 shows a correlation coefficient of 0.695, which indicates a strong positive relationship between self-efficacy and learning motivation with learning outcomes. The higher the self-confidence and motivation, the greater the student's chance of achieving academic success. This finding aligns with

research by Munthe & Amry (2022), which found a similar correlation in mathematics learning. Together, these two variables contributed 48.3% to learning outcomes, while other factors such as family background, social interactions, and emotional intelligence influenced the remaining 51.7% (Fadhilah & Mukhlis, 2021). This demonstrates the importance of considering external factors to support academic success. More complete regression coefficient data can be seen in Table 7.

Table 7.
Table of Coefficients of Self-efficacy and Learning Motivation with Learning Outcomes

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-7,008	6,462		-1,084	0.281
Self-efficacy	0.582	0.166	0.413	3,513	0,000
Motivation to learn	0.442	0.162	0.321	2,728	0.008

Table 7 shows a constant value of -7.008, as well as a positive regression coefficient for the self-efficacy variable of 0.582 and learning motivation of 0.442.This means that every one-unit increase in self-efficacy or learning motivation will significantly improve student learning outcomes. This confirms that both variables play a crucial and complementary role in determining academic achievement. However, observations of 11th-grade MIPA students revealed a real problem related to low levels of self-confidence and learning motivation. Passive attitudes, lack of focus, and a tendency to be easily distracted during the learning process are still frequently encountered, which ultimately negatively impacts suboptimal learning outcomes. This condition illustrates that without internal drive in the form of strong self-efficacy and motivation, students' academic abilities struggle to develop optimally.

Self-efficacy and learning motivation act as key forces that drive students to remain consistent, enthusiastic, and resilient in facing various challenges in the learning process. Students with high self-efficacy generally have strong self-confidence when facing assignments and exams, are open to using different learning strategies, and are able to mentally persevere when facing difficulties (Monika & Adman, 2017). On the other hand, high learning motivation encourages discipline, perseverance, and focus on achieving academic goals (Ersanli, 2015). The synergy between these two factors encourages the formation of positive learning patterns, accompanied by the ability to manage time and optimal learning strategies.

Furthermore, increasing self-efficacy and learning motivation cannot be separated from the influence of various supporting factors in the student's environment. A conducive learning environment includes a comfortable classroom atmosphere, engaging teaching methods, and supportive interactions between students and teachers (Setiawan, 2024). The teacher's role as an inspiring facilitator and the ability to provide constructive feedback is key to helping students develop their potential optimally. Furthermore, support from family and peers also serves as a source of external motivation, providing positive encouragement, both emotionally and practically, so that students feel supported and more enthusiastic about learning.

Observations of student conditions indicate that some students display a lack of confidence in their own abilities, reflected in their hesitation to ask questions when they don't understand the material or when asked to answer questions from the teacher. Students appear passive, reluctant to actively participate in discussions, and prefer to remain silent even when they actually need help. These characteristics align with the developmental stage of high school/Islamic high school students, who are in late adolescence, who tend to be influenced by social pressures and the search for identity, making them prone to doubting their abilities (Rahmi, 2021). Furthermore, according to Piaget (1978), adolescent students have entered the formal thinking stage, characterized by the ability to think logically, abstractly, and systematically. This condition becomes increasingly challenging when students are faced with material such as the excretory system, which is abstract and complex. This material requires students to understand biological processes that cannot be directly observed, thus requiring clear visualization and concept mapping. Thus, implementing the window shopping learning model is an appropriate approach. Furthermore, the use of media such as mind maps in the window shopping model is also very helpful in visualizing the relationships between concepts in the excretory system. The combination of interactive learning models, strong visual support, and increased self-efficacy and learning motivation is expected to create a more meaningful learning experience.

CONCLUSION

The results of the study indicate that self-efficacy and learning motivation of class XI MIPA students at MAN Kota Magelang have a strong, positive, and significant relationship with learning outcomes, both partially and simultaneously. The strong, positive relationship between self-efficacy and learning motivation and learning outcomes indicates that the greater a student's self-confidence and enthusiasm for learning, the higher their academic achievement. Conversely, low levels of these two aspects tend to contribute to lower learning outcomes. However, in addition to self-efficacy and learning motivation, there are still other factors that are also related to learning outcomes. Therefore, for further researchers, it is recommended to develop this study by adding other variables related to learning outcomes, such as learning strategies, family support, or psychological conditions of students. The scope of the study can also be expanded by involving more subjects and schools so that the results are more representative and can be generalized widely.

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