

The Impact of Learning Motivation and Self-Efficacy on Students' Academic Achievement

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ARTICLE INFO

Keywords: Motivation, Self-Efficacy, Chemistry Learning Outcomes

Received : 20, February

Revised : 22, March

Accepted: 24, April

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ABSTRACT

This research adopts an ex-post facto design with a causal approach, aiming to examine the influence of learning motivation and self-efficacy on the chemistry achievement of 11th-grade students at SMA Negeri 1 Tobadak, particularly on the topics of mole concept and stoichiometry. A total of 30 students from class XI during the 2024/2025 academic year were selected as the sample using a cluster random sampling method. Data collection was carried out through three main instruments: (1) a learning motivation questionnaire, (2) a self-efficacy questionnaire, and (3) a chemistry achievement test. The data were processed using both descriptive and inferential statistics, involving simple and multiple linear regression analyses. The findings revealed that: (1) learning motivation significantly influences students' academic performance, (2) self-efficacy also exerts a significant impact on students' achievement, and (3) both learning motivation and self-efficacy jointly have a significant effect on students' performance in chemistry.

INTRODUCTION

Learning can be defined as a transformative process that results in changes to an individual's personality, evident through improvements in behavior, including the development of skills, knowledge, attitudes, habits, comprehension, reasoning abilities, and various other competencies (Ardiansyah, 2016; Festiawan, 2020; Muntahanah, 2021). These changes extend beyond the acquisition of knowledge, encompassing growth in skills, attitudes, self-worth, interests, and adaptability (Firmansyah, 2017; Herawati, 2020; Mursyidi, 2019). The act of learning involves the holistic engagement of human psychological and physical faculties, covering the cognitive, affective, and psychomotor dimensions (Sardiman, 2012; Suhendrayani, 2018). Within the learning experience, every learner is influenced by internal conditions, with motivation playing a pivotal role. Motivation drives learners to achieve educational goals, which is particularly vital in scientific subjects like chemistry that demand a deep and abstract understanding. Topics such as the mole concept and stoichiometry are fundamental in chemistry, yet they often pose difficulties for students due to their complexity.

Student learning outcomes are shaped by both internal and external factors. Internal elements include motivation, self-efficacy, attention span, and intellectual capacity, whereas external elements involve parental support, school atmosphere, and socio-economic background (Susanto, 2016). At SMA Negeri 1 Tobadak, for instance, the learning motivation of students is notably impacted by the socio-economic circumstances of the community, where the majority of parents are employed in oil palm plantations. The economic burden often leads students to take up work after school, which in turn reduces their engagement and drive to study. Learners with low motivation may go through the motions of school activities without genuine engagement. However, motivation is essential for fostering enthusiasm, joy, and persistence in learning (Rahman, 2021). Creating an enjoyable learning environment can significantly boost students' motivation, particularly when dealing with challenging subjects like chemistry that require both conceptual and numerical comprehension. In light of this context, the researcher seeks to investigate the impact of learning motivation and self-efficacy on student performance, specifically in relation to understanding the mole concept and stoichiometry among 11th-grade students at SMA Negeri 1 Tobadak.

LITERATURE REVIEW

Motivation to Learn

Learning motivation is a psychological drive that drives students to engage in learning activities in order to achieve certain goals. Sani et al. (2020) explain that motivation is a basic drive within a person that drives them to act or behave. This means that in the context of education, motivation is the main foundation that determines how far a student is willing and able to actively participate in the learning process. According to Ariyanto and Sulistyorini (2020), motivation can also be interpreted as a process of influencing someone to be willing to carry out tasks in order to achieve certain goals. This statement emphasizes the importance of the role of teachers, the environment, and learning strategies in stimulating

student motivation. Teachers who are able to build a conducive learning atmosphere and facilitate students' psychological needs will find it easier to increase their learning motivation.

Winata (2021) added that motivation has an important function in directing and maintaining learning behavior. Students who are highly motivated will tend to set clear learning goals, try harder to achieve them, and show perseverance in the face of learning difficulties. Thus, motivation is not only a supporting factor, but is the core of success in learning. Arianti (2019) stated that motivation is an internal driving factor that encourages students to involve themselves in the learning process to achieve certain results. This means that learning success does not solely depend on intelligence or learning facilities, but also on how much motivation there is from within the student to learn.

Motivation can be influenced by external and internal factors. External factors such as creative delivery methods by teachers, parental support, and a positive learning environment can foster students' enthusiasm for learning. Meanwhile, from the internal side, students' interest in learning the subject matter and their belief in their abilities (self-efficacy) are also important factors in forming strong motivation. Sudaryono (2012) stated that learning motivation is influenced by students' ideals or aspirations, physical and spiritual conditions, environment, learning dynamics, and the role of teachers. The emphasis on the many factors shows that motivation is a complex variable that is mutually influenced by personal and social aspects. Thus, the approach to learning motivation must be holistic.

Rahman (2021) emphasized that motivation in learning is very important because it can increase students' enthusiasm, happiness, and involvement in learning. Without motivation, students will only be passive participants who go through learning routines without understanding the meaning behind it. Therefore, teachers need to continue to foster student motivation through a humanistic approach, learning innovation, and emotional support.

Slameto (2013) also stated that learning motivation is one of the important components that influence the achievement of learning outcomes. This means that learning success is closely related to the existence of a strong internal drive within the learner. Without motivation, learning outcomes will tend to be low because there is no drive to achieve optimal performance. Sardiman (2016) added that learning motivation functions as a driver of action that directs students in making learning decisions. In other words, motivation helps students understand what needs to be done and how to do it effectively. This process will lead to the formation of a positive learning attitude and have a direct impact on learning outcomes. Djamarah (2002) explained that the level of learning motivation possessed by students will affect the level of learning outcomes achieved. This is in line with the concept that motivation has a direct correlation to academic performance. Therefore, in the learning process, it is important for educators to not only focus on delivering material, but also on strengthening students' motivational aspects.

Self Efficacy

Self-efficacy is an individual's belief in their ability to carry out tasks or overcome certain situations. Geon (2016) states that self-efficacy is a form of belief that encourages students to demonstrate positive behavior and performance. This means that students who have high self-efficacy tend not to give up easily and are better prepared to face learning challenges. Bandura (1997), the main initiator of self-efficacy theory, stated that self-efficacy influences an individual's decision to act, the level of effort made, and resistance to obstacles. According to him, belief in one's own abilities is more important than simply knowing what to do. With high self-efficacy, a person will be more likely to complete tasks with optimal results. In the context of education, self-efficacy is an important indicator of learning readiness.

Susanto (2016) stated that self-efficacy has a direct influence on the achievement of student learning outcomes. This is because self-efficacy forms students' perceptions of their own abilities, which then determines how much they will try to learn. Santrock (2007) added that students with high self-efficacy tend to be more persistent, confident, and do not give up easily in completing challenging academic tasks. In other words, self-efficacy plays a role in forming a tenacious and resilient attitude in learning.

Ghufron and Suminta (2013) stated that individuals with high self-efficacy will achieve higher learning outcomes than those with low self-efficacy. This is because self-efficacy creates the drive to be more persistent and patient in the face of difficulties. Those who are confident tend to find solutions when they fail, rather than giving up. Ormrod's opinion (2009) is in line with this statement, that individuals who have the same abilities but differ in terms of self-efficacy will show different performances. Those with high self-confidence tend to be more successful because they have positive suggestions in undergoing the learning process. Luthans (in Permana, Farida, and Budi, 2016) explained that individuals with low self-efficacy tend to avoid challenges, doubt their own abilities, and have a low commitment to learning. They also give up more easily when experiencing difficulties. Therefore, self-efficacy is a very important aspect to consider in the educational process, especially in dealing with material that is considered difficult such as chemistry.

Feist (2010) divides factors that influence self-efficacy into two large groups: internal and external. Internal factors include previous experience, modeling (influence from others), social persuasion, and physical-emotional conditions. While external factors include culture, gender, nature of tasks, and incentives from the environment. Understanding these factors helps teachers and parents in supporting the formation of student self-efficacy.

The Relationship between Motivation, Self-Efficacy, and Learning Outcomes

Learning motivation and self-efficacy are two internal factors that are closely related and contribute significantly to the achievement of student learning outcomes. Both play a role as the main drivers in the learning process, especially in increasing active participation and academic achievement. According to Zimmerman (2000), self-efficacy and motivation reinforce each other: students who are confident in their abilities (high self-efficacy) tend to have high learning motivation because they believe that the effort they make will result in success. Conversely, high learning motivation can strengthen self-efficacy because with the encouragement to learn, students will gain positive experiences that increase their confidence in facing academic challenges.

Dweck and Leggett (1988) added that students with high self-efficacy tend to develop a growth mindset and prefer challenging learning strategies. In this case, motivation becomes the driving force that makes students continue to try, while self-efficacy provides confidence that they are able to achieve the goal. Research conducted by Schunk, Pintrich, and Meece (2008) also supports this view. They explain that student learning outcomes are greatly influenced by motivation and self-efficacy simultaneously. Students who have high motivation and self-efficacy will be better able to plan, monitor, and evaluate their learning activities independently which ultimately improves their academic achievement. Thus, a deep understanding of the interaction between motivation, self-efficacy, and learning outcomes is important for designing learning strategies that are effective and responsive to students' needs.

METHODOLOGY

This research employed a quantitative method using an ex-post facto design, aiming to investigate the influence of students' learning motivation and self-efficacy on their academic performance. The study was carried out at SMA Negeri 1 Tobadak, located in Central Mamuju Regency. The population consisted of all students in grade XI, from which a total of 30 participants were selected using the total sampling technique.

Three main instruments were utilized for data collection: a learning motivation questionnaire, a self-efficacy questionnaire, and a test assessing students' understanding of the mole concept and stoichiometry in chemistry. The questionnaires measured students' motivational levels and perceived self-efficacy, while the achievement test evaluated their grasp of the relevant chemistry topics.

Data analysis was performed in two stages: descriptive and inferential. Descriptive statistics were used to present the distribution and central tendencies of each variable. Prior to conducting inferential analysis, assumption tests were carried out to ensure model validity. These included tests for normality, multicollinearity, and heteroscedasticity, all analyzed using SPSS version 26. To test the hypotheses, a t-test was applied to examine the individual effects of each independent variable, while an F-test was used to assess the combined influence of learning motivation and self-efficacy on students' learning outcomes.

RESEARCH RESULT

Descriptive Statistical Analysis

The results of the descriptive statistical analysis of the variables of learning motivation, self-efficacy and chemistry learning outcomes of class XI students of SMAN 1 Tobadak are as follows.

a. Motivation to learn

Table. 1 Descriptive Statistics of Learning Motivation Scores

Descriptive Statistics	Statistical Values
Mean	83.30
Median	86.00
Mode	93.00
Standard Deviation	10,793
Variance	116.49
Minimum Value	50.00
Maximum Value	98.00

Referring to the data presented in the table above, the mean score for students' learning motivation is 83.30. This indicates that, overall, the learning motivation of 11th-grade students at SMAN 1 Tobadak falls within the 'very high' classification. The distribution of student motivation scores is further detailed in Table 2.

Table 2 Frequency Distribution of Learning Motivation Scores

Interval	Category	Frequency
score ≥ 88	Very high	14
$79 \leq \text{score} < 88$	Tall	7
$69 \leq \text{score} < 79$	Currently	7
$60 \leq \text{score} < 69$	Low	1
score < 60	Very Low	1
Amount		30

The table indicates that 14 students fall into the 'very high' category of learning motivation, 7 students are in the 'high' category, another 7 are classified as 'moderate', while 1 student each is categorized under 'low' and 'very low' motivation levels. Overall, the majority of 11th-grade students at SMAN 1 Tobadak demonstrate 'very high' learning motivation, representing 46.67% (14 out of 30) of the total sample involved in this study.

b. Self Efficacy

The distribution of self-efficacy scores among grade XI students at SMAN 1 Tobadak is outlined in the table below.

Table. 3 Descriptive Statistics of Self-Efficacy Scores

Descriptive Statistics	Statistical Values
Mean	83.10
Median	86.00
Mode	90.00
Standard Deviation	11,195
Variance	125,334
Minimum Value	59.00
Maximum Value	99.00

According to Table 3, the mean self-efficacy score of the students is 83.10, indicating that, overall, the self-efficacy of grade XI students at SMAN 1 Tobadak falls into the 'high' category. The detailed distribution of students' self-efficacy scores is provided in Table 4.

Table. 4 Frequency Distribution of Self-Efficacy Scores

Interval	Category	Frequency
score $\geq$ 91	Very high	8
$83 \leq$ score $<$ 91	Tall	12
$75 \leq$ score $<$ 83	Currently	3
$67 \leq$ score $<$ 75	Low	5
score $<$ 67	Very Low	2
Amount		30

As shown in Table 4, 8 students fall into the 'very high' self-efficacy category, 12 students are classified as 'high', 3 students fall into the 'moderate' category, 5 students are in the 'low' category, and 2 students are categorized as having 'very low' self-efficacy. Overall, the majority of grade XI students at SMAN 1 Tobadak exhibit a 'high' level of self-efficacy, accounting for 40.00% (12 out of 30) of the total study sample.

c. Chemistry Learning Outcomes

The description of the chemistry learning outcome scores of class XI students at SMAN 1 Tobadak is presented in Table 5.

Table. 5 Descriptive Statistics of Learning Outcome Scores

Descriptive Statistics	Statistical Values
Mean	83.33
Median	85.00
Mode	85.00
Standard Deviation	11,547
Variance	133,333
Minimum Value	60.00
Maximum Value	100.00

Table 5 reveals that the average score of student learning outcomes is 83.33. This indicates that, in general, the academic performance of grade XI students at SMAN 1 Tobadak falls within the 'high' category. The detailed distribution of their learning outcome scores is presented in Table 6.

Table 6. Frequency Distribution of Learning Motivation Scores

Interval	Category	Frequency
90-100	Very high	11
80-89	Tall	12
70-79	Currently	2
60-69	Low	5
<60	Very Low	0
Amount		30

According to Table 6, 11 students achieved learning outcome scores classified as 'very high', 12 students fell into the 'high' category, 2 students were in the 'moderate' range, and 5 students were categorized as 'low'. No students were recorded in the 'very low' category. Overall, the learning outcomes of grade XI students at SMAN 1 Tobadak are predominantly in the 'high' category, representing 40.00% (12 out of 30) of the total research sample.

1. Inferential Statistical Analysis

In inferential analysis, the data obtained in the study were analyzed using SPSS (Statistical Package for Social Science) software version 26.

a. Analysis Requirements

1) Normality Test

In this study, the Kolmogorov-Smirnov test was applied to assess the normality of the research data, using a 5% level of significance. A data set is considered to follow a normal distribution if the resulting significance value exceeds 0.05. Conversely, a significance value below 0.05 indicates non-normal distribution. The normality test in this study produced a

significance value of 0.200, which is greater than 0.05. Therefore, it can be concluded that the data are normally distributed.

2) Multicollinearity Test

In this research, multicollinearity was evaluated by examining the Tolerance and Variance Inflation Factor (VIF) values. A variable is considered free from multicollinearity issues if the Tolerance is equal to or greater than 0.10 and the VIF is less than 10.00. The analysis results showed that all independent variables had Tolerance values exceeding 0.10 and VIF values below 10.00. Therefore, it can be concluded that there are no multicollinearity issues among the independent variables in this study.

3) Heteroscedasticity Test

Heteroscedasticity in this study was assessed using the Glejser test. A significance value greater than 0.05 indicates the absence of heteroscedasticity, meaning the variance of the residuals is consistent across all levels of the independent variables.

b. Hypothesis Testing

1) The Influence of Learning Motivation (X1) on Learning Outcomes (Y)

Individually, the statistical test used is the t-test. The basis for decision making in the t-test is if the significance value is < 0.05 or if the t-count value is $> t\text{-table}$, then there is an influence. Based on data analysis, the significance value is $0.000 < 0.05$, while the t-table test value is seen at a significance level of 0.05 where $df = 30 - 2 - 1 = 27$ is 1.703 and the t-count value is 4.708. This shows that $t\text{-count} > t\text{-table}$ ($4.708 > 1.703$) which means that H_0 is rejected or in other words H_1 is accepted. Thus, learning motivation has a significant effect on the learning outcomes of class XI students of SMAN 1 Tobadak.

2) The Influence of Self-Efficacy (X2) on Learning Outcomes (Y)

The t-test was employed to examine the individual effect of variables. The decision rule states that if the significance value is less than 0.05 or if the calculated t-value exceeds the critical t-value from the t-distribution table, then the effect is considered statistically significant. Based on the results, the significance level was found to be 0.000, which is less than 0.05. Referring to a significance level of 0.05 with degrees of freedom (df) = $30 - 2 - 1 = 27$, the corresponding t-table value is 1.703. The calculated t-value was 8.919, which is greater than the t-table value ($8.919 > 1.703$). This indicates that the null hypothesis (H_0) is rejected, and the alternative hypothesis (H_1) is accepted. Therefore, it can be concluded that self-efficacy has a significant influence on the learning outcomes of grade XI students at SMAN 1 Tobadak.

3) The Influence of Learning Motivation (X1) and Self-Efficacy (X2) on Learning Outcomes (Y)

The F-test was utilized to assess the joint effect of the independent variables. According to the decision criteria, if the significance value is less than 0.05 or if the calculated F-value exceeds the critical F-value, then the variables are said to have a simultaneous effect. The analysis results showed a significance level of 0.000, which is below the 0.05 threshold, and an F-value of 257.774, which is greater than the F-table value of 3.3541. Since $F_{\text{count}} > F_{\text{table}}$ ($257.774 > 3.3541$), the null hypothesis (H_0) is rejected and the alternative hypothesis (H_1) is accepted. Therefore, it can be concluded that learning motivation and self-efficacy collectively have a significant impact on the learning outcomes of grade XI students at SMAN 1 Tobadak.

DISCUSSION

There is an Influence of Learning Motivation (X1) on Learning Outcomes (Y)

Based on the results of the hypothesis test, it shows that the t-count value is 4. The analysis yielded a t-value of 7.08, which is greater than the critical t-value of 1.703. This result indicates that the null hypothesis (H_0) is rejected and the alternative hypothesis (H_1) is accepted. Additionally, the significance level was 0.000, which is less than 0.05, confirming that learning motivation (X1) has a statistically significant and positive effect on the chemistry learning outcomes of grade XI students at SMAN 1 Tobadak, specifically on the topics of mole concept and stoichiometry. This finding suggests that students with higher levels of motivation tend to achieve better academic performance, whereas lower motivation corresponds with weaker outcomes. These results are consistent with previous studies conducted by Simatupang (2021) and Mulyana (2021), which also found that learning motivation significantly enhances students' achievement in chemistry.

The term "motivation" originates from the word "motive," which refers to an internal condition that prompts an individual to engage in specific actions, either consciously or unconsciously, in pursuit of particular objectives. In the context of education, learning motivation is understood as the internal or external drive that encourages an individual to participate in learning activities, ultimately fostering enthusiasm and persistence in the learning process (Monika & Adman, 2017). Learning motivation is recognized by several experts in educational psychology as one of several aspects that have a crucial role in influencing learning success. According to Tentama & Abdillah (2019), learning motivation is a belief held by an individual regarding his learning abilities, values related to his learning activities, and interest in learning activities that involve various internal factors, such as instincts, impulses, habits, needs, and goals that influence success or failure in learning tasks. Motivation is one of the most frequently cited concepts when explaining why individuals succeed or struggle in performing complex tasks. Most scholars concur that motivation theories focus on the elements that initiate and guide behavior. Additionally, it is widely recognized that individuals engage in certain actions due to underlying needs that shape their motives (Idham Kholid, 2017).

There is an Influence of Self-Efficacy (X2) on Learning Outcomes (Y)

The results of the hypothesis testing using simple linear regression revealed a t-value of 8.919 with a significance level of 0.000, which is below the 0.05 threshold. Therefore, the alternative hypothesis (H_1) is accepted, and the null hypothesis (H_0) is rejected. This indicates that self-efficacy has a significant and positive influence on the learning outcomes of grade XI students at SMAN 1 Tobadak, specifically in the topics of mole concept and stoichiometry. The findings suggest that students with higher self-efficacy tend to achieve better academic performance, while those with lower self-efficacy demonstrate poorer outcomes. This is consistent with previous studies by Sihaloho (2018), Chaerunnisa, Murtihapsari, & Christiana (2021), and Susanti et al. (2022), which also found that self-efficacy positively impacts students' achievement in chemistry. Learners with strong self-efficacy hold positive beliefs about their capability to handle challenging tasks, which in turn motivates them to exhibit constructive behaviors that enhance their academic performance (Geon, 2016).

There is an Influence of Learning Motivation (X1) and Self-Efficacy (X2) on Learning Outcomes (Y)

The analysis results showed that the computed F-value was 257.774, which exceeds the critical F-value of 3.3541 at a 0.05 significance level. Since F_{count} is greater than F_{table} ($257.774 > 3.3541$), the null hypothesis (H_0) is rejected and the alternative hypothesis (H_1) is accepted. This confirms that the two independent variables learning motivation and self-efficacy jointly exert a significant effect on the learning outcomes of grade XI students at SMAN 1 Tobadak.

Furthermore, the coefficient of determination (R^2) was found to be 0.950, indicating that 95.0% of the variance in student learning outcomes can be explained by the combined influence of learning motivation and self-efficacy. The remaining 5% is attributed to other factors not included in this study's model. These findings align with previous research conducted by Monika & Adman (2017) and Aqzayunarsih, Hala, & Hartati (2019), which also confirmed the significant impact of learning motivation and self-efficacy on student academic achievement.

CONCLUSIONS AND RECOMMENDATIONS

1. Students' learning motivation significantly affects their academic performance in the topic of mole concept and stoichiometry among grade XI students at SMA Negeri 1 Tobadak.
2. Self-efficacy has a notable impact on students' chemistry learning outcomes related to the concept of moles and stoichiometry in grade XI at SMA Negeri 1 Tobadak.
3. Both learning motivation and self-efficacy jointly contribute to students' achievement in chemistry, specifically in mastering the topics of mole concept and stoichiometry, among grade XI students at SMA Negeri 1 Tobadak..

It is expected to be input for teachers in learning, especially in chemistry lessons, to pay more attention to internal factors that can influence students' chemistry learning outcomes, for example learning motivation and self-efficacy.

ADVANCED RESEARCH

Every study certainly has limitations that need to be considered. This study's sample is limited to a limited number of participants, namely grade XI students of SMA Negeri 1 Tobadak, with a sample size of only 30 people, which may not fully represent the larger population. In addition, this study only focuses on the material of the concept of moles and stoichiometry in chemistry learning, so it cannot be generalized to all chemistry materials or other subjects. Furthermore, external factors that can influence motivation and self-efficacy, such as social factors, family environment, and teacher teaching style, are not considered in depth in this study. For further research, it is recommended to use a larger and more representative sample, and consider external variables that may influence learning outcomes. Further research can also expand the scope of learning materials and assess the influence of other factors, such as the use of technology in learning, on student motivation, self-efficacy, and learning outcomes.

ACKNOWLEDGMENT

The researcher sincerely extends heartfelt appreciation to all individuals and institutions who have offered their support and assistance throughout the course of this study. Special thanks are directed to the dedicated teachers of SMA Negeri 1 Tobadak for their invaluable cooperation and for granting access to the necessary facilities and opportunities that made this research possible. Thank you also to friends and family who always provide encouragement, as well as to all the responses who always provide encouragement, and to all respondents who have taken the time to participate in this research. The author would also like to thank other parties who have provided suggestions, criticisms, and very meaningful moral and material support. Hopefully this research can provide a positive contribution to the world of education, especially in understanding the factors that influence student learning outcomes.

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