The influence of self-efficacy on the learning outcomes of critical thinking skills and understanding of concepts in a school-based management course

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ARTICLE INFO

Article history
Received May 22, 2024
Revised Dec 15, 2024
Accepted Dec 19, 2024

Keywords
Self-efficacy
Self-regulated learning
Critical thinking
Learning outcomes

ABSTRACT

This study investigates the impacts of self-efficacy on self-regulated learning, critical thinking, and the outcomes of comprehending School-Based Management lectures. Additionally, it explores the influence of self-regulated learning on critical thinking and learning outcomes. The SmartPLS 3 analytic method was employed to test the hypotheses. Findings indicate a significant positive effect of self-regulated learning on learning outcomes, establishing self-efficacy as a crucial factor for enhancing learning strategies and self-monitoring capabilities. The research confirms the beneficial effect of self-efficacy on critical thinking, highlighting its role in fostering key student competencies such as creativity, independence, and scientific inquiry. Furthermore, while self-regulated learning positively impacts critical thinking, self-efficacy did not directly affect learning outcomes. The study underscores the importance of self-regulated learning in advancing essential thinking skills, contributing valuable insights into the dynamics between self-efficacy, self-regulated learning, and educational achievement.

I. Introduction

In the era of globalisation, science and technology are rapidly developing and playing an increasingly important role. Therefore, it is necessary to have teachers with strong character. Nations unprepared to face globalisation will likely be left behind due to the rapid advances in science and technology. Therefore, to play a meaningful role in the era of globalisation in the 21st century, every citizen must be able to meet the demands of the times. 21st-century learning represents a shift in the learning model, where the curriculum developed leads schools or universities to change the learning approach from teacher-centred to student-centred. This learning approach aligns with future demands, where students must possess thinking and learning skills. Thinking and learning skills comprise problem-solving, critical thinking, collaboration, and communication skills.

In the learning process, learners must master various 21st-century competencies, including problem-solving and critical and creative thinking. Learners in 21st-century education should be trained to develop 21st-century competencies. (Anagün, 2018; Weaver et al., 2023). These competencies include creative thinking and critical thinking. And problem-solving, communication, and collaboration. The Industrial Revolution 4.0 presents a challenge and a necessity for Indonesian universities to equip graduates with 21st-century skills, including critical thinking, collaboration, communication, creativity, and the ability to compete globally.

Internal individual factors play a significant role in enhancing students' critical thinking and learning outcomes. In the learning process, individuals are controlled not only by external factors but also by self-regulated internal factors. Learning should be understood as an active, constructive, and self-regulatory process. Individuals who engage in self-regulated learning and practice effective learning strategies positively impact their ability to think critically and achieve academic success. (Rahmat et al., 2021). Students need to take responsibility for their learning and utilise self-regulation strategies.

Self-Regulated Learning (SRL) was first proposed in Bandura's (1986) social cognitive self-regulation theory. SRL is a strategy that individuals use to control their learning process, regulating, monitoring, and controlling their cognition, motivation, and behaviour to obtain information or skills. This involves the perception of

http://dx.doi.org/10.17977/um048v30i2p98-105

agency, goals, and the instrumentality of learners, mediating individuals, context, and achievement (Zimmerman, 1989). Zumbrunn et al. (2011) argue that displaying self-regulated learning is crucial to learning as it helps learners develop better learning habits and strengthen their skills.

The statement above suggests that students can use self-regulated learning to demonstrate and assess their learning strategies. It is possible that many undergraduate students have not been able to effectively organise their learning, which may contribute to a decline in learning outcomes and a lack of critical thinking skills. During the even semester of the 2021/2022 academic year, Sanata Dharma University PGSD students experienced declining learning outcomes, critical thinking, analytical skills, and active participation in the online School-Based Management (MBS) course. It is important to note that this information is objective and free from any subjective evaluations.

The research aims to test and analyse the relationship between self-efficacy and self-regulated learning, critical thinking, and learning outcomes in understanding the concepts of school-based management lectures. Additionally, the study aims to determine if there is a significant relationship between self-regulated learning, critical thinking, and learning outcomes in understanding the concepts of school-based management lectures.

A. Self-Efficacy and Self-Regulated Learning

The study found a correlation between self-efficacy and two key components of self-regulated learning: learning strategies and self-monitoring. Students with high self-efficacy demonstrated better quality in their learning strategies and were more effective in monitoring their learning outcomes than those with low self-efficacy. (Kurniawan et al., 2019). Bandura (Bandura, 1986) Proposed that self-efficacy is the main variable that affects one's behaviour. Lee's (2021) research showed a statistically significant difference in using self-regulated learning (SRL) strategies between students with high and low self-efficacy. The findings indicate a positive relationship between self-efficacy and SRL strategies. The study has implications for both practice and research. It has been demonstrated that self-regulated learning (SRL) and self-efficacy are crucial for student success in higher education. Sihotang et al. (2020) Research showed that self-efficacy positively impacts increasing self-regulated learning (SRL). Students who possess independence are more capable of exercising self-control and discipline and can better utilise their abilities and efforts to achieve their goals. Independence arises and operates when in a position that requires confidence. Self-regulation occurs when children believe in their abilities and are confident to complete tasks and learning challenges, leading to achieving desired goals. Based on this explanation, the hypothesis proposed in this study is as follows:

H1: Self-efficacy positively influences self-regulated learning in understanding the concept of school-based management lectures.

B. Self-Efficacy and Critical Thinking

Self-efficacy is a crucial element in developing critical thinking skills. Confidence in one's capacity to solve problems, discover relevant answers to particular questions, or create defensible conclusions. (Dehghani et al., 2011). Vachova et al. (2023) state that critical thinking is a key competency for students, with its importance increasing alongside efforts to develop creativity, independence, and scientific thinking. This skill is critical for feeling assured in one's capacity to address problems, identify relevant solutions, and develop well-supported conclusions. The authors also suggest that academic self-efficacy is a prerequisite for critical thinking in university students. Dehghani et al.'s (Dehghani et al., 2011) research suggests a significant positive correlation between student self-efficacy and critical thinking. It is important to consider self-efficacy as a motivational factor to develop learners' critical thinking skills. The significance of critical thinking in higher education and the study's findings suggest that conducting classes in an argumentative mode and engaging all students in group discussions, reducing the emphasis on memorisation of curriculum content, and increasing the level of challenge, as well as reflective content, are essential for enhancing critical thinking. (Ridhoni et al., 2022). Therefore, the hypothesis proposed in this study is as follows:

H2: Self-efficacy positively influences self-regulated learning in understanding the concept of school-based management lectures.

C. Self-Regulated Learning and Critical Thinking

Santrock (2007) defines self-regulated learning as the capacity to generate and monitor one's thoughts, feelings, and behaviours to achieve academic or socio-emotional goals. This includes improving reading comprehension, developing writing skills, learning multiplication, asking relevant questions, controlling anger, and getting along with peers. Karakoc (2016) found that individuals who think critically are skilled in analysing, synthesizing, and making logical decisions based on the information they receive. Heydarnejad et al. (2021) explained that teachers with high self-regulation skills and critical thinking ability tend to adopt a learner-centred teaching style, while those with low self-regulation skills do the opposite. The study's findings indicate that high self-regulated learning (SLR) levels significantly influence critical thinking skills. This has important implications for policymakers, curriculum designers, and teachers regarding pedagogical success. Additionally, Ghimby's research (2023) supports the positive impact of SLR on student learning outcomes and critical thinking skills. Furthermore, self-regulated learning positively impacts critical thinking skills and student learning outcomes (Priawasana et al., 2020).

Therefore, the hypothesis presented in this study is as follows:

H3: Self-regulated learning positively influences critical thinking in understanding the concept of school-based management lectures.

D. Self-Efficacy and Learning Outcomes

Doménech-Betoret et al (2017)In their research, they explained that self-efficacy positively affects academic achievement. Farihah and Rakasiwi (2020)Different results showed that self-efficacy did not affect student learning outcomes. Research by Mafla et al. (2019) proves that self-efficacy is positively related to academic performance. Honicke et al. (2016), state that self-efficacy is positively correlated with academic achievement. Several mediating and moderating factors were identified, including learning processing strategies, effort, regulation, deep processing strategies, and goal orientation.

Based on empirical studies on Self-Efficacy and Learning Outcomes, researchers found inconsistent results, which provided a gap in this study's effort to re-examine the relationship between Self-Efficacy and Learning Outcomes. (Widajati et al., 2020). Based on this explanation, the hypothesis proposed in this study is as follows:

H4: Self-efficacy positively affects learning outcomes of understanding the concept of school-based management lectures.

E. Self-Regulated Learning and Learning Outcomes

Learning is controlled not only by external aspects but also by self-regulated internal aspects. Therefore, learning must be an active, constructive, and self-regulated process. Every individual who learns will achieve good academic achievement. Every individual (student) with a high SLR is more aware and responsible and knows good self-regulation strategies (self-regulated learning). According to Zimmerman (Zimmerman, 1989)The aspects of SLR consist of three parts: metacognition is an individual's ability to plan, organise, or self-instruct, monitor, and evaluate learning activities. Active self-regulation is an individual's effort to regulate himself and select and utilise the environment that supports learning activities.

Rizki et al. (2022), stated in their research that a positive relationship exists between learning management system activities and student SRL outcomes. The results showed some positive indications of applying the SPADA learning management system, especially in improving students' SRL in general and disadvantaged areas. Self-Regulated Learning (SRL) is an approach that is considered helpful in understanding students' ability to manage their learning strategies and achieve improved performance. Research by Kavcic et al. (2022), states that students' learning outcomes (achievement) in science positively correlate with using SRL strategies. Students with higher knowledge acquisition reported higher use of deep cognitive strategies, higher SRL motivation to learn, and more strategies in taking notes while studying.

Alhazbi and Hasan (2021), stated in their research that self-regulation (SLR) is an important factor for learners' success in both online learning modes. However, there are differences in self-regulated learning strategies between students in synchronous (high-achieving female students) and asynchronous (low-achieving female students) modes. Research by Tadesse et al. (2022), stated that the five (5) components of SRLS significantly predict learning perceptions. Overall, the research findings indicate that Self-Regulated Learning Strategies (SLRS) are a relevant mechanism to help students succeed in learning in college. Based on this explanation, the hypothesis proposed in this study is as follows:

H5: Self-regulated learning positively affects learning outcomes of understanding the concept of school-based management lectures.

Based on several previous studies, no relationship has been found between SRL and learning outcomes and critical thinking, especially in understanding the concepts of school-based management (SBM) lectures. Empirical studies have proven that good self-efficacy has been theorised to predict better academic performance. Still, this relationship has not been tested in understanding the concept of School-Based Management (SBM) lectures. Therefore, to address this knowledge gap, this study aims to determine the relationship between self-efficacy and SLR, Critical Thinking, and Learning Outcomes. Based on this and the development of hypotheses, the conceptual framework in this study is as follows:

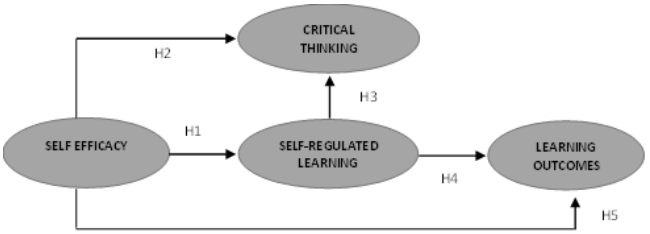

Fig. 1.Conceptual Framework.

II. Method

This study employed a quantitative research design with an explanatory method. Data was collected through the distribution of questionnaires using a Likert scale of 1-5 among PGSD students in their sixth semester during the academic year 2022/2023 at Sanata Dharma University Yogyakarta. The sample size consisted of 106 students. The data analysis method used was Partial Least Square with the SmartPLS 3 program. The variable measurement in this study consists of several indicators presented in Table 1.

Table 1. Variable and Indicator

Variable	Indicator
Self-Efficacy (Sherer et al., 1982)	Initiative, Effort, and Persistence.
Self-Regulated Learning (Zimmerman dan Martinez-Pons, 1986)	Self-evaluating, Organizing and transforming, Goal setting and planning, seeking information, keeping records and monitoring, Environmental structuring, Self-consequences, Rehearsing and memorising, seeking social assistance, and reviewing records.
Critical Thinking (Ennis, 1993)	Elementary Clarification, The Basis for the Decisions, Inference, Advances Clarification, and Supposition and Integration.
Learning Outcomes (Bloom et al., 1956)	Cognitive, Affective, and Psychomotor Skills

III. Results and Discussion

The results of data analysis using SmartPLS obtained the following results:

A. *Outer Model test results*

1) Convergent Validity

Convergent validity testing using outer loading variables Self-Efficacy (X1), SLR (X2), Critical Thinking (Y1), and Learning Outcomes (Y2) obtained the loading factor value of the indicator obtained all items have an outer loading value> 0.5 and have a p-value <0.05. Thus, the indicators of all variables have met convergent validity.

2) Discriminant Validity

The results of the discriminant validity test on the Self-Efficacy (X1), SLR (X2), Critical Thinking (Y1) and Learning Outcomes (Y2) variables using the cross loading value obtained the loading factor in the column of each variable is the highest value compared to the cross loading value of other variables so that the indicators of each variable Self-Efficacy (X1), SLR (X2), Critical Thinking (Y1) and Learning Outcomes (Y2) have met discriminant validity.

The results of the discriminant validity test also use the AVE root value; the AVE root value (bold) is greater than the correlation value between latent variables, so the variables Self-Efficacy (X1), SLR (X2), Critical Thinking (Y1) and Learning Outcomes (Y2) have met discriminant validity. The following is the Discriminant Validity Test (AVE Root) in Table 2. The following presents the results of the construct reliability test on the Self-Efficacy (X1), SLR (X2), Critical Thinking (Y1), and Learning Outcomes (Y2) variables in Table 3.

Constructs (latent variables) can be said to be reliable if they have a composite reliability value and Cronbach alpha> 0.7 so that each variable Self-Efficacy (X1), SLR (X2), Critical Thinking (Y1), and Learning Outcomes (Y2) has met construct reliability.

Table 2. Discriminant Validity Test (AVE Root)

Variable	Self-Efficacy	SLR	Critical Thinking	Learning Outcomes
Self-Efficacy	0,820	0,537	0,466	0,405
SLR	0,537	0,817	0,518	0,471
Critical Thinking	0,466	0,518	0,774	0,743
Learning Outcomes	0,405	0,471	0,743	0,828

B. *Construct a Reliability Test*

Table 3. Construct Reliability Test

Variable	Cronbach's Alpha	Composite Reliability
Self-Efficacy	0,969	0,972
SLR	0,969	0,971
Critical Thinking	0,952	0,957
Learning Outcomes	0,967	0,970

C. *Inner Model Test Results*

The statistical estimation results in R2 presented in Table 4 show the contribution value of the independent variables (exogenous) to the dependent variable (endogenous).

Table 4. Estimation Results of R^2

Endogenous Variable	R^2
Learning Outcomes (Y2)	0,254
Critical Thinking (Y1)	0,318
SLR (X2)	0,288

Based on the Coefficient of Determination of Learning Outcomes of 0.254, it shows that the variation in Learning Outcomes (Y2) can be explained by the Self Efficacy variable (X1) and the SLR variable (X2) by 25.4%. The Critical Thinking Determination Coefficient of 0.318 indicates that the variation in Critical Thinking (Y1) can be explained by the Self Efficacy variable (X1) and the SLR variable (X2) by 31.8%. The SLR Coefficient of Determination of 0.288 indicates that the variation of SLR (X2) can be explained by the Self Efficacy variable (X1) by 28.8%. Overall, the results of this study can be seen in Figure 2.

D. *Hypothesis Testing*

Hypothesis testing proposed in this study is based on testing the significance of the path coefficient using the t-statistic (t-value) estimated through the bootstrapping procedure. If the P value <0.05, the proposed hypothesis is accepted, then the hypothesis is accepted. The results of

estimating the path coefficient of the effect of a construct on other constructs are presented in Table 5.

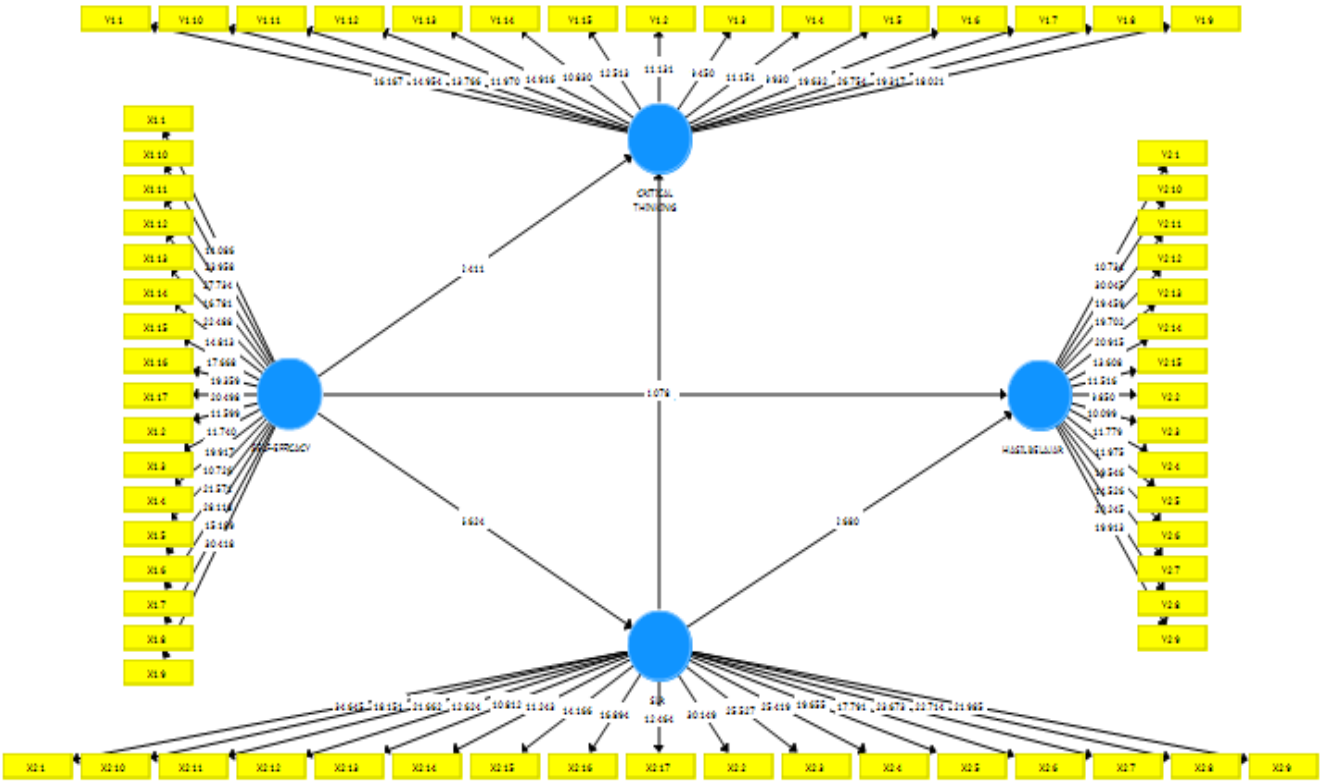

Fig. 2.Partial Least Square (PLS) Testing Results

Table 5. Hypothesis Testing

Hypothesis	Original Sample	T-Statistic	P-value	Conclusion
H1: There is a positive influence of Self-Efficacy on Self-Regulated Learning	0,537	6,933	0,000	Hypothesis Accepted
H2: There is a positive influence of Self-Efficacy on Critical Thinking	0,264	2,316	0,021	Hypothesis Accepted
H3: Self-regulated learning has a positive influence on critical thinking.	0,377	4,015	0,000	Hypothesis Accepted
H4: There is a positive effect of Self-Efficacy on Learning Outcomes	0,214	1,785	0,075	Hypothesis Rejected
There is a positive effect of Self-Regulated Learning on Learning Outcomes	0,356	2,687	0,007	Hypothesis Accepted

Based on Table 5 explains that the first hypothesis, namely the effect of Self-Efficacy on Self-Regulated Learning, has a p-value of 0.000 <0.05. It can be stated that the original sample value that measures the effect of Self-Efficacy on Self-Regulated Learning is significant. The original sample value of 0.537 indicates that Self-Efficacy positively affects Self-Regulated Learning. Thus, hypothesis H1, which states that self-efficacy positively influences Self-Regulated Learning, is accepted. This finding supports the research of Sihotang et al. (2020), which shows that self-efficacy has a positive effect on increasing self-regulated learning. This study also supports Lee's findings (2021), which show a positive relationship between self-efficacy and self-regulated learning strategies. SRL and self-efficacy are important for student success in higher education. This finding supports the social cognitive theory view that self-efficacy is the main variable influencing self-efficacy (Bandura, 1986). Thus, students with independence will be more able to have self-control, be more disciplined, and use their abilities and efforts to achieve goals. Self-regulation arises if individuals believe in their abilities and have confidence that they can carry out every task and challenge in learning; it will impact achieving the desired goals. It can be concluded that self-efficacy is related to two important aspects of Self-Regulated Learning: learning strategies and self-monitoring. Students with high self-efficacy are proven to have better-quality learning strategies and are

better able to monitor their learning outcomes than students with low self-efficacy.

The second hypothesis, namely the effect of Self-Efficacy on Critical Thinking, obtained a p-value of 0.021 <0.05. It can be stated that the original sample value that measures the effect of Self-Efficacy on Critical Thinking is significant. The original sample value of 0.264 indicates that Self-Efficacy positively affects Critical Thinking. Thus, hypothesis H2, which states that self-efficacy positively affects critical thinking, is accepted. This finding supports the research of Dehghani et al. (2011), who found a significant positive relationship between student self-efficacy and critical thinking. Self-efficacy is a motivational factor that must be considered to develop students' critical thinking skills. This study also supports the findings of Vachova et al.. (Vachova et al., 2023), that Academic Self-Efficacy is a Prerequisite for Critical Thinking in University Students. It can be concluded that self-efficacy is an important factor in critical thinking. Critical thinking is viewed as a primary skill among students, with its significance growing alongside endeavours to enhance their creativity, independence, and scientific thinking. These abilities are crucial for fostering confidence in one's capability to tackle problems, identify pertinent solutions, and create well-supported conclusions. Therefore, conducting classes in an argumentative mode and involving all students in group discussions and their contributions to discussions, reducing rote memorisation of curriculum content and increasing challenges, and reflective content is necessary to improve critical thinking.

The third hypothesis, the effect of Self-Regulated Learning on Critical Thinking, obtained a p-value of 0.000 <0.05. It can be stated that the original sample value that measures the effect of Self-Regulated Learning on Critical Thinking is significant. The original sample value of 0.377 indicates that self-regulation learning positively influences critical thinking. Thus, hypothesis H3, which states that self-regulated learning positively influences critical thinking, is accepted. This finding supports Ghimby's research. (Ghimby, 2023), that self-regulated learning positively affects critical thinking skills and student learning outcomes. According to Karakoc (Karakoc, 2016)Individuals who think critically will be accustomed to analysing, synthesising, and making logical decisions based on any information they receive. Self-regulated learning is the ability to generate and monitor one's thoughts, feelings, and behaviours to achieve academic goals and improve a student's critical thinking by asking relevant questions during presentations and lectures. (Kuswandi & Soepriyanto, 2021).

The fourth hypothesis, the effect of Self-Efficacy on learning outcomes, obtained a p-value of 0.075> 0.05. Thus, hypothesis H4, which states that self-efficacy positively affects Learning Outcomes, is rejected. This finding is inconsistent with the research of Doménech-Betoret et al. (Doménech-Betoret et al., 2017), that self-efficacy has a positive effect on academic achievement. This study also does not support the findings of (Honicke & Broadbent, 2016; Mafla et al., 2019), that self-efficacy is positively correlated with academic achievement. However, this study is supported by the research of Farihah and Rakasiwi. (Farihah & Rakasiwi, 2020), that self-efficacy does not affect student learning outcomes. This finding supports Bandura. (1994), that self-efficacy is not related to the skills possessed but to the individual's beliefs about what can be done with his skills at any size. The hypothesis proposed in this study is rejected because student self-efficacy is not the only determinant of action to achieve achievement (learning outcomes); a major determinant in research on learning outcomes is the formation of self-regulation (SLR) and students' ability to think critically. In addition, another reason for the lack of effect of self-efficacy on learning outcomes is that there is a possibility that many participants in the study have moderate self-efficacy or low efficacy.

The fifth hypothesis, namely the effect of Self-Regulated Learning on Learning Outcomes, obtained a p-value of 0.007 <0.05. It can be stated that the original sample value that measures the effect of Self-Regulated Learning on Learning Outcomes is significant (Ulfa & Fatawi, 2021). The original sample value of 0.356 indicates that self-regulation learning positively influences critical thinking. Thus, hypothesis H5, which states that self-regulated learning positively influences learning outcomes, is accepted. This finding supports the research of Rizki et al. (2022), which found that there is a positive relationship between learning management system activities and student SRL outcomes. Self-Regulated Learning (SRL) is an approach that is considered helpful in understanding students' ability to manage their learning strategies and achieve improved performance. This research also supports the findings of Kavcic et al. (2022) that students' learning outcomes (achievement) in science are positively correlated with using SRL strategies. This research also supports Alhazbi and Hasan's findings. (Alhazbi & Hasan, 2021), who states that self-regulation (SLR) is important for learner success. Tadesse et al. (2022) also explained that Self-Regulated Learning Strategies are a relevant mechanism to help students succeed in learning in college. It can be concluded that student learning is controlled not only by external and internal aspects, namely self-regulation. Every individual (student) with a high SLR is more aware and responsible and knows the self-regulation strategy for good learning. Students' active behaviour in self-regulation is an individual's effort to regulate himself, select, and take advantage of the environment that supports his learning activities, which impacts learning outcomes. Students are responsible for their learning activities because they realise that only their efforts can achieve learning goals effectively. Thus, SRL functions concretely to plan the learning process, monitor learning progress, and determine goals (targets to be achieved) in learning.

IV. Conclusion

Your data analysis shows that self-regulated learning (SRL) positively affects learning outcomes. This suggests that students who exhibit more independence, self-control, and discipline can better use their abilities and efforts to achieve their academic goals. Self-efficacy plays a crucial role in SRL, particularly in influencing learning strategies and self-monitoring, which are important aspects of SRL. Additionally, there is evidence that self-efficacy positively influences critical thinking, another key competency for students. Critical thinking is increasingly important for developing students' creativity, independence, and scientific thinking. The study also found a positive relationship between SRL and critical thinking. SRL, which involves managing one's thoughts, feelings, and behaviours to achieve goals, enhances critical thinking skills. However, the study did not find a significant effect of self-efficacy on learning outcomes. This could be because self-efficacy is not the sole determinant of academic achievement; other factors, such as SRL and critical thinking, may play larger roles. It is also possible that many participants in the study had moderate or low self-efficacy. Overall, the findings suggest that internal (self-regulation) and external (classroom practices) aspects play important roles in student learning. Encouraging self-regulated learning, engaging students in argumentative discussions, and reducing rote memorisation can all enhance critical thinking skills and ultimately improve learning outcomes.

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