

## Toward Effective Learning: The Influence of Reflective Thinking and Academic Motivation on Self-Regulated Learning in Students

Zaharuddin<sup>1</sup>, Lukmawati<sup>2</sup>, Siti Dini Fakhriya<sup>3</sup>

Faculty of Psychology, UIN Raden Fatah Palembang, Indonesia<sup>1 2 3</sup>

zaharuddin\_uin@radenfatah.ac.id

### Abstract

Self-regulated learning is an important skill that enables undergraduate students to learn effectively, most student find it difficult to manage. Therefore, fostering reflective thinking and maintaining academic motivation are essential, as these two factors help students take better control of their own learning process. This study aims to examine the influence of reflective thinking and academic motivation on self-regulated learning among students of the Faculty of Psychology, Universitas Islam Negeri Raden Fatah Palembang. A quantitative approach was employed in this study. The sample consisted of 336 active students from the Faculty of Psychology, Universitas Islam Negeri Raden Fatah Palembang, selected using simple random sampling. Three instruments were used in this study. Reflective thinking was measured using the Reflective Thinking Questionnaire. Academic motivation was measured using the Academic Motivation Scale (AMS). Self-regulated learning was measured using an instrument based on the dimensions proposed by Pintrich. The results showed that reflective thinking and academic motivation significantly influenced self-regulated learning among students of the Faculty of Psychology, Universitas Islam Negeri Raden Fatah Palembang, with an effective contribution of 29.2%. Reflective thinking contributed 17.8% to self-regulated learning, while academic motivation contributed 11.4%. Higher education institutions can create activities and programs that encourage students to develop self-regulated learning skills, allowing students to take control of their learning processes and achieve their academic objectives through reflective thinking and increased academic motivation.

**Keywords:** academic motivation, reflective thinking, self-regulated learning

### Abstrak

*Self regulated learning merupakan keterampilan penting yang memungkinkan mahasiswa belajar secara efektif, namun sebagian besar mahasiswa kesulitan mengelolanya. Oleh karena itu, menumbuhkan pemikiran reflektif dan menjaga motivasi akademik sangatlah penting, karena kedua faktor ini membantu mahasiswa mengendalikan proses belajar mereka dengan lebih baik. Penelitian ini bertujuan untuk menguji pengaruh reflective thinking dan academic motivation terhadap self-regulated learning pada mahasiswa Fakultas Psikologi Universitas Islam Negeri Raden Fatah Palembang. Penelitian ini menggunakan pendekatan kuantitatif. Sampel penelitian terdiri dari 336 mahasiswa aktif Fakultas Psikologi Universitas Islam Negeri Raden Fatah Palembang yang dipilih menggunakan teknik simple random sampling. Tiga instrumen digunakan dalam penelitian ini. Reflective thinking diukur menggunakan alat ukur reflective thinking questionnaire. Academic motivation diukur menggunakan Academic Motivation Scale (AMS). Self-regulated learning diukur menggunakan instrumen yang disusun berdasarkan dimensi yang dikemukakan oleh Pintrich. Hasil penelitian menunjukkan bahwa reflective thinking dan academic motivation berpengaruh signifikan terhadap self-regulated learning pada mahasiswa Fakultas Psikologi Universitas Islam Negeri Raden Fatah Palembang, dengan kontribusi efektif sebesar 29,2%. Reflective thinking memberikan kontribusi sebesar 17,8% terhadap self-regulated learning, sedangkan academic motivation memberikan kontribusi sebesar 11,4%. Perguruan tinggi dapat menyelenggarakan kegiatan dan program yang mendorong mahasiswa untuk*

*mengembangkan self regulated learning, sehingga mahasiswa dapat mengendalikan proses belajar mereka sendiri dan mencapai tujuan akademik mereka melalui pemikiran reflektif serta peningkatan motivasi akademik.*

**Kata kunci:** berpikir reflektif, motivasi akademik, pembelajaran mandiri

## Introduction

Learning in the twenty-first century is closely related to digitalization, which is expected to support more effective learning. Effective learning is student-centered and involves the use of appropriate processes and procedures that produce beneficial learning outcomes (Uno & Mohamad, 2012). Effective learning involves changes in an individual's cognitive, behavioral, and psychomotor abilities based on learning experiences derived from personal and environmental interactions, resulting in specific impacts, meanings, and benefits (Bistari, 2018). Achieving effective learning requires strong self-regulated learning (SRL) skills. Self-regulated learning influences academic outcomes by helping students organize their knowledge effectively (Broadbent & Poon, 2015). To adapt with this environment, students need an ability to regulate their learning.

Self-regulation is not a fixed trait but can be developed through teaching strategies that emphasize students' responsibility for their own learning (Antonelli et al., 2020), thereby improving their overall academic performance (Mazlan et al., 2020). This emphasizes that when students take active responsibility for their learning, they see significant improvements in academic performance. Self-regulated learning (SRL) refers to the process by which learners actively manage their learning by setting goals and applying cognitive, metacognitive, motivational, and behavioral strategies to plan, monitor, organize, and evaluate their learning in order to enhance learning outcomes (Pintrich, 2000; Stegers-Jager et al., 2012; Hamid & Singaram, 2016). Self-regulated learning consists of four dimensions (Pintrich, 2000) (1) cognitive control, which involves cognitive and metacognitive activities; (2) motivation, which involves efforts to maintain one's motivation; (3) behavior, which involves efforts to control one's behavior; and (4) context, which involves a person's efforts to regulate the learning environment when engaging in classroom activities.

Self-regulated learning provides students greater responsibility for the learning process, making them more aware of conceptual reasoning, relationships, and explanations for questions that arise during learning (Sudarman, 2014; Hannani & Ajisukmo, 2021). Research conducted by Aghaei et al. (2022) shows that when students are encouraged to engage in metacognition about their own learning and actively reflect on how they learn, their learning goals, and strategies for improvement, they become more internally motivated and gain greater control over their learning processes and habits. This allow student to transform their own education by taking more control over their learning.

Implementing self regulated learning require a process that need an aspect that accompany the process to ensure the effective learning occur. In this case reflective thinking supports the development of self-regulated learning strategies, and it is important for students to be given sufficient time and a supportive learning environment to engage in reflective thinking effectively so that they can recognize its benefits and appreciate the process (McMullen, 2020). Reflective thinking consists of four dimensions: understanding, habitual action, reflection, and critical reflection (Kember et al., 2000). Habitual action refers to actions performed automatically without conscious thought (Kember et al., 2000). Understanding refers to thoughtful action or a deliberate thought process (Kember et al., 2000). Kember et al. (2000) explain that reflection in a learning context refers to an individual's intellectual and affective activities in exploring experiences to gain deeper understanding.

Self-regulated learning provides a sense of self-competence and helps explain students' relationship with motivation and academic achievement (Zimmerman, 1989). Turan et al. (2022) argue that self-regulated learning is an active process that requires flexibility and reflective skills, especially in the context of distance learning. Students who are able to regulate themselves effectively demonstrate consistent learning efforts, adapt to challenges, and experience greater satisfaction with their learning process.

However most of the student find it difficult to maintain this process and tend to give up when obstacle occur in the process.

One theoretical approach that comprehensively explains academic motivation is Self-Determination Theory. Deci and Ryan (2008) state that academic behavior can be understood in terms of intrinsic motivation, extrinsic motivation, and amotivation. Intrinsic motivation refers to an internal drive to achieve success in a particular activity through self-motivation and self-awareness that arise from participation in the activity itself (Deci & Ryan, 2008). Extrinsic motivation refers to motivation that arises from external consequences associated with the activity (Deci & Ryan, 2008). Amotivation, on the other hand, is a condition in which individuals perceive their behavior as beyond their control and therefore feel neither intrinsically nor extrinsically motivated (Deci & Ryan, 2008). This academic motivation allow student to engage in the self regulated learning strategies. Motivated student not only engage in their self regulated learning strategies but they will also find a way to keep motivated.

Further research by McMullen (2020) also shows that students who actively reflect on their learning tend to regulate their learning processes more effectively. Another study by Wangid (2022) states that various motivational components, such as goal orientation, activation of knowledge, outcome expectations, and intrinsic value, help students regulate their learning. Further research by Herliana (2022) found a positive relationship between motivation and self-regulated learning among students in blended learning environments. Koshkouei et al. (2016) found that students' motivation significantly predicted their implementation of SRL strategies, suggesting that motivation serves as a precursor to effective self-regulation in learning. This indicates that motivation acts as a driving force for adopting effective learning strategies in various learning environments.

In the study of self-regulation, many variables contribute to the development of self-regulated learning, such as metacognitive awareness (Efklides, 2011), reflectivity (Aghaei et al., 2022), and learning strategies (Tiarina & Rozimela, 2017). Internal factors identified as predictors of self-regulated learning include self-efficacy (ElSayad, 2024), positive emotion (Abbott & Lee, 2023), and intrinsic motivation (Cahyani et al., 2025). Meanwhile, external factors include social interaction (Hudley & Gottfried, 2008), learning environment (Zarestky et al., 2022), and virtual learning environments (Sapriati et al., 2023).

Despite extensive research about reflective thinking and self regulated learning, most of the research focused on cognitive component and limited research about reflective thinking. Regarding academic motivation, most research examines self regulated learning's effect on motivation rather than motivation's direct effect on self regulated learning, these variables operate interdependently rather than in isolation, but causal directionality requires further investigation. Therefore, more diverse populations, and investigation of casual mechanism where reflective thinking and academic motivation may not enhance self-regulated learning are needed.

This study specifically focuses on reflective thinking and academic motivation within higher education. Higher education has become an important setting for addressing problems related to academic performance and improving learning strategies and environments to support students' professional development in the future. A current phenomenon is that students have not yet fully realized that the learning culture in higher education differs from that of their previous educational experiences. Research by Taufiq (2018) found that many students only read books to complete assignments given by instructors, indicating that the learning culture in higher education is still undervalued. Learning in higher education tends to require students to be self-directed in their studies. Therefore, this study aims to examine the influence of reflective thinking and academic motivation on self-regulated learning among undergraduate students. Furthermore, this study provides an overview of the characteristics of the population studied. The findings are expected to contribute to institutional efforts to improve the learning process of students in the Faculty of Psychology at UIN Raden Fatah Palembang.

## Methods

This study employed a quantitative research design with a cross-sectional approach, in which data were collected at a single point in time (Kumar, 2011). The purpose of this study was to examine the influence of independent variables on the dependent variable. This correlational study was conducted without manipulating the variables and aimed to determine the strength of the relationships among them. (Azwar, 1998).

The participants in this study consisted of 336 active students from the Faculty of Psychology, Universitas Islam Negeri Raden Fatah Palembang. The inclusion criteria were: (1) active students of the Faculty of Psychology at Universitas Islam Negeri Raden Fatah Palembang; (2) students who had attended lectures for more than one semester at the Faculty of Psychology; and (3) students who were willing to participate in the study. The research sample was determined using a simple random sampling technique.

Data were collected using a Likert-scale format (4 = strongly agree, 3 = agree, 2 = disagree, 1 = strongly disagree). Respondents were asked to select the option that best represented their attitudes. The items consisted of both favorable and unfavorable statements. Reflective thinking was measured using the Reflective Thinking Questionnaire developed by (Kember et al., 2000) and adapted to Indonesian according to WHO (2020). This process was implemented through 4 process: (1) forward translation; (2) expert panel review; (3) backward translation; (4) pre-testing and interview. The instrument consists of four dimensions: understanding, habitual action, reflection, and critical reflection, with a total of 11 items.

Academic motivation was measured using the Academic Motivation Scale (AMS) developed by Vallerand et al. (1992) and adapted by Syahputra (2018) with reliability  $\alpha \geq 0.7$ , which ranged from 0.746 to 0.898. The scale measures three dimensions of motivation: intrinsic motivation, extrinsic motivation, and amotivation, consisting of 28 items. Self-regulated learning was measured using an instrument developed by Hidayat et al. (2022) with reliability with reliability  $\alpha 0.908$  based on the self-regulated learning dimensions proposed by Pintrich (2000). The instrument consists of four dimensions: cognitive, motivational, behavioral, and contextual, with a total of 29 items.

To examine the relationship between two independent variables and one dependent variable, multiple regression analysis was used as the data analysis technique. In this study, multiple regression analysis was conducted to examine the effects of reflective thinking and academic motivation on self-regulated learning. Prior to conducting the regression analysis, several classical assumption tests were performed to ensure that the data met the required assumptions, including tests of normality, linearity, multicollinearity, and heteroscedasticity.

## Results and Discussion

### Results

A total of 336 undergraduate students from the Faculty of Psychology, Universitas Islam Negeri Raden Fatah Palembang, participated in this study and completed the online questionnaire. The demographic data indicated that females constituted 85.5% of the sample, while males accounted for 14.5%. Regarding participation in student organizations, 51.2% of the students reported being involved in student organizations, whereas 48.8% reported no participation.

**Table 1.** Demographics Data

Factor	N	%
Gender		100%
Male	49	14.5%
Female	287	85.5%
Organization Participation		100%
Participant	172	51.2%
Non-participant	164	48.8%

**Validity Test**

Construct validity was examined using Confirmatory Factor Analysis (CFA) with Mplus version 7. To ensure that the instruments adequately measured the intended constructs, confirmatory factor analysis (CFA) was conducted for all instruments. The cut-off criteria for model fit followed the guidelines proposed by Hooper et al. (2008), including a chi-square probability value ( $p > .05$ ), Comparative Fit Index (CFI)  $> .90$ , Tucker–Lewis Index (TLI)  $> .90$ , and Root Mean Square Error of Approximation (RMSEA)  $< .08$ . The results of the CFA validity test are presented in **Table 1**.

**Table 2.** Confirmatory Factor Analysis Test

Instrument	Dimension	<i>p</i> value of $\chi^2$	RMSEA	CFI	TLI
<i>Reflective thinking</i>	<i>Understanding</i>	.498	.000	1.000	1.000
	<i>Habitual Action</i>	.453	.000	1.000	1.000
	<i>Reflection</i>	.0469	.094	.992	.951
	<i>Critical Reflection</i>	.2851	.028	.998	.993
<i>Academic motivation</i>	<i>Extrinsic Motivation</i>	.000	.0067	.951	.937
	<i>Intrinsic Motivation</i>	.000	.067	.949	.938
	<i>Amotivation</i>	.0247	.065	.991	.981
	<i>Cognition</i>	.0006	.067	.946	.910
<i>Self-regulated learning</i>	<i>Motivation</i>	.0155	.060	.980	.943
	<i>Behavior</i>	.0155	.079	.946	.905
	<i>Context</i>	.0008	.067	.959	.928

The results of the CFA test showed that the RMSEA values were below .08 and the CFI and TLI values exceeded .90, indicating an acceptable to good model fit. Overall, the results suggest that the measurement model is theoretically and statistically sound, although some chi-square statistics remained significant due to the sensitivity of the chi-square test to sample size (Hu & Bentler, 1999).

*Reliability Test*

Reliability testing of the research instruments was conducted using Cronbach's alpha coefficient. Reliability is expressed as a coefficient ranging from 0 to 1.00. The closer the reliability coefficient is to 1.00, the higher the reliability of the measurement. Conversely, coefficients closer to 0 indicate lower reliability (Azwar, 2012). The **Table 2.** displays the findings of the CFA validity test:

**Table 3.** Reliability Analysis Test

Instrument	Reliability
<i>Reflective thinking</i>	.874
<i>Academic Motivation</i>	.911
<i>Self-regulated learning</i>	.877

The reliability analysis showed high Cronbach's alpha values ranging from .874 to .911 (**Table 3.**). Therefore, all instruments used in this study demonstrated strong reliability and good internal consistency.

In the hypothesis-testing stage of the study, multiple regression analysis was conducted using SPSS version 29. An important aspect of regression analysis is examining the coefficient of determination ( $R^2$ ) to determine the proportion of variance in the dependent variable explained by the independent variables. In addition, the analysis was used to assess whether the independent variables collectively had a significant effect on the dependent variable and to evaluate the significance of the regression coefficients of each independent variable.

**Table 4.** Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	.540 <sup>a</sup>	.292	.288	6.257

Based on **Table 4.**, the  $R^2$  value obtained was .292, indicating that reflective thinking and academic motivation explained 29.2% of the variance in self-regulated learning. The remaining 70.8% of the variance may be explained by other variables not included in this study. Furthermore, an F-test was conducted to determine whether the independent variables collectively had a significant effect on the dependent variable. The results of the F test can be seen in Table below:

**Table 5.** ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	5379.049	2	2689.525	68.694	.001 <sup>b</sup>
Residual	13037.710	333	39.152		
Total	18416.759	335			

Based on **Table 5.**, the F-test result was 68.694 with a significance level of  $p < .05$  ( $p = .001$ ). This indicates that the regression model was statistically significant. Therefore, H1, which states that reflective thinking and academic motivation influence self-regulated learning among students of the Faculty of Psychology, Universitas Islam Negeri Raden Fatah Palembang, was supported.

To further examine the contribution of each independent variable in predicting self-regulated learning, a t-test was conducted on the regression coefficients of each independent variable, as presented in Table 6. The significance of the regression coefficients was determined based on the p-value. If the p-value was less than .05, the regression coefficient was considered statistically significant, indicating that the independent variable had a significant effect on self-regulated learning. The magnitude of the regression coefficients for each independent variable is presented in the following table.

**Table 6.** Multiple Linear Regression

Model	Unstandardized Coefficients		Standardized Coefficients		T	Sig.
	B	Std. Error	Beta			
(Constant)	29.377	3.972			7.395	0.001
RT	.508	.086	.352		5.933	0.001*
AMS	.217	.053	.244		4.115	0.001*

The results presented in **Table 6.** show that the reflective thinking variable had a t-value of 5.933 with a significance level of  $p = .001$  ( $p < .05$ ). Therefore, H2, which states that reflective thinking influences self-regulated learning among students of the Faculty of Psychology, Universitas Islam Negeri Raden Fatah Palembang, was supported. This finding indicates that reflective thinking has a significant effect on self-regulated learning among these students.

Furthermore, the results in **Table 6.** show that the academic motivation variable had a t-value of 4.115 with a significance level of  $p = .001$  ( $p < .05$ ). Therefore, H3, which states that academic motivation influences self-regulated learning among students of the Faculty of Psychology, Universitas Islam Negeri Raden Fatah Palembang, was supported. This finding indicates that academic motivation has a significant effect on self-regulated learning among these students.

Next, a partial correlation analysis was conducted to examine the relationship between each independent variable and the dependent variable while controlling for the other independent variables. The results of the partial correlation analysis are presented in the following table.

**Table 7.** Partial Correlation

	r	Sig
<i>Reflective thinking * Self-regulated learning</i>	.309	.001*
<i>Academic motivation* Self-regulated learning</i>	.220	.001*

The results presented in **Table 7.** show that the reflective thinking variable had an r-value of .309 with a significance level of  $p = .001$  ( $p < .05$ ), indicating a significant relationship between reflective thinking and self-regulated learning among students of the Faculty of Psychology, Universitas Islam Negeri Raden

Fatah Palembang. Similarly, the academic motivation variable had an r-value of .220 with a significance level of  $p = .001$  ( $p < .05$ ), indicating a significant relationship between academic motivation and self-regulated learning among these students.

## Discussion

The result show that reflective thinking supports the development of self-regulated learning strategies, and it is important for students to be provided with sufficient time and an appropriate learning environment to engage in reflective activities so that they can recognize the benefits and appreciate the process. Students who actively reflect on their learning tend to regulate their learning processes more effectively (McMullen, 2020). Self-regulated learning encourages critical thinking and helps students achieve higher levels of understanding, which in turn influences their ability to analyze and interpret complex concepts (Hidayati & Kurniati, 2018). Rivas et al. (2022) emphasize that reflective thinking develops more optimally when supported by an individual's metacognitive capacity and a supportive learning environment for exploring experiences.

Furthermore, Efklides (2011) emphasized the importance of metacognitive awareness in supporting self-regulation. This awareness is strengthened through reflective practice, enabling students to become more skilled in selecting appropriate learning strategies. Reflective thinking has been shown to influence students' higher order thinking skill, which are essential for identifying personal learning gaps and developing appropriate strategies (Liu et al., 2025). In this relationship, reflective thinking provide the metacognitive data that allow student to engage in the process beyond passive information absorption. Engaging in reflective discussions and structured debriefing activities has also been shown to improve students' independent and active learning abilities (Almomani & Attallah, 2020).

Zarestky et al. (2022) found that the use of reflective journals significantly increased students' metacognitive awareness and self-regulation strategies. These findings strengthen the argument that instructional design that supports reflection has a direct impact on self-regulated learning. Yang (2008), through a study of online group discussions, found that reflective social interactions broaden students' perspectives and encourage self-regulation through collaborative learning. This finding confirms that reflective thinking is closely related to academic self-confidence, As the students becomes increasingly aware of their own mental processes, this process lead to higher self-efficacy and the ability to regulate both emotional responses and cognitive strategies more effectively. Students with high self-efficacy tend to be more active in reflective practices, enabling them to continuously adjust their learning strategies Yong et al. (2024).

When individuals engage in reflective thinking, it encourages deeper learning and personal growth (Gaupp et al., 2018; Yun et al., 2021). This is supported by evidence showing that reflective inquiry teaching techniques improve academic performance by encouraging students to critically analyze their learning and develop a deeper understanding of the material (Simacon & Veloria, 2022). Reflective thinking helps student set realistic goals and it enables reflection to adjust learning strategies and evaluates the learning outcomes. The implementation of reflective practices can significantly enhance students' self-regulation skills, ultimately leading to improved academic achievement (Hidayati & Kurniati, 2018).

Zimmerman (2002) observed that self-regulated learning is closely related to motivation. High levels of motivation are associated with higher levels of self-regulated learning, whereas low motivation is associated with lower levels of self-regulated learning. Students who demonstrate effective self-regulated learning tend to have higher academic motivation, which in turn contributes to better academic achievement (Nabizadeh et al., 2019). Motivation and self-confidence influence how individuals learn. Highly motivated individuals are more likely to plan their learning activities, develop academic skills, and evaluate their academic performance.

Individuals with higher levels of intrinsic motivation tend to employ self-regulatory strategies, such as goal setting and self-monitoring, that support their academic achievement (Ning & Downing, 2012). In

this instance, the student needs to implement self-regulated learning strategies to maintain their learning drive from distractions using motivational regulation to maintain their effort through challenges. Students with higher motivation more frequently use cognitive strategies such as elaboration and organization to manage their learning processes (She et al. 2023). Similarly, Lopez-Ponton et al. (2017) found that students with higher levels of academic motivation tend to demonstrate stronger self-regulated learning behaviors, as motivated learners are more likely to engage in self-regulatory activities such as goal setting, self-monitoring, and self-reflection. As these intrinsic interest leads to deeper cognitive engagement, and the mastery gained through self-regulation reinforces the drive to learning.

A study by Hajivosoogh et al. (2022) revealed the important role of academic motivation in self-regulated learning among students, while also emphasizing the interaction between motivation, self-efficacy, and emotional regulation. Academic motivation is closely related to self-regulation, indicating that students with higher levels of motivation are more likely to adopt effective self-regulated learning strategies (Thompson et al., 2024). Individuals with high academic motivation are more likely to engage in effective self-regulated learning, leading to improved learning outcomes (Chen et al., 2024).

Sugandi (2020), in a study conducted in Indonesia, revealed that learning motivation and self-reflection together significantly contribute to students' self-regulated learning. Lin et al. (2017) found that students who actively engage in learning regulation tend to use cognitive and metacognitive strategies more effectively, and there is a direct relationship between motivation levels and the strategies used in online language learning. Similar findings were also reported by Gunther et al. (2022), who argued that motivated students tend to adopt a wider variety of learning strategies, thereby improving their academic achievement.

This study confirm the effect between reflective thinking and academic motivation to self regulated learning. In this case, student should focus on reflection about their learning, as its an essential component to set goal based on their performance, conduct evaluation about their learning and adjust their future learning strategies. Where as academic motivation act as a drive to encourage student engaging in the self regulated learning strategies and maintain their engagement. Therefore its required for student to sustain their academic motivation for their learning. To implement effective self regulated strategies, reflective thinking should include in all the learning process as a reflective aspect, as motivation become a force to employ that process to achieve a successful learning in higher education.

## Conclusion

The results of this study indicate that reflective thinking and academic motivation significantly influence self-regulated learning among students of the Faculty of Psychology, Universitas Islam Negeri Raden Fatah Palembang, with a combined effective contribution of 29.2%. Reflective thinking contributed 17.8% to self-regulated learning, while academic motivation contributed 11.4%. These findings suggest that students who actively reflect on their learning experiences and possess strong academic motivation are more likely to regulate and monitor their learning processes effectively. This study offer an insight, that to conduct self-regulated learning in higher education, require reflective thinking to evaluate the learning process and academic motivation to maintain their learning process as it could get harder in implementing self-regulated learning.

This study has several limitations. First, the research focused only on examining the influence of variables using a correlational design. Therefore, future studies are encouraged to employ experimental approaches to investigate self-regulated learning-based instructional models more comprehensively. Second, the data were collected from a single university, which may limit the generalizability of the findings. Future research is recommended to involve larger and more diverse samples from different institutions. In addition, the use of cluster random sampling may provide deeper insights into variations in self-regulated learning across different academic years.

Despite these limitations, this study contributes to the development of knowledge and psychological theory, particularly in the field of educational psychology, and provides a basis for further research on

self-regulated learning among university students. Practically, the findings may serve as a reference for faculties or educational institutions in designing programs and activities that support the development of students' self-regulated learning. By fostering reflective thinking and academic motivation, students may regulate their learning processes more effectively and achieve their academic goals.

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