

Metacognitive Awareness and Self-Regulated Learning toward Students' Academic Achievement: Prediction study



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ABSTRACT: This study was intended to find the relationship among metacognitive awareness and self-regulated learning as independent variables and students' achievement/GPA as dependent variable. The study took senior college students as the sample from two private Indonesian universities. Thereupon, this study also was aimed to find whether students' metacognitive awareness and self-regulated learning could be predictors of students' achievement/ GPA. The study used Metacognitive Awareness Inventory and questionnaire to get the data of students' metacognitive awareness and self-regulated learning. The results showed that there were positive correlations between students' metacognitive awareness and self-regulated learning on academic achievements. The study also revealed that both metacognitive awareness and self-regulated learning could be predictors for academic achievement as many as 24.8%.

KEYWORDS: academic achievement, metacognitive awareness, self-regulated learning

1. INTRODUCTION

Metacognition has been seen to take a significant role in learning. The term "metacognition" is a bit of a misnomer. The term "metacognition" relates to how cognition works with strategy and knowledge that has already been acquired (Dangin, 2020). It refers to a person's awareness and comprehension of their own mental processes. It is also defined as an individual's awareness of being able to regulate or manage their mental cognition process. The role of metacognition on academic performance was initially investigated by (Flavell, 1979) who found that metacognition has significant part on students' listening, reading, speaking and writing skills.

Metacognition and self-regulated learning are two critical cognitive processes that significantly influence academic achievement. Metacognition refers to an individual's ability to monitor, control, and reflect upon their own thinking processes (Nodoushan, 2008). It involves self-awareness of one's cognitive strengths and weaknesses, as well as the strategies employed during learning (Levchik et al., 2022). Self-regulated learning, on the other hand, encompasses the ability to set goals, plan, monitor progress, and adapt strategies based on one's understanding of the task and personal performance (Gomes et al., 2019).

Self-regulated learning complements metacognition and further contributes to academic achievement. Students who are proficient in self-regulation are proactive in their learning pursuits (Limone et al., 2020). They set specific goals, develop organized plans, and consistently monitor their progress toward those objectives Zimmerman (1990). This active engagement fosters a sense of ownership over one's learning journey, promoting sustained motivation and dedication. Self-regulated learners are also better equipped to manage their time efficiently, allocate resources effectively, and adapt their strategies when faced with challenges (Hsu et al., 2022). This adaptability ensures that students can navigate complex academic tasks more successfully and persist in the face of difficulties (Valle et al., 2008). By integrating metacognition and self-regulated learning, individuals cultivate a holistic approach to learning that optimizes their cognitive resources, resulting in improved academic performance and a deeper understanding of the subject matter.

Thus, this study proposed two research questions as the main goals of the study as below:

1. *Is there correlation of metacognition and self-regulated learning on academic achievement?*
2. *Can metacognition and self-regulated learning be predictors of academic achievement?*

2. LITERATURE REVIEW

2.1 Metacognition

Some specialists, who are also considered as inventors of the metacognition word, inspired the concept of metacognition (Baker & Brown, 1984; Flavell, 1979; Jacobs & Paris, 1987). The following subheadings delve deeper into metacognitive methods. Cognition and metacognition are two topics that are intertwined in metacognitive methods. The term "metacognition" relates to

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how cognition works with strategy and knowledge that has already been acquired (Dangin, 2020). Metacognition refers to a person's awareness and comprehension of their own mental processes. Metacognition is also defined as an individual's awareness of being able to regulate or manage their mental cognition process. There are two main topics in metacognition term. Those topics can be derived as metacognitive knowledge and metacognitive regulation.

2.1.1 Cognitive knowledge

The term "knowledge of cognition" refers to three major aspects of metacognition (Jacobs & Paris, 1987). Declarative knowledge is the first component, and it pertains to an understanding of what the techniques are and why users should employ them. Procedural knowledge is the next component, in which users or students learn how to use the strategies. The final component is conditional knowledge, which is concerned with when and where users or students can utilize the strategies.

2.1.2 Cognitive Regulation

It has to deal with the strategy's regulatory process. As three primary points, (Schraw & Moshman, 1995) present regulatory skill of metacognition. The first point is to plan. Students should have ideas about what to do and how to approach the job or future materials at this time. The following point is to keep an eye on things. Students strive to retrace and monitor their steps in completing the activity or using the materials at this phase (Mitchell et al., 2009). The final phase is evaluation, in which students examine and evaluate their own approach to confronting and completing the materials or activity. (Schraw et al., 2006) also presents a basic instructional aid for increasing metacognitive awareness in an effort to create metacognitive awareness. He gives a strategy evaluation matrix, which is a quick review of metacognitive information that he believes will help pupils grasp learning objectives. In fact, this schema included metacognitive knowledge patterns discovered by previous pioneers such as Flavell (1979), (Baker & Brown, 1984), and Jacob & Paris (1981).

2.2 Self-regulated learning

Self-regulated learning refers to Self-regulated learning takes "all control into the hands of online learners, they are required to take it upon themselves to plan, organize, monitor, self-reflect and evaluate their learning processes" (Ejubovic & Puska, 2019). It means that self-regulated learning refers to how students could handle all supporting stuff related to the goal of learning (Hertel & Karlen, 2021). It refers to the ability of students to take all control in aspects as a learner.

Table 1. Determinants of self-regulated learning by (Zimmerman, 1990)

Learning influences	environment	Person (self) influences	Behavioral influences
Physical context		Knowledge	Enactment of self-regulatory activities
Task features		Declarative	Self-observations
External outcomes		Self-regulative	Self-evaluations
Material and social sources		Self-efficacy beliefs	Self-reactions
		Goal or intentions	Environmental structuring
		Metacognitive processes	
		Planning	
		Behavioral control	
		Affective processes	

The table illustrates some aspects related to self-regulate learning. There three main point of determinants of self-regulated learning. The first point is learning influences. They include physical context like task features and external and also material and social sources. The second point is person or self-influences that comprise knowledge (declarative and self-regulatory), self-efficacy beliefs, goal or intentions, metacognitive processes (planning and behavioral control) and affective processes. The third point is behavioral influences that includes Enactment of self-regulatory activities, self-observations, self-evaluations, self-reactions, environmental structuring. The physical setting which is learning takes places, such as the supporting environment

2.3 The Role of Metacognition and Self-Regulated Learning on Academic Achievement

Academic achievement means the ability of students to reach the goal of the study. It is relevant to students' accomplishment in academic field as their effort to reach it. It refers to the outcomes performance of students in reaching the standard, requirements, indicators and the target of institution (Spinath, 2012).

Zimerman (1990). The overview of self-regulated learning and students' achievement. He found that self-regulated learning has positive role in students' achievement. It is because self-regulated learning support students to achieve the learning's goal. The next study is from (Ejubović & Puška, 2019). They brought topic related the impact of self-regulated learning on students' achievement. They found that there was a positive impact of self-regulated learning toward students' academic achievement.

Xiao et al., (2019) The relationship between self-regulated learning and students' achievement. The last study could be reviewed is by Cetin (2017). He came up with the topic of the possibility of metacognitive awareness and self-regulated learning as the predictors

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of students' academic achievement. He got the results that metacognition and self-regulated learning have significant relationship toward students' achievement. From the studies above, it can be construed that students' achievement has relation to both metacognition and self-regulated learning. Thus, this study would like to bring issue related to the possibility of metacognition and self-regulated learning become the predictors of students' achievement.

3. METHODS

The study is prediction study, which is intended to find whether metacognition and Self-regulated learning could be predictors to students' achievement. As stated by Fraenkel & Wallen (2009) that prediction study could determine the predictors as if there is a sufficient magnitude found between two variables.

3.1 Sample

This Study will take place at English Department of UMBY. It will be focused on senior college students who have reached the final semester of theoretical courses. Frankel and wallen sampel min 30

3.2 Data Collecting Technique

There 3 data collecting tools in this study based on the variables. First instrument is Metacognitive awareness Inventory to get students' metacognitive awareness. The second instrument is questionnaire to get the data of students' self-regulated learning data adopted from (Magno, 2010). Lastly, the third instrument will be used is documentation to get the data of students' GPA.

3.3 Data Analysis Technique

After gaining all data needed in this study, the data were analysed according to the stand in the need of the study. Therefore, this study applied multiple regressions. Pearson Product Moment will be used to get the correlation between scores get from students' metacognitive awareness and self-regulated learning and students' GPA. Moreover, Multiple Regressions will be applied to find whether metacognitive awareness and self-regulated learning could be predictor of students' GPA

4. RESULTS (or, this section may be combined with DISCUSSION)

Table 2. Correlation of metacognition and self-regulated learning on academic achievement

Correlations				
		GPA	MAI	SRL
Pearson Correlation	GPA	1.000	.425	.369
	MAI	.425	1.000	.283
	SRL	.369	.283	1.000
Sig. (1-tailed)	GPA	.	.009	.020
	MAI	.009	.	.061
	SRL	.020	.061	.
N	GPA	31	31	31
	MAI	31	31	31
	SRL	31	31	31

Table 2 shows the significancy among variables. Self-Regulated Learning (SRL) reveal a significant level on its relationship with GPA as dependent variable ($p=0.009$). Furthermore, Metacognitive Awareness also has positive relationship with GPA on significance level as $0.009 (<0.05)$. On the other hands, SRL has no significant relationship with MAI with significance level $0.06 (>0.05)$.

Table 3. Model Summary

Model Summary ^b					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.498 ^a	.248	.195	.23249	1.526

a. Predictors: (Constant), SRL, MAI

b. Dependent Variable: GPA

Table 3 contains the model summary of contribution of Predictors (SRL & MAI) on MAI as dependent variable. It can be seen that R point is on 0.498 which means that it is categorised on medium level of prediction. Moreover, R Square level is gained as 0.248 level and indicates that dependent variable can be explained by Predictors as 24.8%.

Table 4. Test of overall regression model

		ANOVA ^a				
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.500	2	.250	4.626	.018 ^b
	Residual	1.514	28	.054		
	Total	2.014	30			

a. Dependent Variable: GPA

b. Predictors: (Constant), SRL, MAI

Table 4 demonstrates the F-Ratio and overall regression model. It shows that Mean Square of regression is 0.250. Meanwhile, from the table, it can be recognized that independent variables (SRL & MAI) **statistically significantly predict** dependent variable (GPA) with F-score as 4.626 and significant level on 0.018 (<0.05).

5. DISCUSSION

5.1 Correlation of metacognition and self-regulated learning towards academic achievement

The first research question is intended to investigate the correlation of metacognition and self-regulated learning towards academic achievement. Specifically, this study comes up with the result that metacognition has positive relationship to academic achievement. It indicates that those students who have higher metacognitive awareness also get higher level on academic achievement. This finding is in line with (Çetin, 2017; Pradhan & Das, 2021; Samuel & Okonkwo, 2021) that metacognition takes significant role as their positive relationship with students' academic achievement. Dangin & Elysa (2022) also reported that metacognition brought positive connection on students' academic performance.

5.2 Metacognition and self-regulated learning as predictors of academic achievement

The second research question is intended to investigate whether metacognition and self-regulated learning could explain students' academic achievement. This study revealed that both metacognition and self-regulated learning explained students' academic achievement about 24.8 %. It indicates that metacognition and self-regulated learning could be promising predictors of academic achievement and additionally if they are integrated to other aspects in supporting academic performance. The finding is in accordance with (Gupta, 2017) that metacognition is significant predictor of students' academic achievement. Furthermore, the result also confirms the finding of (Raofi et al., 2013) which reported metacognition could be strong predictor of students' academic achievement that helped students reach their improvement. Ha et al., (2023) also took into the use of metacognitive strategies is a crucial learning ability that supports academic performance in reading and arithmetic; it was an essential predictor of academic achievement both within and across schools. The role of metacognition on academic achievement also found by Tibken et al., (2022) that the low level of metacognitive awareness could be the cause of students' underachievement. Furthermore, self-regulated learning also takes a role as significant predictor since it enables students to regulate their capabilities and manage their efforts in academic (Pérez-González et al., 2022). It also points that academic accomplishment is more immediately impacted by SRL since it entails the capability to directly monitor a learning setting and make adjustments to boost learning efficacy (Wang & Kao, 2022). (Deng et al., 2022) also reported that self-regulated learning takes significant role on students' academic performance in Macau. (Olanami et al., 2017) draw a conclusion that self-regulated learning has significant part in increasing students' academic performance. Contradictory finding was found by (Çetin, 2017) that both metacognition and self-regulated learning got positive correlation but those variables couldn't predict academic achievement. Metacognition and self-regulated learning can therefore be viewed as reliable predictors of the students' awareness, knowledge, and control over their academic activities (Valle et al., 2008).

6. CONCLUSION

This research has given substantial roles of metacognitive awareness and self-regulated learning in impacting the academic performance of students. The results of the research indicate that students with stronger metacognitive awareness attain better academic outcomes. The finding also shows a positive relationship between metacognition and academic achievement. Furthermore, the present research focuses mostly on the positive elements of these cognitive and self-regulated learning. It would be advantageous for forthcoming research to delve into potential limitations and boundaries of metacognition and self-regulated learning in forecasting academic success. Such exploration could lead to a more detailed comprehension of when and how these mechanisms are most effective and under what conditions they may have limited impact within diverse educational contexts and among individuals with distinct characteristics. This, in turn, can inform more precise and efficacious educational interventions. Lecturers or teachers can empower students to take control of their educational journeys, set and achieve academic goals, and persevere in the face of difficulties by developing metacognitive awareness and self-regulated learning skills. Educational institutions can also implement strategies that include these cognitive and self-regulatory processes into their courses, thereby improving students' overall academic performance.

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