

## The Influence of Learning Environment in Developing Students' Self-Regulated Learning Abilities in Higher Education

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### ABSTRACT

Self-regulated learning has been believed by several studies as one of the determinants of successful learning characterized by good academic performance. In fact, many learners are not able to regulate themselves optimally to stay motivated and consistent in learning. Therefore, this study aims to explore the influence of seven dimensions of learning environment on students' self-regulated learning. A cross-sectional research design was used in this study. Data were obtained from 419 4th semester students using a questionnaire packaged in the form of googleform. Data analysis in this study used Structural Equation Modeling Partial Least Squares (SEM-PLS). The findings in this study are involvement, investigation, task orientation, cooperation and equity have little effect on students' self-regulated learning. Meanwhile, lecture support and student cohesiveness proved to have no influence. Therefore, a learning environment that is able to create involvement, investigation, task orientation, cooperation and equity in the classroom learning process plays an important role in developing students' self-regulated learning ability. These findings certainly provide a strong empirical basis for educational institutions to design appropriate interventions, develop relevant curricula, and create a conducive academic atmosphere to equip students with essential skills as adaptive lifelong learners who are ready to face global challenges.

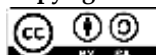
**Keywords:** Problem-Based Learning, Learning Motivation, Social Character

### ARTICLE INFO

*Article history:*

Received  
October 28, 2024  
Revised  
June 14, 2025  
Accepted  
July 13, 2025

**Published by**  
**Website**  
**E-ISSN**  
**Copyright**



Institut Agama Islam Ma'arif NU (IAIMNU) Metro Lampung  
<https://journal.iaimnumetrolampung.ac.id/index.php/ji/index>  
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## INTRODUCTION

In recent years, technological development has developed very rapidly and has an impact on all aspects of life. The impact that occurs in the world of education results in changes in the learning process, which initially learning was done face-to-face in the classroom, now it has experienced a shift where learning can also be done online (Ivone et al., 2020; Rohman et al., 2024). Blended learning that combines face-to-face classroom teaching with digital learning is increasingly popular in higher education, to simplify and enhance learner learning, support collaboration and creativity, and equip learners with the skills they need to work and live in an increasingly digital world (Anthonysamy et al., 2020; Buaja et al., 2024). Furthermore, in recent years, many educational institutions have also started using online resources to deliver educational content to learners (Ejubovic & Puška, 2019).

For this learning to be successful learners are required to be able to make the most of the learning content offered online. They are required to take responsibility for planning, organizing, monitoring, self-reflecting and evaluating their learning process (Ejubovic & Puška, 2019). Therefore, learners should be independent learners as the core of successful learning is self-direction and self-management (Broadbent & Poon, 2015; Siregar, 2024) and such learner ability is very similar to the theory of Self Regulated Learning (SLR) proposed by Zimmerman

(1989). Several studies have believed that SLR is a determining factor of successful learning characterized by good academic performance (Alegre, 2014; Ejubovic & Puška, 2019; You & Kang, 2014). However, the fact that many learners are not able to organize themselves optimally to be able to stay motivated and consistent in learning (Levy & Ramim, 2012; Michinov et al., 2011) and for this reason, it is necessary to pay attention to the factors that can shape a person's SLR in the learning process.

In recent decades, research has consistently shown that the quality of the learning environment is the most important determinant of learning, with learners tending to learn better when they perceive their classroom environment positively (Velayutham & Aldridge, 2013; Ambawani et al., 2024). In general, a positive perception of the classroom environment can increase learners' motivation to learn. Furthermore, the characteristics of the learning environment play an important role in facilitating self-directed learning. Classroom learning can influence the motivational goals that learners use in learning such as SLR (Chipangura & Aldridge, 2017). The social environment can influence the affective domain and review behavior. In measuring the learning environment, the use of the What Is Happening in This Classroom (WIHIC) scale developed by (Fraser et al., 1996) has been recognized as one of the most widely used scales for assessing students' perceptions of the learning environment (Yerdelen & Sungur, 2019). This is due to its widespread acceptance (Stein et al., 2020). WIHIC has seven dimensions consisting of Student Cohesion, Teacher Support, Involvement, Investigation, Task Orientation, Cooperation, and Equity (Oo et al., 2022).

Although the What Is Happening in This Classroom (WIHIC) scale has been widely used to assess students' perceptions of the learning environment, research findings examining the relationship between WIHIC dimensions and SRL show inconsistent results. Some studies, such as those conducted by (Velayutham & Aldridge, 2013), indicate that only three WIHIC dimensions influence SRL, while other studies found that the cooperation dimension has no effect or even a negative impact on SRL (Alzubaidi et al., 2016; Ariani, 2017; Yerdelen & Sungur, 2019). Additionally, experimental research results have not provided consistent conclusions; some studies state that collaborative learning is ineffective in developing SRL (Cai & Lombaerts, 2024; De Boer et al., 2018), while others emphasize the importance of a collaborative environment in developing students' SRL skills (Bellhäuser et al., 2022; Kennedy et al., 2024; Wu, 2024). Inconsistencies are also evident in the role of teacher support, with some studies suggesting that student autonomy is more effective in enhancing SRL (Núñez-Regueiro et al., 2025; Radkowsch et al., 2020). Meanwhile, other studies indicate that teacher guidance positively contributes to SRL (J. Aldridge & Rowntree, 2022; Tzimas & Demetriadis, 2024). The inconsistency of these findings highlights a research gap that needs to be addressed to gain a deeper understanding of how each dimension of the learning environment contributes to the development of students' SRL in different contexts, particularly in higher education settings.

In the increasingly complex and dynamic context of higher education, students' ability to regulate their own learning process, known as SRL, is a crucial factor for academic success and future career preparation. SRL not only encompasses cognitive strategies for acquiring knowledge but also involves metacognitive aspects such as planning, monitoring, and self-evaluation, as well as motivation and emotional regulation during the learning process. This ability becomes increasingly vital given the shift in the learning paradigm from highly structured to more independent, especially with the adoption of online and hybrid learning models post-pandemic, which demand a high degree of learning independence. However, many students still struggle to develop SRL optimally, often facing challenges in achieving their learning goals. Therefore, in-depth research on the influence of the learning environment on the development of students' SRL in higher education institutions is urgently needed. Thus, the question posed in this study is whether the dimensions of the learning environment can influence Self-Regulated Learning? The objective of this study is to gain a comprehensive understanding of how dimensions of the learning environment can support or hinder SRL, which will provide a strong empirical foundation for educational institutions to design appropriate interventions, develop relevant curricula, and create a conducive academic

atmosphere to equip students with essential skills as adaptive lifelong learners ready to face global challenges.

**Literature Review and Hypothesis Development**  
**Self Regulated Learning**

Self-regulated learning (SRL) includes the processes of metacognition (reflecting on one's thought processes), strategic action (including planning, monitoring, and evaluating personal progress relative to predetermined standards), and motivation to acquire knowledge (Wu, 2024). Self-regulated learners actively engage in monitoring, directing, and regulating their actions with the goal of acquiring information, advancing their expertise, and pursuing self-improvement (Boekaerts & Corno, 2005; Perry et al., 2006). SRL is an important aspect of effective education. It empowers learners to take control of their learning process, set goals, monitor their progress, and adjust their strategies as needed (Zimmerman, 2000). Many studies have been conducted revealing that SRL is a significant predictor of academic success (Bempechat et al., 2018; Caughy et al., 2018; Skibbe et al., 2019; Zimmerman & Schunk, 2011). This study adopts the SLR model proposed by Zimmerman as a basic framework that seeks to explore the dynamics of SRL among learners engaged in the context of learning in higher education. Zimmerman (2002) SRL model consists of three distinct phases that individuals go through in their learning journey which can be seen in table 1.

Table 1. Phase of Learners' Self Regulated Leaning

Fase	Deskripsi
Forethought	This stage occurs before the actual performance, sets the stage for action, maps out tasks to minimize unknowns, and helps develop a positive mindset. Involves tasks such as initiation, planning, goal setting and distractions or problems that interfere with the start of the learning process.
Performance Control	This stage is concerned with the process of learning. It involves the utilization of various strategies by individuals to enhance their learning, distractions faced by them during the learning process, time management, conditions that facilitate learning and self-motivation techniques used.
Self-Reflection	This phase involves reflection after performance, self-evaluation, and evaluation of results compared to goals. Requires evaluation of goal achievement, success or failure of a plan, inadequate time management, and conditions under which they achieved maximum results.

**Learning Environment**

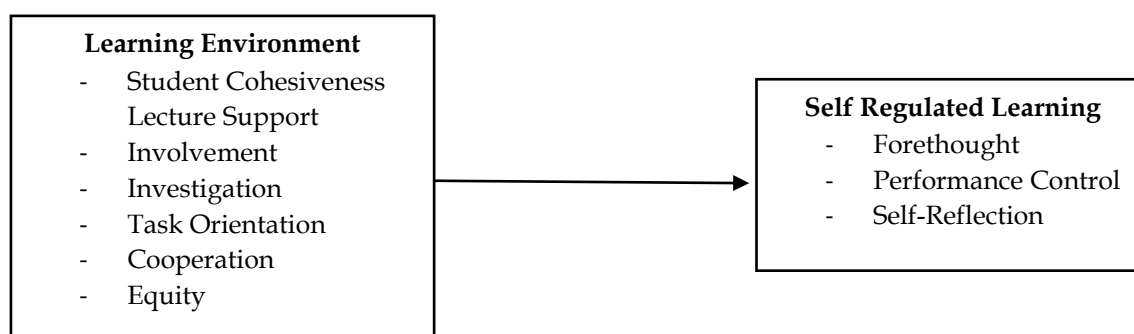
Learning environment stimulation has always been a key factor influencing the level of learning intention among learners (Chang et al., 2008). Many studies show that good learning environment stimulation increases learners' intrinsic learning motivation and helps them acquire the necessary knowledge and skills, thereby achieving their scheduled goals (Bojuwoye et al., 2014). Xu et al. (2023) argues that institutions have a responsibility to create a supportive learning environment to encourage effective learning, and learners will benefit from mutual help among peers, course enhancement, and high-quality teaching strategies in such an environment. Since the concept of learning environment has been considered an outstanding area of educational research, a large number of self-report instruments have been developed to measure learners' perceptions of classroom climate (Cayubit, 2022). The most frequently used learning environment instrument in various levels of education is the What is Happening In this Class (WIHIC) instrument originally developed by (Fraser et al., 1996). WIHIC combines relevant features of various existing questionnaires with additional scales that accommodate contemporary educational thinking, such as equity and constructivism (Oo et al., 2022). The WIHIC has seven dimensions which can be seen in table 2.

Table 2. Scale Description for each WIHIC Scale

Scale	Description
<b>Student Cohesiveness</b>	The extent to which learners know, help and support each other
<b>Teacher Support</b>	The extent to which the teacher helps, befriends, trusts and cares for learners.
<b>Involvement</b>	To what extent do learners take an attentive interest, participate in discussions, do extra work and enjoy class.
<b>Investigation</b>	The extent to which inquiry skills and processes and their use in problem solving and investigation are emphasized.
<b>Task Orientation</b>	To what extent is it important to complete planned activities and stick to the subject matter.
<b>Cooperation</b>	The extent to which learners cooperate rather than compete with each other on learning tasks
<b>Equity</b>	The extent to which learners are treated equally by the teacher.

Based on the background and theoretical studies that have been presented, this study proposes the hypothesis that the learning environment (learner cohesiveness, teacher support, involvement, inquiry, task orientation, cooperation, Equity) affects students' self-regulated learning. Furthermore, the proposed research model can be seen in Figure 1 below.

Figure 1. proposed research model



## METHOD

A cross-sectional research design was used in this study to explore the influence of seven dimensions of the learning environment on students' self-regulated learning. To obtain the expected amount of data, researchers used an instrument in the form of a questionnaire. The questionnaire was used as a data collection tool in this study and the questionnaire used in the form of a closed questionnaire packaged into the google form application. A total of 419 active students of the Faculty of Teacher Training and Education, Jambi University who are at the 4th semester level were sampled in this study. The basis for considering students at this semester level as a pupulation is because students in this semester are still active in carrying out lectures and also at this semester level it is felt that students already have sufficient experience in undergoing various activities carried out during lectures in their respective Study Programs. Overall, the research sample was dominated by female gender and the number of samples of each study program was divided equally. The detailed demographics of the research sample can be seen in table 3 below.

Table 3. Demographics of the Research Sample

Characteristics	Total (n=419)	Percentage%
<i>Gender</i>		
Men	81	19%
Women	338	81%
<i>Study Programs</i>		
Educational Administration	25	6%

Archaeology	20	5%
Guidance and Counseling	20	5%
History	20	5%
Sports Coaching	20	5%
Arabic Language Education	20	5%
Indonesian Language and Literature Education	20	5%
English Language Education	22	5%
Biology Education	20	5%
Economic Education	23	5%
Physics Education	20	5%
Early Childhood Education Teacher Education	20	5%
Elementary School Teacher Education	23	5%
Chemistry Education	20	5%
Mathematics Education	20	5%
Sports and Health Education	20	5%
Pancasila and Citizenship Education	23	5%
History Education	23	5%
Indonesian Literature	20	5%
Art, Drama, Dance and Music	20	5%

The data measurement questionnaire in this study was adopted and adapted from a questionnaire with a scale that had been applied by previous researchers. to measure learning environment variables using a questionnaire with the What is Happening In this Class (WIHIC) scale which was originally developed by (Fraser et al., 1996) and until now has been applied in various studies in the field of education at various levels in various countries (Oo et al., 2022). The WIHIC has 56 items divided equally into seven scales and the reliability test results conducted by Oo et al. (2022) resulted in a Cronbach's alpha value of 0.85 which indicates that the questionnaire is very feasible to use for the research context. Before use, each statement item was first translated into Indonesian. Furthermore, the instrument used in measuring students' self-regulated learning variables used the Academic Self-regulated Learning Questionnaire (ASLQ) developed by Nambiar et al. (2022) based on the three-phase model of individual learning journey proposed by Zimmerman (2002). The total items amounted to 36 statement items with the reliability level of all items above 0.7.

In this study using data analysis techniques Structural Equation Modeling Partial Least Squares (SEM-PLS) with SmartPLS version 4.0. The disjoint two-stage approach is used as an approach procedure in the data analysis of this study (Sarstedt et al., 2019). Then for the analysis steps used, it refers to those recommended by Hair et al. (2022). In addition, referring to Kock (2015) recommendations for handling CMB, Table 4 of this study shows that the highest variance inflation factor value ( $VIF = 2.343$ ) is less than the threshold of 3.3. Therefore, it can be concluded that the CMB did not significantly affect the participants' responses.

## RESULT AND DISCUSSION

### Evaluation of Measurement Model

Referring to The disjoint two-stage approach procedure, the first stage we did in the SEM-PLS analysis was to evaluate the measurement model on the SRL dimensions (FT, PC, SR). the results of data analysis can be seen in table 3 of the 36 measurement items used, the remaining 19 measurement items were declared to meet the criteria with loading factors  $> 0.70$ , AVE value  $< 0.5$  and Cronbach's Alpha value and composite reliability  $> 0.70$  and then the measurement dimensions were converted into latent variable scores.

Table 4. Evaluation of SRL Dimension Measurement Model

Laten Variable	Indicators	Convergent Validity		Internal Consistency Reliability	
		Loading	AVE	Cronbach's Alpha	Composite Reliability
Forethought	FT1	0.827	0.637	0.857	0.858

Performance Control	FT2	0.822	0.61	0.920	0.920
	FT3	0.754			
	FT4	0.778			
	FT5	0.807			
	PC1	0.803			
	PC2	0.756			
	PC3	0.76			
	PC4	0.767			
	PC5	0.811			
	PC6	0.795			
Self-Reflection	PC7	0.777	0.659	0.870	0.873
	PC8	0.763			
	PC9	0.796			
	SR1	0.839			
	SR2	0.871			
	SR3	0.815			
	SR4	0.759			
	SR5	0.772			

In the second stage, we evaluated the overall measurement model by using the latent variable score of the SRL dimension as the basis for the SRL measurement score of 92 measurement items, the remaining 49 measurement items were declared to meet the criteria with loading factors > 0.70. Furthermore, the AVE value, Cronbach's Alpha, Composite Reliability of 64 items were declared to have met the criteria, namely the AVE value < 0.5 and the Cronbach's Alpha value and composite reliability > 0.70. It can be concluded that the measurement model in this study has met the criteria of Convergent Validity and Internal Consistency Reliability. The measurement model evaluation results can be seen in table 5.

Table 5. Evaluation of Measurement Model Phase Two

Laten Variable	Indicators	Convergent Validity		Internal Consistency Reliability	
		Loading	AVE	Cronbach's Alpha	Composite Reliability
Student Cohesiveness	SC1	0.770	0.579	0.854	0.857
	SC2	0.771			
	SC3	0.728			
	SC4	0.805			
	SC5	0.757			
	SC6	0.732			
Lecture Support	LS1	0.826	0.634	0.811	0.829
	LS2	0.731			
	LS3	0.838			
	LS4	0.786			
Involvement	INVL1	0.774	0.614	0.895	0.897
	INVL2	0.825			
	INVL3	0.707			
	INVL4	0.781			
	INVL5	0.768			

Investigation	INVL6	0.843	0.622	0.913	0.915
	INVL7	0.781			
	INVS1	0.704			
	INVS2	0.793			
	INVS3	0.763			
	INVS4	0.828			
	INVS5	0.808			
	INVS6	0.810			
	INVS7	0.817			
Task Orientation	INVS8	0.779	0.626	0.880	0.881
	TO1	0.706			
	TO2	0.796			
	TO3	0.818			
	TO4	0.809			
	TO5	0.813			
Cooperation	TO6	0.801	0.672	0.902	0.904
	CO1	0.723			
	CO2	0.802			
	CO3	0.820			
	CO4	0.834			
	CO5	0.853			
	CO6	0.833			
Equity	CO7	0.789	0.693	0.936	0.940
	EQ1	0.738			
	EQ2	0.818			
	EQ3	0.843			
	EQ4	0.849			
	EQ5	0.872			
	EQ6	0.894			
	EQ7	0.792			
	EQ8	0.847			
Self Regulated Learning	Forethought	0.827	0.808	0.881	0.889
	Performance	0.929			
	Control	0.904			
	Self-Reflection	0.904			

In addition, discriminant validity is also a measure of the validity of the measurement model, in this study using the value of the Heterotrait-Monotrait Ratio (HTMT) with a threshold value of  $< 0.85$ . Table 6 shows the HTMT value between constructs  $< 0.85$ , which means that the discriminant validity criteria are also met in the measurement model.

Table 6. Discriminant Validity using HTMT

	LS	SC	CO	EQ	INVL	TO	INVS	SRL
LS								
SC	0.477							
CO	0.428	0.587						
EQ	0.487	0.544	0.557					

INVL	0.580	0.611	0.557	0.595			
TO	0.427	0.700	0.611	0.688	0.639		
INVS	0.537	0.525	0.496	0.578	0.758	0.643	
SRL	0.444	0.633	0.596	0.677	0.687	0.796	0.684

LS: Lecture Support, SC: Student Cohesiveness, CO: Cooperation, EQ: Equity, INVL: Involvement, TO: Task Orientation, INVS: Investigation, SRL: Self Regulated Learning

### Evaluation of Structural Model

After ensuring that the measurement model of this study has met the criteria of validity and reliability, we next evaluate the structural model. In the first step, you check whether there are symptoms of multicollinearity using the basis of the VIF value  $< 3$  (Hair et al., 2022). Table 7 shows that the relationship between constructs in this study does not contain symptoms of multicollinearity.

Table 7. Variance inflation factor (VIF)

	VIF
Lecture Support -> Self Regulated Learning	1.481
Student Cohesiveness -> Self Regulated Learning	1.851
Cooperation -> Self Regulated Learning	1.690
Equity -> Self Regulated Learning	1.951
Involvement -> Self Regulated Learning	2.343
Task Orientation -> Self Regulated Learning	2.321
Investigation -> Self Regulated Learning	2.176

Furthermore, the results of the structural model test in order to test the hypothesis that has been proposed, can be seen in table 8 shows that of the seven learning environment variables used in this study, there are five learning environment variables (INVL, INVS, TO, CO, EQ) that affect student SRL with a small overall effect ( $f^2 < 0.15$ ). then the other 2 (SC, LS) have no effect on SRL ( $p > 0.05$ ). It can be concluded that overall the learning environment affects students' SRL. The decision-making basis we use in determining the amount of direct effect refers to Hair et al. (2022) who recommend as a threshold value of  $f^2$  where values of 0.02, 0.15 and 0.35 show the effect of small, medium and large sizes. values of less than 0.02 indicate there is no measurable effect.

Table 8. Summary Of Constructs' Associations and Influences

Relationships	Path Coefficients	T Value	P values	Effect Size ( $f^2$ )	Category
SC -> SRL	0.080	1.806	0.071	0.009	No effect
LS -> SRL	-0.031	0.841	0.400	0.002	No effect
INVL -> SRL	0.135	2.083	0.037	0.020	Small
INVS -> SRL	0.176	3.610	0.000	0.037	Small
TO -> SRL	0.328	6.610	0.000	0.119	Small
CO -> SRL	0.088	1.971	0.049	0.012	Relative Small
EQ -> SRL	0.177	3.545	0.000	0.041	Small

LS: Lecture Support, SC: Student Cohesiveness, CO: Cooperation, EQ: Equity, INVL: Involvement, TO: Task Orientation, INVS: Investigation, SRL: Self Regulated Learning

The final step we take is to evaluate the predictive ability of the model using the PLSpredict test. The results of the output from the PLSpredict test in table 7 show that the  $Q^2$ predict value on all indicators contained in the endogenous construct is  $> 0$ , which means that the model has predictive power (Shmueli et al., 2019). Furthermore, based on the comparison of the value of PLS-SEM\_RMSE/MAE with LM\_RMSE/MAE shows that all

indicators in the PLS-SEM analysis produce smaller prediction errors than LM, which means that the model has high predictive power.

Table 7. PLS<sub>predict</sub> Result

	Q <sup>2</sup> <sub>predict</sub>	PLS- SEM_RMSE	PLS- SEM_MAE	LM_RMSE	LM_MAE
Performance Control	0.554	0.670	0.521	0.718	0.564
Forethought	0.387	0.785	0.596	0.840	0.646
Self-refelction	0.485	0.719	0.554	0.770	0.598

## DISCUSSION

This study tries to explore the influence of seven dimensions of learning environment using the What is Happening In this Class (WIHIC) perspective on students' self-regulated learning in higher education. The findings in this study show that of the seven dimensions of the learning environment, there are five dimensions that have an influence on students' self-regulated learning with a small influence. In the context of this study, student involvement is the extent to which students have attentive interest, participate in discussions, do additional assignments and enjoy class. Furthermore, (Cheong & Ong, 2016) student involvement refers to the time and effort students spend participating in classroom and out-of-class activities on campus. (Reeve & Tseng, 2011) found that student involvement in learning has a direct impact on the development of self-regulated learning ability through increased motivation and interest. Students who are more actively involved in learning will have more independent and proactive learning strategies, such as setting learning goals, trying to understand concepts in depth, and correcting errors found in their learning (Setiani & Wijaya, 2020). This shows that students' involvement strengthens their ability to regulate their learning process.

Then the second influential dimension is investigation, learning environments that emphasize investigation and exploration will improve learners' self-regulation skills because they will be encouraged to make decisions independently in the learning process (Perry et al., 2006). Furthermore, inquiry activities that involve problem solving and exploration motivate students to use self-regulation strategies such as planning, monitoring progress, and evaluating results (Dignath & Büttner, 2008). Learners who are encouraged to utilize the skills and processes associated with inquiry in problem solving tend to be more motivated to learn and regulate their efforts in learning (Velayutham & Aldridge, 2013). Furthermore, scientific inquiry activities encourage students to take control of the learning process, integrate critical thinking and metacognition, and gradually develop their SRL (Cheong & Ong, 2016; Setiani & Wijaya, 2020).

The third influential dimension is task orientation. Elliot & McGregor (2001) found that a strong task orientation will encourage students to use strategies that support self-regulation, such as self-reflection, problem solving, and specific goal setting in learning. Students with high task orientation are more likely to engage in self regulation strategies, such as setting learning goals, developing learning plans, and reflecting on learning outcomes. This task orientation helps students focus on the learning process, which encourages them to stay motivated even when facing difficulties (Kaplan & Maehr, 2007). To enhance students SRL in the classroom, instructors can explain the purpose of each activity to students and ensure that students understand what they need to achieve in each task (Aldridge et al., 2012; Alzubaidi et al., 2016). If these objectives are clear and relevant, students are more likely to engage in their learning process. The findings of this study support previous research reporting a positive and statistically significant relationship between task orientation and self-regulated learning (J. Aldridge & Rowntree, 2022; Alzubaidi et al., 2016; Ariani, 2017; Velayutham & Aldridge, 2013; Yerdelen & Sungur, 2019) which suggests that to increase student motivation in academic tasks, instructors need to help them set goals and reinforce them with planned activities.

Next is the cooperation dimension, the findings of this study show that cooperation does affect self-regulated learning, but the influence that occurs can be said to be not so impactful. The results show that the amount of influence from cooperation is almost practically no influence. Cooperation in this study refers to the extent to which students work together in completing learning tasks. By working together students will have the opportunity to learn from other friends who have high self-regulated learning how to organize their learning which can motivate them to be able to develop similar abilities (Panadero & Järvelä, 2015). Then Hadwin et al. (2011) argued that interaction in collaborative learning influences students' ability to better self-regulate, especially in the aspects of planning and reflection. Collaboration encourages students to coordinate their learning strategies with group members, which trains them in setting learning goals, managing time, and evaluating the learning process (Bellhäuser et al., 2022; Kennedy et al., 2024; Wu, 2024). Although it has a very small effect, this study argues that cooperation can improve students' self-regulated learning.

The last influential dimension is equity. Equity refers to the extent to which learners are treated equally by lecturers. Equity in classroom treatment affects students' emotional engagement which will give them the confidence to manage their emotions and focus on learning, thus better managing the learning process (Juvonen et al., 2018). Furthermore, a fair classroom environment will make learners feel more motivated to manage their learning process because they feel valued and supported by teachers and peers (Patrick et al., 2007). Students who feel there is equity in the classroom are more able to develop self-regulation because they feel safe and free from social pressure or feelings of exclusion (Boekaerts & Corno, 2005).

Finally, two dimensions of the learning environment, namely lecture support and student cohesiveness, have no influence on students SRL. SLR in students may not develop adequately if they consistently receive support from instructors during learning. The finding that the dimension of instructor support has no effect aligns with findings obtained by (Velayutham & Aldridge, 2013). This occurs because students who are not overly guided by instructors during the learning process develop skills in planning, monitoring, and evaluating their own performance, which leads to the development of their SRL (Núñez-Regueiro et al., 2025; Radkowsch et al., 2020). Furthermore, the unexpected finding that the dimension of student cohesiveness has no effect aligns with the findings (J. Aldridge & Rowntree, 2022). This finding is different from the research findings by (Alzubaidi et al., 2016; Yerdelen & Sungur, 2019) which stated that both dimensions have an influence. We believe that the difference in findings is because the two studies were conducted at different levels of education with different learning approaches. In adult learning, lecture support and student cohesiveness may not have much impact in honing students' self-regulated learning skills and that is what we believe.

The findings of this study have important implications for higher education practices in creating a learning environment that supports the development of students SRL abilities. The finding that five out of seven dimensions of the learning environment namely involvement, investigation, task orientation, cooperation, and equity have an influence on SRL, this indicates that instructional design should focus on enhancing active student participation, implementing inquiry based approaches, emphasizing task achievement, as well as fairness and collaboration in the learning process. These implications underscore the importance of faculty and educational institutions in designing learning activities that not only convey content but also foster an environment that encourages independent learning. Conversely, two dimensions instructor support and student cohesion did not show a significant influence on SRL, indicating that approaches to developing SRL in higher education need to focus more on structural and motivational aspects rather than solely on personal relationships. These findings provide a strong empirical foundation for policymakers and curriculum developers to design effective learning interventions, particularly in preparing students as independent and adaptive learners in the global era.

As with all studies, this study was not without limitations. First, the scope of this study only covers fourth-semester students from one Faculty at the University of Jambi, so the generalization of the research results to a wider student population or to other educational

institutions is limited. Second, the use of a closed-ended questionnaire completed independently by respondents opens the possibility of perceptual bias or social response, where respondents may answer based on what is considered “good” or “desirable,” rather than based on actual conditions. Third, there is a lack of qualitative information that could provide additional causal insights into the research findings. Additionally, two important dimensions of the learning environment—lecturer support and student cohesiveness were found to have no effect on SRL. However, these results need to be further tested using different methodological approaches, such as longitudinal studies, experiments, or mixed methods, to gain a deeper and more comprehensive understanding.

Beside the limitations of the design and scope of this study, there are several directions that could be the focus of future research to expand understanding of the influence of the learning environment on SRL. First, longitudinal research is needed to observe changes in students' SRL over time, thereby providing a deeper understanding of the causal relationship between learning environment dimensions and SRL development. Second, further research should involve students from various semesters, study programs, or even from different universities in different regions to increase the generalizability of the findings. Additionally, a mixed-methods approach combining quantitative and qualitative data can provide a more comprehensive understanding, particularly for exploring the subjective and contextual aspects of students' learning experiences. Lastly, it is also important to examine classroom based interventions aimed at developing specific dimensions of the learning environment such as experiments on the impact of increasing student involvement or the application of project-based learning approaches on enhancing SRL to provide practical recommendations for instructors and institutions.

## CONCLUSION

In the context of learning in higher education, a learning environment that is able to create involvement, investigation, task orientation, cooperation and equity in the learning process in the classroom plays an important role in developing students' self-regulated learning abilities. Overall, these five dimensions of the learning environment will create active learning that is centered on students so that through the learning process it will hone students' abilities that lead to the formation of self-regulated learning. Although this study provides good insights in developing students' self-regulated learning through the learning process, this study is only limited to a cross-sectional design with the scope of only students in one Faculty. Therefore, perhaps future research can use an experimental design or add a wider scope of research, namely students from various faculties and universities in order to see a clearer impact of the learning environment in the formation of students' self-regulated learning.

## ACKNOWLEDGEMENT

Our gratitude goes to LPPM and FKIP Jambi University for providing financial assistance in this research. We would also like to thank all those who have been involved in the completion of this research who cannot be named one by one.

## AUTHOR CONTRIBUTION STATEMENT

FWT and HA had a major contribution in this study, namely playing a role in designing the research approach, determining the measurement instruments and carrying out the research. While RND, HT and ZAMM contributed a lot in analyzing the data and preparing the final research report.

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