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The Effect of Self-Regulated Learning on Student Learning Outcomes Through Religiosity as a Mediating Variable

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Abstract. *This study aims to investigate the effect of self-regulated learning on student learning outcomes, with religiosity as a mediating variable. The focus of this study is to understand whether religiosity can be an intermediary in the relationship between self-regulated learning and learning outcomes in students of the Basic Education Program at the Open University of Makassar. Using a quantitative approach with a cross-sectional survey design, this study involved 400 students from the Basic Education Program at the Open University of Makassar. The research variables consisted of self-regulated learning (8 items), religiosity (5 items), and learning outcomes (6 items), which were measured using a Likert scale. The data were analyzed using Smart PLS version 4.0 software. The results of the analysis showed that religiosity had a significant effect on learning outcomes (β = 0.557, p-value = 0.000), with an R^2 value of 0.319. However, self-regulated learning did not show a significant direct effect on learning outcomes (β = 0.053, p-value = 0.246). Self-regulated learning had a significant effect on religiosity (β = 0.110, p-value = 0.033), and religiosity acted as a mediator between self-regulated learning and learning outcomes, with a significant indirect effect (β = 0.061, p-value = 0.033). These findings indicate that religiosity plays an important role in improving student learning outcomes, both directly and through its role as a mediator between self-regulated learning and learning outcomes.*

Keywords: *Self-Regulation Learning; Learning Outcomes; Religiosity; Mediation.*

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Abstrak. *Penelitian ini bertujuan untuk menyelidiki pengaruh pembelajaran self-regulated learning terhadap hasil belajar siswa, dengan religiusitas sebagai variabel mediasi. Fokus penelitian ini adalah untuk memahami apakah religiusitas dapat menjadi perantara dalam hubungan antara pembelajaran self-regulated learning dan hasil belajar pada siswa Program Pendidikan Dasar di Universitas Terbuka Makassar. Menggunakan pendekatan kuantitatif dengan desain survei cross-sectional, penelitian ini melibatkan 400 siswa dari Program Pendidikan Dasar di Universitas Terbuka Makassar. Variabel penelitian terdiri dari pembelajaran self-regulated learning (8 item), religiusitas (5 item), dan hasil belajar (6 item), yang diukur menggunakan skala Likert. Data dianalisis menggunakan perangkat lunak Smart PLS versi 4.0. Hasil analisis menunjukkan bahwa religiusitas memiliki pengaruh signifikan terhadap hasil belajar (β = 0.557, nilai p = 0.000), dengan nilai R^2 sebesar 0.319. Namun, pembelajaran self-regulated learning tidak menunjukkan pengaruh langsung yang signifikan terhadap hasil belajar (β = 0.053, p-value = 0.246). Pembelajaran self-regulated learning memiliki pengaruh signifikan terhadap religiusitas (β = 0.110, p-value = 0.033), dan religiusitas berperan sebagai mediator antara pembelajaran self-regulated learning dan hasil belajar, dengan pengaruh tidak langsung yang signifikan (β = 0.061, p-value = 0.033). Temuan ini menunjukkan bahwa religiusitas berperan penting dalam meningkatkan hasil belajar mahasiswa, baik secara langsung maupun melalui perannya sebagai mediator antara pembelajaran self-regulated learning dan hasil belajar.*

Kata Kunci: *Self-Regulation Learning; Hasil Belajar; Religiusitas; Mediasi.*

Introduction

Education is a major factor in improving the quality of human resources. In education, learning outcomes are often used as the main indicator to assess the success of the learning process. Various factors, both internal and external, influence student learning outcomes. One internal factor that has long received attention is self-regulated learning (SRL), which is the ability of individuals to plan, organize, and evaluate their own learning processes. Previous studies have shown that students with good SRL skills tend to achieve better learning outcomes (Fauzi and Widjajanti 2018; Maldonado and Stewart 2024; Vishwakarma and Tyagi 2023) .

However, although the influence of SRL on learning outcomes is recognized as important, several studies show that this influence is often inconsistent and influenced by other factors that have not been widely explored (Assafi'i et al. 2023) . One important factor that can influence the effectiveness of SRL is religiosity. Religiosity in this context refers to the extent to which individuals internalize and practice religious teachings in their lives, which in turn influences their attitudes and behaviors, including in terms of learning (Andini, Gurendrawati, and Sumiati 2023; Khoirudin 2022) . Several studies show that religiosity can shape internal characteristics that support SRL, such as self-discipline, motivation, and self-control (Yaseen et al. 2023) . Therefore, religiosity can act as an intermediary variable that strengthens the influence of SRL on learning outcomes.

Previous studies have shown that SRL affects learning outcomes, but this effect is not always consistent depending on the context and other factors involved. In this case, religiosity can make a significant contribution as an internal factor underlying SRL. Religious practices involving routines such as prayer or meditation can help individuals manage their time and resources better, which in turn improves their ability to learn independently. Research by Zong & Cheah(2023) shows that religiosity can influence the development of disciplinary attitudes essential to SRL, such as managing study time, setting goals, and maintaining long-term motivation.

SRL involves three important phases in learning: planning, monitoring, and evaluation (Zimmerman and Labuhn 2012) . Further research shows that individuals who develop good SRL skills are more likely to have higher academic outcomes because they can set learning goals, use effective strategies, and monitor their progress. On the other hand, religiosity can contribute to the formation of discipline and self-control, two important components of SRL that support the self-regulated learning process (Kelly, Kramer, and Shariff 2024; Saquib et al. 2024) . Research by Fathan et al.(2025) also shows that religiosity can improve academic performance by strengthening internal motivation to achieve academic goals.

This study aims to explore the role of religiosity as an intermediary variable in the relationship between self-regulation learning (SRL) and learning outcomes. Specifically, the objectives of this study are as follows: (1) to assess the direct effect of SRL on student learning outcomes, (2) to identify the effect of SRL on student religiosity, and (3) to assess the role of religiosity as a mediator in the relationship between SRL and learning outcomes. By understanding the relationship between SRL and religiosity, it is hoped that ways to

integrate religious values into education can be found to improve student learning outcomes and academic achievement. The findings of this study are expected to contribute to the development of more effective educational theory and practice by addressing the existing gap in understanding the influence of internal factors such as religiosity on self-regulation learning and learning outcomes.

Method

This study used a quantitative approach with a cross-sectional survey design (Creswell and Creswell 2017; Khosla 2021) to investigate the effect of self-regulation learning on learning outcomes, with religiosity as an intervening variable. The sample in this study was taken using a cluster sampling method, which resulted in 400 students as the sample, who were enrolled in the UPPBJ basic education program at the Open University of Makassar.

The data used in this study was primary data, obtained through an online questionnaire distributed to students in the UPPBJ basic education program at the Open University of Makassar. The use of an online questionnaire was chosen to facilitate data collection from a widely dispersed sample. The questionnaire consisted of three parts: first, questions about SRL; second, questions about religiosity; and third, questions about student learning outcomes.

The researcher adopted various instruments developed by previous researchers. The SRL instrument developed by Basmi et al. (Basmi et al. 2022) has undergone validity and reliability tests with satisfactory results, where the Cronbach's alpha value for the entire instrument is 0.89, indicating an excellent level of reliability. The religiosity instrument adopted from (Kata et al. 2024) has undergone convergent validity testing with an AVE value of 0.55, indicating good validity, while the learning outcome instrument developed by (Kata et al. 2024; Mahsup et al. 2020) has a Cronbach's alpha value of 0.87 and an AVE value of 0.52. The results of the reliability and convergent validity tests show that the instruments used in this study are of good quality and reliable for measuring the variables in question.

Data analysis was performed using Smart PLS version 4.0 software (Hair et al. 2025) . Model measurement was performed by examining factor loading values, where values above 0.70 indicate that the indicators can form variable constructs well. Indicators with factor loading values below 0.70 were considered unable to measure the construct accurately and had to be excluded from the model. To measure reliability, Cronbach's alpha and composite reliability were used, both of which had to be greater than 0.70. Convergent validity is tested using the Average Variance Extracted (AVE) value, which must be greater than 0.50. Meanwhile, discriminant validity is tested using HTMT (Heterotrait-Monotrait Ratio), which should be below 0.90, which is still considered valid for research in the field of education (Sarstedt et al. 2019) . In addition, the Fornell-Larcker criterion is used to test discriminant validity by ensuring that each latent construct is more dominant in explaining its own indicators than the indicators of other constructs in the

model, and is empirically different from other constructs (Henseler, Ringle, and Sarstedt 2015) .

The algorithm test in PLS was used to obtain structural and measurement model solutions by estimating the relationships between latent variables and their indicators, as well as the relationships between latent variables in the model. The algorithm test results provide path coefficients that describe the relationships between variables and measure the validity and reliability of the constructs. To test the stability and significance of the path coefficients, the bootstrapping method was used by repeatedly resampling the data. The bootstrapping process produces an estimation distribution that is used to calculate t-statistics, p-values, and confidence intervals. The bootstrapping results showed that the relationships between SRL, religiosity, and learning outcomes were all statistically significant, with p-values lower than 0.05.

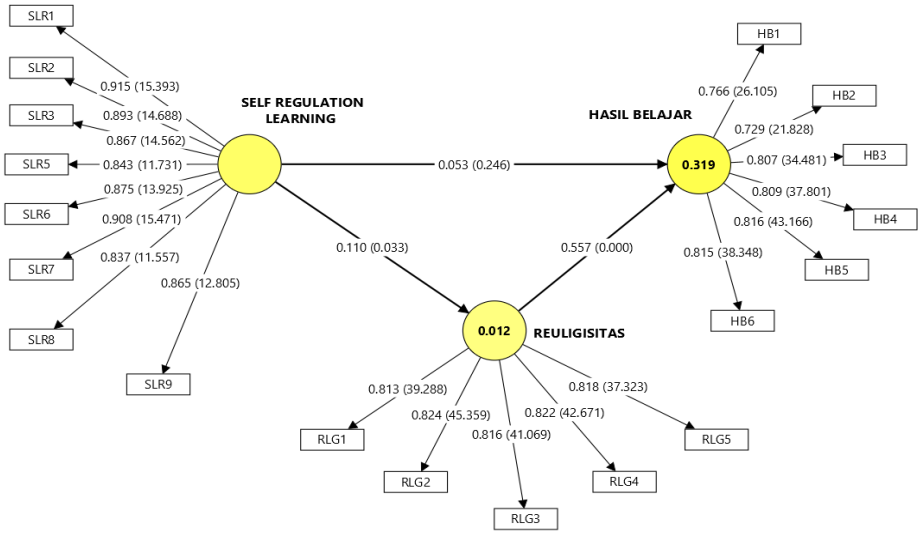

Figure 1 PLS Algorithm and Bootstrapping Test Model

Results and Discussion

To test the reliability and validity of each variable tested in the study, the factor loading, CA, CR, and AVE values are shown. This table illustrates how strong these constructs are in measuring the variables in question and provides an overview of the quality of the model used in this study. The results obtained show that the three variables tested ( ) have good reliability and validity, which supports the overall quality of the research model.

Table 1. Construct Validity and Reliability

Variable	Code Item	Indicator	Factor Loadings	CA	CR	AVE
Self-regulated learning	SLR1	Metacognitive	0.913	0.930	0.948	0.683
	SLR1	Motivation	0.892			
	SLR1	Behavior	0.866			
	SLR5	Self-control	0.839			

Variable	Code Item	Indicator	Factor Loadings	CA	CR	AVE
	SLR6	Learning goal setting	0.872			
	SLR7	Academic stress management	0.906			
	SLR8	Adaptability	0.836			
	SLR9	Self-monitoring	0.863			
Religiosity	RLG 1	Dimension of Belief	0.812	0.877	0.910	0.670
	RLG 2	Dimension of Worship	0.824			
	RLG 3	Dimension of Appreciation	0.816			
	RLG 4	Religious Knowledge Dimension	0.822			
	RLG 5	Dimension of Consequences or Practices	0.817			
Learning Outcomes	HB1	Academic Achievement (Exams and Assignments)	0.766	0.881	0.909	0.626
	HB2	Understanding of material	0.729			
	HB3	Involvement in the learning process	0.807			
	HB4	Timely completion of tasks	0.809			
	HB5	Improvement in technological skills	0.816			
	HB6	Adaptability	0.815			

Table 1 shows the reliability and construct validity results of the three main variables in this study, namely Self-Regulated Learning (SRL), Religiosity, and Learning Outcomes. Each variable has a number of items with indicators measured using loading factors, Cronbach's Alpha (CA), Composite Reliability (CR), and Average Variance Extracted (AVE). For the Self Regulation Learning (SRL) variable, which consists of eight indicators, the factor loading values range from 0.836 to 0.913. The CA and CR values are 0.930 and 0.948, respectively, indicating an excellent level of reliability. The AVE value of 0.683 also indicates that this construct has adequate convergent validity. The Religiosity variable consists of five indicators covering the dimensions of belief, worship, appreciation, religious knowledge, and consequences or practices. All indicators have a loading factor above 0.8, with CA and CR values of 0.877 and 0.910, respectively. The AVE value for religiosity is 0.670, which indicates good convergent validity. The Learning Outcomes variable consists of six indicators, including academic achievement, understanding of material, involvement in learning , timely completion of assignments, improvement in technological skills, and adaptability. The loading factor for each indicator ranges from 0.729 to 0.816. The CA and

CR values are 0.881 and 0.909, respectively, with an AVE of 0.626, indicating that this construct also has good reliability and validity. Overall, these results show that all variables in this study have high levels of reliability and validity, which supports the quality of the proposed model.

Table 2 Discriminant Validity Criteria

Heterotrait-monotrait ratio (HTMT)			
Variable	Learning outcomes	Religiosity	Self-regulated learning
Learning outcomes			
Religiosity	0.631		
Self-regulation_learning	0.122	0.120	
Fornell-Larcker criterion			
Learning outcomes	0.791		
Religiosity	0.562	0.818	
Self-regulation_learning	0.115	0.112	0.826

Table 2 presents the results of the discriminant validity test using two methods, namely Heterotrait-Monotrait Ratio (HTMT) and Fornell-Larcker Criterion. These two methods were used to evaluate the extent to which the constructs in this research model could be distinguished from one another.

In the HTMT test, which measures the relationship between different constructs, the results show adequate values. The HTMT value for the relationship between Learning Outcomes and Religiosity is 0.631, which is still below the threshold of 0.90, indicating that these two constructs can be distinguished well. Meanwhile, the relationship between Learning Outcomes and Self-Regulated Learning has a very low HTMT value of 0.122, indicating that these two constructs are very different and do not overlap. Similarly, the relationship between Religiosity and Self-Regulated Learning, which has an HTMT value of 0.120, also shows a clear difference between the two constructs.

In addition, in the Fornell-Larcker Criterion test, which measures discriminant validity by comparing the square root of AVE with the correlation between constructs, the results show that each construct is more dominant in explaining its own indicators than the indicators of other constructs. The Learning Outcome value (0.791) is greater than the correlation between Learning Outcome and other constructs (Religiosity 0.562 and Self-Regulation Learning 0.115), indicating that this construct has good discriminant validity. Similarly, Religiosity and Self-Regulation Learning each have higher AVE root values than the cross-correlations between constructs. Overall, the results of the HTMT and Fornell-Larcker Criterion tests indicate that this research model has good discrimination between constructs, suggesting that the constructs measured in this study can be clearly and validly distinguished.

The evaluation of the structural model related to testing the hypotheses that examine the influence between variables in this study includes several important steps. Hypothesis testing and 95% confidence intervals for path coefficient parameter estimates include the direct influence between variables at the structural level. This direct effect can be measured

using the f^2 (square) measure, with interpretations of 0.02 (low), 0.15 (moderate), and 0.35 (high) (Hair Jr. et al. 2017) . Meanwhile, for the mediation effect, the statistical measure used is the Upsilon V value, which is calculated by squaring the mediation coefficient, as proposed by Lachowicz et al.(2018) and interpreted by Ogbeibu et al.(2021) with categories of low (0.02), moderate (0.075), and high (0.175) mediation effects. The overall model evaluation consists of R Square with criteria (Chin 1998) , namely 0.19 (low effect), 0.33 (moderate effect), and 0.66 (high effect), and Q^2predict above 0 (Hair, Jr. et al. 2022) .

Table 3 Direct and Indirect Effects

Variable	Path coefficient β	P value	Sig	f^2 Upsilon V	R-Squared	Q2 Square	SRMR
H_1 . Religiosity -> learning outcomes	0.557	0.000	Yes	0.449	0.319	0.007	0.048
H_2 . Self-regulation learning -> learning outcomes	0.053	0.246	No	0.004	0.319	0.007	
H_3 . Self-regulation learning -> religiosity	0.110	0.033	Yes	0.01	0.012	0.006	
H_4 . Self-Regulation Learning -> Religiosity -> Learning Outcomes	0.061	0.03	Yes	0.004			

Based on the analysis results, the SRMR value of 0.048 indicates that the model used fits well with the available data. The SRMR value is below 0.08, according to Schermelleh-Engel et al.,*(2003)* , which sets the SRMR criterion between 0.08-0.10 as an "acceptable fit".

Hypothesis testing for the direct effect H1 religiosity has a significant effect on learning outcomes, the path coefficient (β) for this relationship is 0.557 with a p-value of 0.000, which means that the effect of religiosity on learning outcomes is significant at the 0.05 level. The f^2 value of 0.449 indicates that the effect of religiosity on learning outcomes is high (according to Cohen's convention, $f^2 > 0.35$ indicates a high effect). The R-square value of 0.319 shows that 31.9% of the variability in learning outcomes can be explained by the religiosity variable. The religiosity factor has a significant effect on learning outcomes, although there is 68.1% of other variability that cannot be explained by the religiosity variable and may be influenced by other factors not included in this model. This model contributes significantly to explaining learning outcomes.

H2 Self-regulation learning has a significant effect on learning outcomes. The path coefficient (β) for this relationship is 0.053 with a p-value of 0.246, which means that the effect of self-regulation learning on learning outcomes is not significant (p-value > 0.05).

Thus, we can conclude that self-regulation learning does not have a significant direct effect on learning outcomes in this model.

H3 self-regulation learning has a significant effect on religiosity. The path coefficient (β) for this relationship is 0.110 with a p-value of 0.033, which shows that self-regulation learning has a significant effect on religiosity. Although the effect is small, it is still significant at the 0.05 level. The f^2 value of 0.013 indicates that this effect is relatively small in the context of the model as a whole.

H4 religiosity is an intervening variable for learning outcomes. The path coefficient (β) for this indirect effect is 0.061 with a p-value of 0.033, which is also significant at the 0.05 level. This shows that self-regulation learning has an indirect effect on learning outcomes through religiosity as a mediating variable. However, to determine whether this is full mediation, we need to look at several things. In the context of full mediation, the direct effect of self-regulation learning on learning outcomes (H2) should not be significant, which has been proven in your analysis results (p-value H2 > 0.05). Since the indirect effect is significant (H4) and there is no significant direct effect, H4 can be considered as full mediation between self-regulation learning and learning outcomes through religiosity. The proposed model shows that religiosity plays an important role in improving learning outcomes through its direct effect (H1) and as a mediator between self-regulation learning and learning outcomes (H4).

Discussion

The results of this study indicate that religiosity has a significant and substantial effect on student learning outcomes. Religiosity, with its positive and strong influence, can be used as an important factor in improving learning outcomes. This is in line with Albert Bandura's motivation theory, which emphasizes the importance of an individual's belief in their ability to achieve goals (self-efficacy) *(Bandura 1977)* . Self-confidence derived from religious values helps students manage stress, which in turn improves their academic performance. As explained by Merrill, Read, and LeCheminant*(2009)* , higher levels of religiosity are associated with better stress management, promoting positive outcomes such as confidence in facing personal problems and reducing negative emotions. Research by Farhan and Rofi'ulmuiz*(2021)* also reveals that good religiosity can increase emotional intelligence and learning motivation, which contribute to students' academic achievement.

Religiosity provides strong moral guidance in academic life, including the value of honesty that underlies students' honest behavior in academic activities *(Heryadi et al. 2024)* . In addition, religiosity also strengthens students' commitment to achieving better performance in the form of a learning achievement index *(Horwitz, Domingue, and Harris 2020)* . Meanwhile, self-regulation learning (SRL), although important, did not show a significant effect on learning outcomes in this study. This indicates that although SRL is a fundamental approach in education, which emphasizes student independence in managing their learning process, its contribution to student learning outcomes in the context of this study is not significant. Research by Yustika*(2022)* and Ramadhany and Rosy(2021) also notes that SRL has only a small impact on learning outcomes. This indicates that other factors, such as motivation, self-discipline, and social support, play a greater role in improving student learning outcomes. Therefore, these results open up opportunities for further research to

explore other variables that can strengthen the relationship between SRL and learning outcomes.

In relation to self-regulation learning, the self-control theory developed by Baumeister and Vohs(2007) states that self-control, which involves an individual's ability to regulate their behavior, emotions, and thoughts, is an important factor in SRL. Religiosity can serve as a mediator in the relationship between SRL and learning outcomes, as religious practices such as prayer or meditation can increase the self-control and discipline necessary for SRL. According to Carter, McCullough, and Carver(2012) , religious beliefs can strengthen self-control and self-monitoring, which support independent and structured learning processes.

The significant influence of SRL on religiosity in this study indicates that individuals' ability to regulate their learning processes, such as goal setting and time management, can contribute to an increase in their religiosity. This is in line with the research by(Zong and Cheah 2023) , which indicates that good self-regulation can improve the quality of religious life and life satisfaction. Religiosity, in turn, can strengthen self-regulation in the context of learning, as religious beliefs provide a sense of external supervision that helps individuals monitor their behavior and emotions (Misran, Khaiyom, and Razali 2021) .

This study expands the understanding of the relationship between SRL and religiosity in the context of education. These findings contribute theoretically by showing that religiosity can act as a mediator that strengthens the relationship between self-regulation and learning outcomes, supporting the findings of self-control and motivation theories in education. In addition, this study confirms that self-regulation learning does not always have a significant direct influence on learning outcomes, and other factors such as motivation, self-discipline, and religious values need to be taken into account in influencing student learning outcomes.

From a practical perspective, the results of this study indicate that educators can utilize religiosity as a tool to improve student learning outcomes. Integrating religious values into education can be an effective strategy to strengthen students' self-regulation learning, helping them manage stress, increase motivation, and maintain high learning discipline. On the other hand, although SRL is important, it should be noted that its influence on learning outcomes can be maximized if it is supported by internal factors such as religiosity, motivation, and self-discipline. Therefore, education that promotes a balance between SRL and religious values can create more independent, structured, and sustainable learning. These findings open opportunities for further research to explore the role of religiosity in supporting self-regulation learning and learning outcomes, as well as how these two factors interact in the context of higher education.

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