



# The Effect of *SiJaring* LMS-Based Learning Model in Fostering Self-Regulated Learning among Islamic Education Students in Indonesia

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## Abstract

This research aimed to investigate the effectiveness of the *SiJaring* Learning Management System (LMS)-based learning model in the Islamic Civilization History course at Islamic Religious Higher Education institutions in East Kalimantan, Indonesia. The study employed a quantitative research approach with a quasi-experimental design. A total of 320 respondents were selected as research participants from a population of 1,890. Data was collected through questionnaires administered to two groups, namely the experimental group and the control group. Each respondent underwent pretest and posttest sessions. Statistical analysis using SPSS revealed a significant difference in mean scores between the pretest and posttest results of the experimental group, with a mean difference of 45.61. Furthermore, the independent t-test demonstrated a significant difference in mean scores between the experimental and control groups' post-test results, with a mean difference of 45.1234. These findings indicate that the implementation of the *SiJaring* LMS-based learning model effectively promotes self-regulated learning among students in the Islamic Civilization History course at Islamic Religious Higher Education institutions in East Kalimantan, Indonesia.

**Keywords:** Learning model, learning management system, self-regulated learning, *SiJaring* LMS model, Islamic Civilization History classes

## **1. Introduction**

Self-regulated learning is an essential skill for student success, involving abilities like managing study time, self-motivation, and taking the initiative to understand the material (Mulyadi & Syahid, 2020). Supporting self-regulation is crucial as learning paradigms shift towards student-centric models (Zahro et al., 2021). Self-regulation enables students to succeed in an increasingly globalized world (Zumbrunn et al., 2021). Integrating self-regulated learning in education systems is vital for developing adaptive thinking and achievement (Arista et al., 2022). Factors like innovative technologies, collaborative environments, and dynamic teaching can nurture self-regulation by providing personalized feedback and resources (Pratiwi & Laksmiwati, 2016). The capacity for self-regulated learning and a high degree of engagement with social media can be used to forecast a tendency toward academic procrastination in students (Latipah et al., 2021).

A growing body of research demonstrates how online learning platforms and technology tools can promote self-regulated learning across educational contexts. For example, Sobri et al. (2020) found that e-learning environments enabled improved goal-setting, responsibility, and self-evaluation among students. The increased autonomy and ownership facilitated through digital platforms were linked to gains in these self-directing behaviors essential to self-regulation. Other studies have shown learning management systems like Google Classroom and Moodle to increase independence by providing communication channels and solution-sharing capabilities. Krismanto & Tahmidaten (2022) as well as Paseleng et al. (2022) found that discussing problems and ideas within online forums and explaining thinking through multimedia uploads allowed students to better regulate collaborative knowledge-building.

Beyond platform affordances, researchers have shown personalized interventions to also advance self-regulated learning. Goh et al. (2012) demonstrated that receiving regular persuasive SMS messages improved motivation and study strategies among school-age youth. At the postsecondary level, Chen & Hwang (2019) designed a collective issue-quest approach facilitated through an Intelligent Responsive System (IRS) which enhanced metacognitive monitoring and other self-regulatory skills for Taiwanese university students. Additionally, a multitude of ongoing studies continue to deepen understanding of how self-regulation interrelates with other student factors. Ellis & Helaire (2018) recently explored connections between self-regulated learning readiness and student engagement finding significant correlations which underline the importance of self-direction capabilities. Similarly, emerging research by Wu et al. (2023) and Zhao & Cao (2023) investigating self-regulation complexity or its relationships to efficacy and engagement respectively promises to advance knowledge on nuances in this vital set of learning skills.

Together these prior studies provide robust evidence that purposeful integration of education technology along with personalized supports can positively shape self-regulatory behaviors tied to student success. The current research aimed to build on these findings by evaluating the potential of customized LMS platforms specifically to enhance multidimensional self-regulation among the understudied multicultural student population of Indonesian Islamic higher education institutions.

A preliminary study of 43 students at Islamic universities in East Kalimantan, Indonesia found learning does not adequately encourage independence, with most students dissatisfied (Rahmi & Samsudi, 2020). Key issues are conventional lecturer-centric models, minimal skill development opportunities, formal evaluation methods, and lack of personalization. Improving self-regulation requires shifting towards adaptive, student-centric paradigms.

While prior research shows potential for LMS-based learning to increase self-regulation, limitations exist regarding skills development, cultural contexts, and integrated self-regulated learning patterns. Further research on LMS features that significantly impact student initiative can address these gaps and better guide institutions on optimizing technology for independent learning. Therefore, this study examines the research question: Does LMS SiJaring-based learning give significant effect to the improvement of students' self-regulated learning with multicultural background?

## **2. Literature Review**

Historically, Learning Management Systems (LMSs) have evolved from and combined the concepts of distance learning and e-learning. Both adopt the same underlying notion of technology-enabled remote learning, yet have key differences in digital education contexts. Distance learning refers to teaching methods where students and instructors are geographically separated, like in correspondence course models where learning materials are delivered as hard copies by the provider via mail services (Hidayat et al., 2021). Meanwhile, e-learning (electronic learning) utilizes digital technologies to deliver educational content. This encompasses any computer, internet, or electronics-based learning, from online courses to instructional videos to learning apps (Sari & Priatna, 2020). An LMS, however, is a software platform designed to organize and facilitate learning digitally. LMSs provide tools for uploading, accessing, and interacting around learning materials, enabling online class scheduling, student progress tracking, and teacher feedback (Khudri, 2022). The key distinction lies in distance learning's focus on remote student-teacher interactions, e-learning's emphasis on utilizing technology for instructional content delivery, and the LMS's purpose in administrating and supporting technology-based learning overall (Muhammad, 2017).

Self-regulated learning refers to one's abilities in independently directing and managing their own learning process. This entails an array of cognitive, metacognitive, and motivational skills and strategies that empower individuals to actively steer their educational journey (Martinez-Lopez et al., 2023). As Zimmerman & Schunk (2008) outlined in Gruneisen et al. (2023), key domains include cognition (grasping subject matter), metacognition (self-monitoring and control), and motivation (managing drives and emotions). Self-regulated learners can set learning goals, assess progress, and leverage effective techniques to accomplish desired outcomes (Gruneisen et al., 2023). Hence, self-regulation is pivotal for fostering lifelong learner autonomy and success.

Fundamentally, self-regulated learning involves cognitive strategies for processing information, motivational strategies for sustaining engagement, and behavioral strategies for supporting learning actions. Cognitively, learners utilize approaches like planning, organizing, and clustering material to promote understanding, such as mind maps to grasp concepts (Rahmawati et al., 2022). Motivationally, clearly defining learning objectives, recognizing content value, and setting suitable targets can help align studies to individual interests and talents, fueling drive. Finally, efficacious behaviors like scheduling study times, curating productive learning environments, and controlling emotions facilitate the learning process overall (Yulanda, 2017).

Zimmerman (2013) outlines seven key interrelated dimensions that characterize self-regulated learning effectiveness. Firstly, self-regulated learners are adept at setting goals and proactively motivating themselves to achieve them (dimension 1). They are also proficient planners and organizers when it comes to managing their study time and learning materials (dimension 2). These students exhibit strong metacognitive monitoring skills to intently direct their own learning

process (dimension 3) paired with robust self-control capabilities to avoid distractions (dimension 4). Highly self-regulated learners further tend to be self-reflective; frequently evaluating progress to adjust their strategies as needed (dimension 5). They also consciously regulate their own emotional states to persist through difficulties (dimension 6). Finally, self-regulated learners are comfortable seeking collaborative assistance when beneficial (dimension 7). As this multidimensional framework highlights, developing self-regulation requires scaffolding a diverse repertoire of interplaying motivational, behavioral, metacognitive and resource management competencies. Evaluating support interventions therefore necessitates assessing their impact on the full profile of self-directing capabilities students require for success.

Technology integration plays a major role in enabling self-regulated skill building. Digital platforms can serve as metacognitive scaffolds for self-monitoring and regulation during learning. With embedded tracking tools, students can gauge their progress, pinpoint areas for improvement, and independently tailor study strategies (Zimmerman, 2000). Additionally, expanded access to diverse learning resources through applications, e-books, online courses, and virtual classrooms allows for greater personalization. Students can customize when, where, and how they learn. Thus, technology affords more than convenience; it empowers learner agency and self-direction (Dabbagh & Kitsantas, 2012).

In particular, LMSs present unique affordances for fostering self-regulated learning, like opportunity for student-driven goal-setting, ubiquitous access that enables self-pacing, data-driven feedback to inform strategy adjustments, and digital portfolios to support metacognitive monitoring (Broadbent & Poon, 2015). As Nikolopoulou & Gialamas (2016) investigated, key LMS features that correlated with improved self-regulation included progress dashboards, automated notifications, online discussion forums, and added personalization tools. Ultimately, thoughtfully designed and learner-centered LMS interfaces can positively shape how students regulate their motivations, cognitions, and behaviors.

### **3. Research Methodology**

This research employs a quantitative approach, specifically a quasi-experimental design, where the sample is divided into an experimental group and a control group. The experimental group receives the treatment of using the SiJaring LMS in Islamic religious education learning, while the control group does not. Here, the researcher will collect data in the form of numbers, statistics, or other numerical data to test hypotheses and make generalizations about a phenomenon, particularly to evaluate the impact of an activity/intervention under certain conditions. According to Creswell (2012), using a quantitative research design, the researcher can provide robust empirical evidence to support new findings, which can establish a solid scientific basis for understanding a problem or phenomenon (Supratiknya, 2022). In addition to the quasi-experimental design, the quantitative approach is also supported by descriptive statistical data analysis, which according to Arikunto (2021), aims to provide a systematic, factual and accurate overview of the facts, characteristics and relationships between the phenomena studied.

The study population comprises Islamic religious education students from the 2023 cohort in semester II of the 2022/2023 academic year across three Islamic religious colleges in East Kalimantan, Indonesia. The total study population is 1,890 people, consisting of 770 males and 1,120 females. From the total population, 320 people were taken as research samples using cluster sampling technique. From all the research samples, they were then divided into two groups or

classes, namely the experimental class and the control class, where each respondent from each class will be involved in two testing sessions, namely the initial test and the final test (pre-test and post-test). The pretest and posttest in the experimental class involved 69 respondents each, so the total research sample in this class amounted to 138 people. Meanwhile, the pre-test and post-test activities in the control class involved 91 respondents each, so the total sample in this class amounted to 182 people as shown in Table 1 below.

Table 1. Sample Descriptions

Experimental Group		Control Group		Total
Pre-test	Post-test	Pre-test	Post-test	
18	18	32	32	
20	20	30	30	
31	31	29	29	
69	69	91	91	
138		182		320

Meanwhile, the instrument used in this study is a closed questionnaire in the form of multiple choice, with provided answer formats. The instrument model uses a 1-5 Likert scale with a score of 5=Strongly Agree, 4=Agree, 3=Less Agree, 2=Disagree, 1=Strongly Disagree. The instrument is divided into 7 groups of self-regulated learning indicators or aspects, detailed into 20 statement items. The seven indicators (aspects) are: a). Encouraging understanding of learning goals and motivation detailed into 3 statement items (items 1,2,3) b). The learning model supports planning and organization of time and learning materials, detailed into 3 statement items (items 4 ,5,6) c). The learning model supports metacognitive strategies/self-monitoring, detailed into 3 items (items 7,8,9) d). The learning model encourages self-supervision abilities, detailed into 3 statement items (items 10,11,12) e). The learning model encourages the ability to reflect and evaluate, detailed into 3 statement items (items 13,14,15) f). The learning model encourages the ability to manage emotions, detailed into 3 statement items (items 16,17,18), and g). The learning model encourages the ability to collaborate and self-help, detailed into 2 statement items (items 19, 20). The research instrument used here has previously been tested for validity and reliability involving 20 participants. The test results show that out of the initial 30 items tested, there were 10 items that were invalid (possibility that respondents did not understand the intent of the questions asked), while the remaining 20 items were declared valid and reliable, so these 20 statement items were used as instruments in measuring the effectiveness of LMS-based learning models for increasing student self-regulated learning.

Data were collected through questionnaires distributed to predetermined samples of respondents. The overall sample consisted of students taking a course on the history of Islamic civilization. The collected data were then analyzed using an independent sample t-test to compare pre-test scores between the experimental and control classes and post-test scores between the experimental and control classes. In addition, a paired sample t-test was also conducted to examine whether there was an improvement between the pre-test and post-test scores of each group.

After completing the t-test, the researcher also used descriptive statistical analysis techniques to calculate the variation in responses from the research sample by highlighting the acquisition scores of the mean and standard deviation. According to Sugiono (2017) descriptive statistical analysis is a statistical model used to analyze data from research results by narrating (describing) the

collected data as it is. To simplify and ensure accurate analysis of the data used, the researcher utilizes SPSS computer application-based software.

## 4. Findings

### 4.1. Results of Descriptive Analysis

To facilitate understanding of the collected research data, descriptive analysis is required which helps present information in a concise yet clear manner, so that patterns or trends and characteristics of each existing data can be identified, as a basis for further decision making.

Table 1. Results of Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Pre-test of experimental group	69	36	54	45.61	4.209
Post-test of experiment group	69	81	103	91.10	4.893
Pre-test of control group	91	37	56	46.22	4.555
Post-test of control group	91	36	56	45.98	4.253
Valid N (listwise)	69				

Based on the results of the descriptive statistical analysis as shown in Table 2, it shows that the pretest results in the experimental class involving 69 respondents produced an average score of 45.61. Meanwhile, the pretest in the control class resulted in an average score of 46.22. From these data it can be analyzed that there is no significant difference between the two groups, both in the experimental class and in the control class before the SiJaring LMS-based learning model is applied. This is indicated by the average pretest score of 45.61 and 46.22 (only differ by 0.61). This is different from the average results shown after being given SiJaring LMS-based learning in the experimental class where the posttest results show a significant difference. The average posttest score in the experimental class is 91.10 while the posttest score in the control class is 45.98, there is a significant difference in the average posttest score from the two classes of 45.12. Thus, based on the statistical analysis, it can be concluded that there is a difference in the average score of students who were given SiJaring LMS-based learning compared to students who studied conventionally, in the history of Islamic civilization courses.

### 4.2. Data Normality Test

The normality test in this study aims to ensure that each sample data used is normally distributed, so as to ensure the validity of the analysis and interpretation of the data carried out more accurately.

Table 2. Results of Data Normality Test

Groups	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pre-test of experimental group	.073	69	.200*	.977	69	.244
Post-test of experiment group	.088	69	.200*	.985	69	.569
Pre-test of control group	.081	91	.190	.977	91	.105
Post-test of control group	.095	91	.040	.984	91	.340

Based on the results of the normality test as shown in Table 3, it shows that all the data used in this study are normally distributed with significance value indicators (Sig.) of pretest and posttest examinations in both the experimental and control classes. Based on the table, the significance value of the pretest in the experimental class is 0.244 and the posttest is 0.569, while the significance value of the pretest in the control class is 0.105 and the posttest is 0.340. Because all tests in all classes produce a significance value greater than the standard probability value of 0.005, it can be concluded that all the data used in the study are normally distributed. Thus, all data used are declared feasible and meet the requirements, so the process can proceed to the next stage, namely the paired sample t test.

**4.3. Paired Sample T Test Results in Experimental and Control Groups**

The paired sample t-test in this study aims to see the difference in paired averages between the pretest and posttest results in the experimental group, as well as the pretest and posttest results in the control group, with the results of the paired difference test can be seen in the following table 4:

Table 3. Results of Paired Sample T-test between Experimental and Control Groups

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pre-test – post-test of experimental group	-45.493	5.822	.701	-46.891	-44.094	-64.903	68	.000
Pair 2	Pre-test – post-test of control group	.242	6.510	.682	-1.114	1.598	.354	90	.724

Based on the data from the results of the paired mean difference test as shown in Table 4, it shows that the pretest and posttest results in the experimental class have a significance degree of 0.000. Sig. (2-tailed). Thus, it can be concluded that if the significance value of the paired test results is smaller than the standard probability value of 0.05, then the average pretest and posttest results in pairs in the experimental class have a significant difference and meet the requirements.

**4.4. Paired Sample T-Test Results in Experimental and Control Groups**

The following statistics show data/information on the level or magnitude of differences in paired sample test results in the experimental class and control class.

Table 4. Results of Paired Sample T-test

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre-test of experimental group	45.61	69	4.209	.507
	Post-test of experiment group	91.10	69	4.893	.589
Pair 2	Pre-test of control group	46.22	91	4.555	.478
	Post-test of control group	45.98	91	4.253	.446

As the data in Table 6 shows, the magnitude of the mean difference value is indicated by the difference in the mean between the posttest results and the pretest results in the experimental class of 45.61 and 91.10 (of 45.49). Thus, the two posttest variables of the experimental group and the pretest of the experimental group have a significant degree of average difference.

#### 4.5. Data Variance Test Results

The homogeneity test in this study aims to ensure that the comparison between groups of data carried out is truly valid so that the interpretation of the test results can be relied upon.

Table 5. Results of Data Homogeneity Test

	Levene Statistic	df1	df2	Sig.
Based on Mean	.858	1	158	.356
Based on Median	.800	1	158	.372
Based on Median and with adjusted df	.800	1	152.670	.372
Based on trimmed mean	.802	1	158	.372

Based on the results of the homogeneity test, as presented in Table 7, it shows that the data distribution has homogeneous variants, this is indicated by the significance value based on the mean of 0.858. As the basis for making decisions about the level of data homogeneity, if the homogeneity test results in a value greater than the standard probability value of 0.05, the data distribution is declared homogeneous, and meets the requirements to proceed to the independent sample test.

#### 4.6. Unpaired Mean Difference Test Results for Experimental and Control Groups

The unpaired mean difference test (independent sample T-test) is intended to see whether there is a difference in the mean of two samples used in different groups, namely the post-test results in the experimental group and the post-test results in the control group.

Table 6. Results of Independent Sample Test

	Paired Differences						t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference					
				Lower	Upper				
Pair 1 Pre-test to Post-test of experimental group	-45.493	5.822	.701	-46.891	-44.094	-64.903	68	.000	
Pair 2 Pre-test to Post-test of control group	.242	6.510	.682	-1.114	1.598	.354	90	.724	

Based on the results of the unpaired average test or independent sample T test as shown in Table 8, it shows that the significance value of the data in the Sig. (2-tailed) section is 0,000, this significance value is smaller than the standard probability value of 0.05, thus it can be concluded that there is a difference in the mean of two unpaired samples between the experimental group and the control group.

#### 4.7. Magnitude of Post-test Result Difference Values in Experimental and Control Groups

Furthermore, it is necessary to measure how much the mean difference value of the two samples is, so it is necessary to analyze the results of the independent sample t-test statistics that have been carried out as in the following table 9:

Table 7. Results of Independent Sampel T-test

Groups	N	Mean	Std. Deviation	Std. Error Mean
Post-test of experimental group	69	91.1014	4.89341	.58910
Post-test of control group	91	45.9780	4.25305	.44584



Based on the test results as shown through Table 5, it can be analyzed that the average posttest score in the experimental class has a value of 91.1014 while the posttest in the control class is 45.9780. The difference test results indicate a significant mean difference of 45.1234 between the experimental class and the control class. Based on this difference, it can be concluded that the use of the SiJaring LMS-based learning model in teaching the history of Islamic civilization for students of Islamic Religious Colleges in East Kalimantan, Indonesia is effective in increasing students' self-regulated learning or learning independence.

## **5. Discussion**

The research findings demonstrate that the use of Learning Management System (LMS)-based learning models, particularly in the Islamic Civilization History courses for PTKI students in East Kalimantan, Indonesia, has proven to be effective in enhancing students' self-regulated learning within a multicultural educational context. The study aimed to comprehensively explore self-regulated learning from various perspectives based on Zimmerman's (2013) seven aspects of the self-regulated learning model. The findings provide compelling evidence that thoughtfully designed technology-enabled learning approaches can effectively nurture self-direction and independence for learners even within multicultural educational settings.

Several previous studies have yielded findings that prove the improvement of self-regulated learning through technology-enabled approaches. Bannert & Reimann, (2012) found enhancements in students' ability to plan learning using self-regulated patterns. Waschle et al. (2014) showed increased discipline and less procrastination through visual-based learning. Aligning with Zimmerman, Rimm-Kaufman et al. (2014) suggested integrated self-reflection and problem-solving effectively supports self-regulation. Continuous encouragement was also found to be an effective strategy (Weinhardt & Sitzmann, 2019). The current evidence extends previous findings on the promise of learning technology for self-regulation to Indonesian Islamic institutions and their diverse learner populations specifically.

Regarding multicultural factors, research by Chen et al. (2020) highlighted the need to provide personalized and adaptive support for self-regulated learning among students from diverse cultural backgrounds through leveraging technology. Matuk et al. (2021) also emphasized designing culturally-responsive digital learning environments to empower self-regulation skills development equitably. The current findings align with these studies in demonstrating the potential of thoughtfully designed LMS-based learning to promote self-regulated learning for students across cultural contexts. By demonstrating the potential of thoughtfully designed, context-appropriate LMS platforms to enhance self-regulated learning specifically for multicultural students at Indonesian Islamic institutions, this study makes an important contribution in addressing this need.

This study makes a novel contribution by being among the first to evaluate the LMS SiJaring platform specifically for facilitating self-regulated learning within the East Kalimantan PTKI multicultural student context. The findings carry important pedagogical implications for instructors and institutions seeking to leverage technology to nurture self-directed learning behaviors that enable academic success for diverse students.

As with all research, this study has certain limitations that provide avenues for further research. The sample is confined to Islamic university students in a specific Indonesian province. Additional studies across expanded demographics and geographic areas can build understanding of

the transferability of these self-regulated learning supports. Comparative studies evaluating multiple LMS platforms may also offer valuable insights.

The research findings demonstrate that the use of Learning Management System (LMS)-based learning models, particularly in the Islamic Civilization History courses for PTKI students in East Kalimantan, Indonesia, has proven to be effective in enhancing students' self-regulated learning within a multicultural educational context. The study aimed to comprehensively explore self-regulated learning from various perspectives based on Zimmerman's (2013) seven aspects of the self-regulated learning model, including understanding learning goals and motivation, planning and organizing time and materials, self-monitoring skills (metacognitive strategies), self-control abilities, reflection and evaluation skills, emotion management skills, and collaboration and self-help abilities in the context of LMS-based learning.

Several previous studies, related to the use of learning models, have yielded findings that prove the improvement of self-regulated learning. For example, Bannert and Reimann's research indicated an enhancement in students' ability to plan their learning using self-regulated learning patterns (Bannert & Reimann, 2012). Waschle et al. (2014) found that students exposed to self-regulated learning approaches tended to be more disciplined and less prone to procrastination through the use of visual-based learning. Consistent with Zimmerman's (2013) views, Rimm-Kaufman's et al. (2020) study suggested that self-reflection in self-regulated learning is effective when supported and integrated into problem-solving in learning. Additionally, Weinhardt & Sitzmann's (2019) study indicated that continuous encouragement is the most effective strategy in achieving the goals of self-regulated learning in education.

Furthermore, the findings align with the research Al-Abdullatif (2020), which demonstrated an increase in self-regulated learning in e-learning based on the flipped classroom approach, particularly in the categories of good to high. However, no significant difference in academic achievement compared to conventional classes was observed (Saks & Leijen, 2014). Additionally, B. Kramarski & Gutman's (2006) research showed that e-learning environments supported by IMPROVE self-metacognitive questioning can improve students' mathematical problem-solving abilities and self-regulated learning. Cerezo et al.'s (2020) findings indicated that E-Learning using the Moodle platform can empower students to independently manage their learning, impacting their learning processes and graduation rates.

Furthermore, Krismanto & Tahmidaten's (2022) research highlighted that self-regulated learning is a crucial aspect for the success of online learning programs within multicultural educational environments. The findings underscore the importance of facilitating the development of self-regulated learning aspects through the use of online learning platforms within multicultural contexts, ensuring that students from diverse cultural backgrounds can effectively engage in independent learning.

Conversely, Araka et al.'s (2021) findings emphasized that the effectiveness of optimizing features in learning tools to guide students in achieving learning goals independently is a challenge that needs attention in online learning. They underscored the significant role of instructors and other learning tools in promoting students' success in self-regulated learning. These research findings collectively underscore the importance and effectiveness of self-regulated learning in various educational settings and the significance of support and infrastructure in facilitating independent learning experiences for students.

Overall, the research findings emphasize the positive impact of LMS-based learning and e-learning approaches on self-regulated learning within multicultural educational settings. These findings suggest that the implementation of such learning models can effectively support students from diverse cultural backgrounds in developing their self-regulated learning skills, ultimately contributing to their academic success within multicultural educational environments.

## 6. Conclusion

The conclusion drawn from this study is that the utilization of Learning Management System (LMS)-based learning models has proven to be effective in fostering self-regulated learning among students in the Islamic Civilization History courses at Islamic Religious Higher Education institutions in East Kalimantan, Indonesia. This conclusion is supported by the statistical analysis, which revealed a significant difference in mean scores in the paired t-test with a significance value of 0.000, indicating a level of significance lower than the standard probability value of 0.05. Moreover, there was a notable disparity between the mean posttest score of the experimental group (91.10) and the mean pretest score (45.46), resulting in a difference of 45.61. This finding suggests a significant discrepancy between the posttest and pretest scores of the experimental group. In addition, the independent t-test exhibited a significant difference in mean scores, with a significance value of 0.00, which is lower than the standard probability value of 0.05. Furthermore, there was a substantial difference between the mean posttest score of the experimental group (91.1014) and the mean posttest score of the control group (45.9780), resulting in a difference of 45.1234. This finding highlights a significant difference between the posttest scores of the experimental and control groups. A potential area for further investigation and development stemming from this research revolves around the support of LMS-based learning models, specifically in their implicit encouragement of self-regulated learning in terms of exploring and managing students' emotions.

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