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The Effect of Digital Literacy on Self-Regulated Learning among Students in the Library and Information Science Program at Universitas Negeri Padang

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Abstract

The rapid expansion of information technology has transformed students' learning environments, requiring not only the ability to access digital information but also the capacity to regulate learning independently. However, the relationship between digital literacy and self-regulated learning in higher education remains insufficiently examined, particularly among Library and Information Science students. This study aims to identify the levels of digital literacy and self-regulated learning and to examine the effect of digital literacy on self-regulated learning among students of the Library and Information Science Program at Universitas Negeri Padang. A quantitative approach was employed, involving a population of 259 students, from which 72 respondents were selected through stratified proportional sampling. Data were collected using a structured questionnaire based on validated indicators and analyzed using simple linear regression. The findings show that both digital literacy and self-regulated learning are at a high level. The regression results indicate that digital literacy has a positive and statistically significant effect on self-regulated learning ($Y = 11.107 + 0.670X$; $p < .05$), with a coefficient of determination (R^2) of 0.378, indicating that digital literacy explains 37.8% of the variance in

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self-regulated learning. These findings demonstrate that digital literacy plays an important role in enhancing students' ability to plan, monitor, and evaluate their learning processes. This study contributes to the literature on digital learning and information science by providing empirical evidence of the relationship between digital literacy and self-regulated learning. Practically, the findings imply that strengthening digital literacy through curriculum integration and instructional strategies is essential to support autonomous learning and improve the quality of higher education.

Keywords: Digital Literacy; Self-Regulated Learning; Library And Information Science Students; Autonomous Learning; Higher Education

INTRODUCTION

Digital technology advancements have brought significant transformations to higher education systems across various nations (Irhandayaningsih & Ardina, 2025). Higher education institutions no longer rely solely on face-to-face instruction but increasingly utilize online learning platforms, digital learning resources, and technology-based learning management systems. These changes drive a shift from teacher-centered learning patterns toward student-centered learning (Sabban, 2023). Within this context, students are required to demonstrate greater independence in managing their learning processes, ranging from planning learning activities, managing time, and selecting learning resources to continuously evaluating learning outcomes. This demand for learning independence is recognized as self-regulated learning (Rusdi et al., 2023).

Self-regulated learning refers to an individual's ability to plan learning goals, implement learning strategies, monitor learning progress, and evaluate learning outcomes consciously and systematically (Mirmoadi & Satwika, 2022). Students possessing strong self-regulated learning tend to be capable of setting learning goals, selecting appropriate strategies, maintaining motivation, and reflecting on learning outcomes (Amalia et al., 2026). This capability contributes to learning discipline, academic persistence, and more optimal achievement of learning outcomes (Sestiani et al., 2022). In the context of higher education in Indonesia, the implementation of digital-based learning through Learning Management Systems, online classes, and electronic learning resources is becoming widespread; however, students' self-regulated learning readiness still shows disparities. Students are still found to learn without clear planning, lacking consistency in completing

assignments, and remaining unaccustomed to monitoring and evaluating their learning processes independently (Hemmler & Ifenthaler, 2024). Such conditions are also observed at Universitas Negeri Padang, particularly among students of the Library and Information Science Study Program who are closely associated with the utilization of digital information sources in academic activities. Based on preliminary interviews conducted with five students from the 2022 cohort, a more specific overview was obtained regarding variations in students' digital literacy and self-regulated learning abilities. Regarding the information sources used to complete course assignments, 2 students stated they consistently use Google Scholar and online journals as primary references. Meanwhile, the other 3 students admitted to more frequent use of blogs and general articles, as these are considered more practical and easier to understand. This condition indicates that the utilization of academic sources has not been evenly practiced by all students.

Regarding the credibility of digital information, only 2 students stated they always verify the publication year, author's name, and journal reputation before utilizing a source. Conversely, the other 3 students admitted to rarely performing in-depth evaluations of information credibility as long as the content is deemed relevant to the assignment topic. These findings indicate that the cognitive dimension of digital literacy, specifically the ability to think critically about information, has not fully developed optimally. Furthermore, regarding planning and study time management, 3 students stated they do not yet have a structured study schedule and tend to work on assignments close to the submission deadline. On the other hand, 2 students stated they have developed weekly study schedules, although implementation is not always consistent. This indicates differences in the learning planning aspect, which is part of the metacognitive dimension in self-regulated learning. In the aspect of monitoring and self-evaluation of the learning process, only 1 student stated they routinely reflect on their understanding of the material after lectures. Meanwhile, the other 4 students stated that self-evaluation is usually only conducted upon receiving unsatisfactory grades. This condition indicates that the ability for self-monitoring and reflection as vital components of self-regulated learning has not developed systematically.

Overall, these preliminary interview findings demonstrate variations in students' abilities to utilize digital information and regulate their learning processes independently. Differences in academic source usage, information credibility evaluation, study time planning, and learning monitoring suggest that digital literacy is interconnected with students' self-regulated learning abilities (Fasyiyah et al., 2025). The conditions found

among these students indicate that self-regulated learning does not form automatically but is influenced by various factors, both internal and external, such as learning motivation, learning strategies, the learning environment, and the ability to utilize digital technology (Anisa Dwi Kurnia et al., 2025). These factors play a role in determining how students plan, manage, and evaluate their learning processes independently and sustainably (Hemmler & Ifenthaler, 2024). In technology-based learning, the ability directly related to the utilization of digital information is known as digital literacy (Arma et al., 2025).

Several previous studies indicate a link between digital literacy and students' self-regulated learning. Research by Sestiani et al. (2022) demonstrates that digital literacy education can enhance student self-regulated learning through an experimental approach. Research by Mirmoadi and Satwika (2022) as well as Suci and Razak (2024) also shows a positive and significant relationship between digital literacy and student self-regulated learning within the context of online learning. Nevertheless, most of these studies still focus on the relationship between variables using subjects across various study programs and have not specifically examined the context of a study program directly related to information management and digital literacy.

High intensity of digital technology use among students does not always correlate positively with high levels of academic digital literacy (Bahri et al., 2024). Many students are active in using digital devices, yet their utilization remains dominated by non-academic interests (Ginting & Arindani, 2022). This condition indicates that digital literacy serves as a crucial factor determining the quality of student interaction with digital learning resources and the effectiveness of the learning undertaken, including the management of the learning process independently (Kantona & Munadi, 2024). This research utilizes the digital literacy theory proposed by Wan Ng (2012) as the primary grand theory, which views digital literacy as a multidimensional competence encompassing technical, cognitive, and social-emotional dimensions. The technical dimension relates to the ability to use digital devices and applications, the cognitive dimension relates to critical thinking skills in evaluating and managing digital information, while the social-emotional dimension relates to attitudes, ethics, and responsibility in digital technology use. These three dimensions interact and form an essential foundation in digital-based learning (Zakir et al., 2025). As the dependent variable, self-regulated learning in this study is supported by Zimmerman's theory (1989), which views self-regulated learning as a process involving metacognitive, motivational, and behavioral aspects. In the context of digital learning, the ability to utilize technology in a

directed manner becomes a vital part of supporting these three aspects. Therefore, digital literacy is positioned as a factor that theoretically influences students' self-regulated learning abilities (Thoyibah et al., 2024). Therefore, this study is conducted to analyze the influence of digital literacy on the self-regulated learning of students in the Library and Information Science Study Program at Universitas Negeri Padang.

METHODS

This study employed a quantitative research approach aimed at examining the relationship between digital literacy and self-regulated learning. The research design was descriptive with simple linear regression analysis. This approach was selected to obtain empirical evidence regarding the condition of the research variables and to statistically test the relationship between them (Febriyani Eka et al., 2022). The research process encompassed the stages of instrument preparation, data collection, and data analysis. Specifically, the data collection phase was conducted from March 12 to March 31, 2026

The research population included all active students of the Library and Information Science Study Program at Universitas Negeri Padang from the 2022, 2023, and 2024 cohorts, totaling 259 students. The sample size was determined using the Slovin formula with a 10% margin of error, resulting in 72 respondents. The sampling technique employed was stratified proportional sampling to ensure that each cohort was represented proportionally, providing a more representative depiction of digital literacy and self-regulated learning levels. The research instrument was a questionnaire developed based on specific theoretical indicators. Digital literacy was measured using Wan Ng's (2012) dimensions (technical, cognitive, and social-emotional), while self-regulated learning was assessed based on Zimmerman's (1989) theory (metacognitive, motivational, and behavioral processes).

A four-point Likert scale was used: (1) strongly disagree, (2) disagree, (3) agree, and (4) strongly agree. The use of a four-point scale aimed to eliminate neutral responses, encouraging more decisive answers from respondents. Before the main study, the instrument was tested for validity and reliability. Data were collected online via Google Forms, with the questionnaire link distributed through WhatsApp groups to the targeted cohorts (2022, 2023, and 2024). Data analysis was conducted using descriptive statistics to identify the level of each variable and simple linear regression to test the effect of digital

literacy on self-regulated learning (Priadana & Sunarsi, 2021). All data processing and statistical testing were performed using SPSS software.

RESULTS

In this section, the research findings are presented systematically based on the data collected from students of the Library and Information Science Study Program at Universitas Negeri Padang. The results are derived from a sample of 72 respondents, determined using the Slovin formula and selected through stratified proportional sampling to ensure representativeness across different academic years.

1. Respondent Characteristics

The characteristics of the respondents were analyzed based on their academic year to reflect the population distribution of the study program.

Table 1. Distribution of Respondents by Academic Year

Academic Year	Total (N)	Percentage (%)
2022	28	38,9%
2023	21	29,2%
2024	23	31,9%
Total	72	100%

source: Compiled by the researcher (2026)

Based on Table 1, the largest group of respondents belongs to the class of 2022 (38.9%), followed by the class of 2024 (31.9%) and the class of 2023 (29.2%). This distribution confirms that all targeted cohorts are represented, allowing the data to generalize the population's characteristics.

2. Validity Test of the Research Instrument

Table 2. Validity Test of the Research Instrument

Item	Pearson Correlation	R table	Description
1	0,546	0,232	Valid
2	0,517	0,232	Valid
3	0,568	0,232	Valid
4	0,636	0,232	Valid
5	0,436	0,232	Valid
6	0,424	0,232	Valid

Item	Pearson Correlation	R table	Description
7	0,518	0,232	Valid
8	0,656	0,232	Valid
9	0,608	0,232	Valid
10	0,551	0,232	Valid
11	0,530	0,232	Valid
12	0,628	0,232	Valid
13	0,670	0,232	Valid
14	0,670	0,232	Valid
15	0,599	0,232	Valid
16	0,536	0,232	Valid
17	0,642	0,232	Valid
18	0,455	0,232	Valid
19	0,536	0,232	Valid
20	0,566	0,232	Valid
21	0,652	0,232	Valid
22	0,564	0,232	Valid
23	0,637	0,232	Valid
24	0,630	0,232	Valid

source: Compiled by the researcher (2026)

Based on these results, all statement items in variable X (Digital Literacy) and variable Y (Self-Regulated Learning) demonstrate r values greater than the r table (0.232). Consequently, all research instruments are declared valid and feasible for use in the study.

3. Reliability Test

Table 3. Reliability Test

Variabel	Nilai cronbach's alpha	Description
Digital Literacy (X)	0,783	Reliabel
Self-Regulated Learning (Y)	0,822	Reliabel

source: Compiled by the researcher (2026)

The table above demonstrates that the Cronbach's Alpha values for all variables are greater than 0.60. Assumptions for the Cronbach's Alpha test dictate that if the obtained Cronbach's Alpha value is greater than or equal to 0.6, the instrument is considered reliable (Wajdi et al., 2024).

4. Normality Test

Table 4. Normality Test

		Unstandardized Residual
N		72
Normal Parameters[a,b]	Mean	.0000000
	Std. Deviation	3.69822994
Most Extreme Differences	Absolute	.106
	Positive	.089
	Negative	-.106
Kolmogorov-Smirnov Z		.899
Asymp. Sig. (2-tailed)		.395

a. Test distribution is Normal.

b. Calculated from data.

source: Compiled by the researcher (2026)

Normality test results show a significance value of 0.395, exceeding the 0.05 threshold; therefore, the data is declared normally distributed and the normality assumption is satisfied. This outcome indicates that the data is suitable for analysis using parametric statistical methods and provides a sufficient basis for the reliability of further analysis results, as the data distribution shows no significant deviation from a normal distribution pattern (Ode et al., 2026).

5. Linearity Test

Table 5. Linearity Test

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
Y * X	Between Groups	(Combined)	839.634	17	49.390	3.696	.000
		Linearity	590.259	1	590.259	44.166	.000
		Deviation from Linearity	249.375	16	15.586	1.166	.324
	Within Groups		721.686	54	13.365		
	Total		1561.319	71			

source: Compiled by the researcher (2026)

Linearity test results show a significance value of 0.00, indicating that the relationship between variables meets the linearity criteria as it falls below the 0.05 threshold. However, assessment should not rely solely on this value; the deviation from

linearity value must also be considered to strengthen the interpretation. If the deviation from linearity value exceeds 0.05, no significant deviation from a straight-line pattern exists, allowing the relationship between variables to be understood as strictly linear and suitable for parametric analysis requiring linearity assumptions (Haryanti & Maknunah, 2025).

6. Heteroscedasticity test

Heteroscedasticity test results using a scatterplot demonstrate that the data points are spread randomly without forming a regular pattern. This condition indicates that the residual variance remains relatively constant across various predictor values, thus showing no indication of heteroscedasticity within the regression model. Consequently, the model is considered to meet the homoscedasticity assumption and is suitable for further analysis, as the residual distribution pattern aligns with the characteristics of homoscedasticity (Kusumastuti et al., 2026).

7. Digital Literacy Among University Students

Based on the descriptive analysis, the digital literacy level of students in the Library and Information Science Study Program is categorized as High. This is evidenced by the mean score obtained from 72 respondents.

Table 6. Descriptive Statistics Digital Literacy

Variable	N	Mean	Std. Deviation	Category
Digital Literacy (X)	72	39.26	4.305	High

source: Compiled by the researcher (2026)

To provide a more detailed view, the following table breaks down the achievement of each indicator within the Digital Literacy variable.

Table 7. Mean Score and Category

Indicator	Mean Score	Category
Technical Aspect	3.52	Very High
Cognitive Aspect	3.11	High
Social-Emotional Aspect	3.22	High

source: Compiled by the researcher (2026)

8. Self-Regulated Learning Among University Students

The level of Self-Regulated Learning (SRL) among students also falls into the High category. Students demonstrate a strong capability to manage their own learning processes independently.

Table 8. Descriptive Statistics Self-Regulated Learning

Variable	N	Mean	Std. Deviation	Category
Self-Regulated Learning (Y)	72	37.40	4.689	High

source: Compiled by the researcher (2026)

The distribution of scores across the SRL indicators is presented in the table below:

Table 9. Mean Score and Category

Indicator	Mean Score	Category
Metacognition	3.02	High
Motivation	3.26	Very High
Behavior	3.04	High

source: Compiled by the researcher (2026)

9. Simple Linear Regression Analysis

Table 10. Simple linear regression analysis

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	11.107	4.055		2.739	.008
	X	.670	.103	.615	6.523	.000

a. Dependent Variable: Y

source: Compiled by the researcher (2026)

Simple linear regression analysis results yielded a constant value of 11.107 and a regression coefficient of 0.670, forming the regression equation Y = 11.107 + 0.670X. This equation demonstrates that when digital literacy is at zero, self-regulated learning remains at 11.107, and every one-unit increase in digital literacy is followed by a 0.670 increase in self-regulated learning. The positive coefficient direction indicates a unidirectional relationship

(Qudratullah, 2025), suggesting that higher levels of digital literacy correspond to a proportional increase in self-regulated learning tendencies.

10. T-test

T-test results yielded a $t_{calculated}$ value of 6.523 with a significance level of 0.000, which is lower than 0.05, thereby indicating that the digital literacy variable exerts a significant influence on self-regulated learning. This value not only confirms the existence of an influence but also demonstrates that the established relationship is statistically strong, suggesting that changes in digital literacy tend to be followed by substantial and empirically justifiable changes in self-regulated learning (Setyaedhi et al., 2025).

11. Regression Coefficient

Analysis results show a regression coefficient of 0.670, indicating that digital literacy has a positive influence on self-regulated learning. This value implies that every increase in digital literacy will be followed by a unidirectional increase in self-regulated learning; thus, superior digital literacy skills correspond to an increased tendency in the ability to regulate learning independently (Prastowo, 2022).

12. Coefficient of Determination

Table 11. Coefficient of Determination

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.615[a]	.378	.369	3.725

a. Predictors: (Constant), X

b. Dependent Variable: Y

source: Compiled by the researcher (2026)

Model summary analysis results yielded a coefficient of determination (R Square) of 0.378. This value demonstrates that the digital literacy variable is capable of explaining 37.8% of the variance in self-regulated learning. Consequently, the contribution of digital literacy to changes in self-regulated learning falls within the moderate category and holds a significant role in the research model. Meanwhile, 62.2% of the variation in self-regulated learning is influenced by other factors not included in this study's model. This indication suggests the existence of other relevant variables with potential influence, which could be considered in future research to obtain a more comprehensive overview (Kurniawan, 2026).

DISCUSSION

The findings of this study reveal that students of the Library and Information Science Study Program at Universitas Negeri Padang possess "high" to "very high" levels of both digital literacy and self-regulated learning. Specifically, the digital literacy variable (mean = 39.26) is dominated by the technical aspect (3.52), indicating that students are highly proficient in operating digital hardware and navigating academic software. However, a critical gap was identified in the cognitive dimension (3.11); while students are technically skilled, they often struggle to critically evaluate the scientific validity and credibility of internet-based sources. Furthermore, in the social-emotional aspect (3.22), students demonstrate strong academic ethics but face significant challenges in managing digital distractions, such as social media, which often disrupt their focus during independent study. Regarding self-regulated learning (mean = 37.40), the motivation aspect recorded the highest achievement (3.26), reflecting a robust "effort-outcome belief" where students recognize that their academic success is a direct result of their learning persistence. Nevertheless, the research highlights crucial weaknesses in metacognitive (3.02) and behavioral (3.04) indicators. Students often start their learning process without systematic planning and show a frequent tendency toward academic procrastination, delaying assignments until the final deadlines. The simple linear regression analysis ($Y= 11.107 + 0.670X$) with a significance value of $p = 0.000 < 0.05$ confirms that digital literacy is a significant predictor of self-regulated learning. With a coefficient of determination ($R^2= 0.378$), digital literacy contributes 37.8% to students' self-regulation capabilities. This suggests that as students become more adept at managing digital information, their ability to independently plan, monitor, and evaluate their learning increases proportionally.

The results of this study strongly align with the research conducted by Sestiani et al. (2022), which suggests that digital literacy interventions can effectively enhance students' self-regulation. While Sestiani utilized an experimental approach, this study provides descriptive and inferential reinforcement of that relationship. Furthermore, these findings are consistent with Mirmoadi and Satwika (2022) and Suci and Razak (2024), both of whom identified a positive correlation between digital literacy and independent learning. However, this study offers a more nuanced contribution by focusing on the Library and Information Science context. Unlike previous studies that reported lower correlation strengths, this research demonstrates a substantial 37.8% influence. This discrepancy suggests that for students in information-centric disciplines, digital literacy is not just a

general skill but a core competency that directly dictates the quality of their self-regulated learning. While digital literacy is a major factor, the remaining 62.2% influence from external factors—as mentioned in prior studies—confirms that self-regulation is a multifaceted construct that requires holistic support.

The implications of these findings are twofold. First, they suggest that academic success in a digital-based curriculum is heavily dependent on a student's ability to move beyond basic technical operation toward high-level cognitive evaluation. For the Library and Information Science Study Program, this study serves as a recommendation to integrate critical information literacy more deeply into the curriculum. Second, the positive regression coefficient indicates that any investment in digital literacy training will yield a direct improvement in student independence. Faculty members should focus on teaching metacognitive strategies—such as digital goal setting and time management—to help students mitigate the behavioral weaknesses and procrastination habits identified in this research. Despite the significant insights provided, this study has certain limitations. The coefficient of determination (R^2= 0.378) implies that 62.2% of the variance in self-regulated learning is influenced by variables outside the scope of this research, such as individual learning styles, family support, and psychological resilience. Additionally, because the sample was drawn exclusively from one study program at Universitas Negeri Padang, the results may not be fully generalizable to students in non-information-related fields. Future research should consider a longitudinal approach or a mixed-methods design to capture the evolving nature of digital literacy and its long-term impact on academic self-regulation.

CONCLUSION

Based on the research findings regarding the influence of digital literacy on the self-regulated learning of students in the Library and Information Science Study Program at Universitas Negeri Padang, the following conclusions are drawn: (1) the level of students' digital literacy is categorized as high to very high, with a mean score of 39.26, where the technical aspect is in the very high category (3.52), while the cognitive (3.11) and social-emotional (3.22) aspects are in the high category, indicating strong proficiency in utilizing digital technology despite a tendency within the cognitive aspect to use information without optimal verification; (2) the level of self-regulated learning is also categorized as high to very high, with a mean score of 37.40, where the motivation aspect is very high

(3.26), while metacognition (3.02) and behavior (3.04) are high, reflecting generally good independent learning abilities although weaknesses remain in learning planning strategies and a tendency toward procrastination; (3) digital literacy has a positive and statistically significant effect on self-regulated learning, contributing 37.8% to its variance, with a regression coefficient of 0.670 indicating a unidirectional relationship. This study contributes to the existing body of knowledge by providing empirical evidence that digital literacy plays a crucial role not only in technical competencies but also in enhancing students' capacity to manage their learning processes independently. For future research, it is recommended to explore additional factors influencing self-regulated learning, such as intrinsic motivation, learning environment, and social support, in order to obtain a more comprehensive understanding of the determinants of students' independent learning.

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