

Research Articles

The Influence of Digital Literacy on Learning Independence Mediated by Students' Self-Efficacy at SMKN 31 Jakarta

Amanda Anasty^{1*}, Roni Faslah², Maulana Amirul Adha³

¹Universitas Negeri Jakarta ;E mail : anastyamanda991@gmail.com

²Universitas Negeri Jakarta ;E mail : ronifaslah@unj.ac.id

³Universitas Negeri Jakarta ;E mail : maulanaamirul@unj.ac.id

* Author correspondence: Amanda Anasty

Abstract. There are demands in the 21st century in the use of information and communication technology in everyday life, one of which is in education. Education today requires students to not only master basic knowledge, but also have the competence to learn independently, think critically, and be technologically literate. This study aims to determine the contribution of digital literacy to learning independence through self-efficacy. This study uses quantitative methods with primary data collected through questionnaires using Google Forms. This study involved 245 students as samples, selected using proportionate stratified random sampling technique. This study used SEM-PLS data analysis using measurement model analysis (outer model), structural model analysis (inner model), and direct and indirect hypothesis testing. The results of the research analysis showed several significant findings. (1) There is a positive and significant direct influence between digital literacy on learning independence. (2) There is a positive and significant direct influence between digital literacy on self-efficacy. (3) There is a positive and significant direct influence between self-efficacy on learning independence. (4) There is a positive and significant indirect influence between digital literacy on learning independence through self-efficacy

Keywords: Self-Efficacy, Learning Independence, Digital Literacy

1. Background

Education is a fundamental right and a crucial foundation for national quality and character, shaping individuals who are intelligent behaviorally, emotionally, and spiritually (Chandra, 2023). The 21st century necessitates the use of information and communication technology, especially in education. The importance of 21st-century learning for producing qualified and competitive human resources drives the development of essential learning skills, as advancements in technology and information now require every individual to possess adaptive skills (Mardhiyah et al., 2021). This century is filled with challenges from digital media and electronic information, demanding innovative approaches in education. The focus is not only on academic knowledge but also on developing 4C skills: critical thinking, collaboration, communication, and creativity (Fahri, 2025). While technology facilitates education, its negative impacts, such as online game addiction and access to harmful information, also warrant attention (Maritsa et al., 2021).

Learning independence, defined as the ability to monitor and regulate one's learning environment and behavior (Zimmerman, 1989), is a vital 21st-century competency. This skill can be developed, influenced by environmental, behavioral, and internal factors like self-belief and motivation (Bandura, 1986; Hariyadi et al., 2023). Indicators of learning independence include initiative, diagnosing learning needs, setting goals, viewing difficulties as challenges, utilizing resources, selecting strategies, evaluating, and self-efficacy (Masitoh et al., 2024). Internal factors (intrinsic motivation,

Received: May 02, 2025

Revised: May 16, 2025

Accepted: June 30, 2025

Online Available: July 09, 2025

Curr. Ver.: July 09, 2025



Hak cipta: © 2025 oleh penulis.
Diserahkan untuk kemungkinan
publikasi akses terbuka
berdasarkan syarat dan ketentuan
lisensi Creative Commons
Attribution (CC BY SA) (
<https://creativecommons.org/licenses/by-sa/4.0/>)

self-efficacy, time management) and external factors (family support, school environment, availability of digital learning resources) also influence it.

Digital literacy, the ability to use digital tools and information effectively and responsibly (Redhana, 2024), is increasingly central to education. This includes basic computer operation, critical thinking for evaluating information, and problem-solving in the digital world. However, Indonesia faces significant challenges; PISA 2022 results showed low reading literacy scores, indicating weaknesses in comprehension and critical thinking skills (OECD, 2022). Digital literacy extends beyond access to information, encompassing an understanding of how to use digital platforms for learning (Dashtestani et al., 2022), including evaluating content credibility (Mufaizah et al., 2024). A lack of effective information searching and evaluation skills hinders the optimal utilization of digital resources for independent learning (Rahmy et al., 2023; Siregar, 2024). Digital literacy indicators include internet search, hypertext navigation guidance, content evaluation, and knowledge construction (Fauzi et al., 2023).

Self-efficacy, as an individual's belief in their ability to complete tasks and overcome challenges (Hidayat et al., 2022), is crucial for student success. High self-efficacy leads to greater confidence, perseverance, and a focus on problem-solving. It influences emotional management and motivation, fostering effective learning strategies and academic resilience (Hendra et al., 2024).

Preliminary research at SMKN 31 Jakarta revealed challenges in student learning independence. Most students (73.3%) did not demonstrate learning independence, with many (53.3% neutral, 40% disagree) showing low initiative in independently seeking learning resources. Additionally, 66.6% of students doubted their own abilities in completing academic tasks, indicating low self-efficacy. Although the majority of students (93.3%) had access to technology, most were not able to use it productively for academic purposes. Only 60% could find appropriate learning sites, and 53.3% could identify reliable online information, indicating a need for improved critical information evaluation skills. This suggests a disconnect between technology access and its effective use for independent learning, driven by low student initiative and self-efficacy (Supiani et al., 2023).

Given these issues, this study aims to explore the direct and indirect influence of Digital Literacy on Learning Independence, mediated by Students' Self-Efficacy at SMKN 31 Jakarta. Unlike previous research focusing solely on direct relationships, this study specifically examines the mediating role of self-efficacy to deepen the understanding of how digital literacy impacts learning independence, which is particularly relevant for vocational high school students preparing for the workforce. Specifically, this research will analyze the direct influence of digital literacy on learning independence, the influence of digital literacy on self-efficacy, the influence of self-efficacy on learning independence, and test the mediating role of self-efficacy in the relationship between digital literacy and student learning independence.

2. Theoretical Study

2.1 Learning Independence

Independence is not only for adults, but every student must also develop their independence according to their capacity and level of development (Widyastuti, 2021). Learning independence must be possessed by every student with the aim that students can learn according to their desires, hopes and motivations (Banat, 2020). The characteristics of independent students according to Mudjiman (2007) include the ability to solve problems, not depend on teachers, utilize various sources and media, be confident, work hard, utilize time, be responsible, and be able to solve problems. Indicators of learning independence include learning initiatives, diagnosing learning needs, setting goals, viewing difficulties as challenges, utilizing relevant sources, choosing strategies, evaluating processes and results, and self-efficacy. According to Masitoh et al (2024) there are 8 indicators, namely learning initiatives, examining learning needs, determining learning goals, viewing difficulties as challenges, utilizing or seeking relevant learning sources, implementing learning strategies, evaluating the learning outcome process, and self-efficacy.

2.2 Digital Literacy

Digital literacy is defined by Paul Gilster (1997) as the ability to understand and use a variety of information from various sources accessed via a computer. Bawden added that digital literacy is rooted in computer literacy and information literacy. More broadly, digital literacy includes the ability to use digital technology and information efficiently and effectively in a variety of professional and academic contexts. This is not only about accessing online information but also understanding the use of digital platforms to support learning, as well as the ability to distinguish valid information from less accurate information, evaluate the credibility of sources, and compare with trusted sources. Indicators of digital literacy according to Paul Gilster include: (1) internet searches, (2) hypertext directional guides, (3) content and information evaluation, and (4) knowledge compilation.

2.3 Self-Efficacy

Self-efficacy theory comes from the social learning theory proposed by Bandura (1997) (in Laily, N et al. 2018) stating that "Perceived self-efficacy refers to beliefs in one's capabilities to organize and execute the course of action required to produce given attainments". Self-efficacy is an individual's perception of their belief in their ability to carry out the expected action. Self-efficacy beliefs can influence the choice of actions to be taken, the amount of effort and resilience when faced with obstacles or difficulties. Individuals with high self-efficacy choose to make greater efforts and never give up.

There are 3 dimensions of self-efficacy, namely magnitude, generality, and strength. Magnitude is the level of a person in believing in the efforts or actions that he can do. Generality is the flexibility of the form of self-efficacy that a person has to be used in other different situations. Strength is self-confidence that exists in a person that can be manifested in achieving a certain performance. The higher a person's self-efficacy, the higher the level of a person's adjustment to the situation faced.

3. Research Methods

This research is quantitative research with a descriptive and associative approach. The design of this study aims to test the influence between predetermined variables. The population of the study was 636 students of SMKN 31 Jakarta. The research sample involved 245 students, selected using the proportionate stratified random sampling technique. Data were collected through a questionnaire distributed using Google Form with a Likert scale. The Likert scale is used to measure respondents' attitudes, opinions, and perceptions of social phenomena. The questionnaire consists of closed questions or statements with five answer choices: Strongly Agree (SS), Agree (S), Undecided (RG), Disagree (TS), and Strongly Disagree (STS). Data analysis includes descriptive analysis to describe the data in general and statistical analysis using the Structural Equation Model (SEM) based on Partial Least Square (PLS) with the help of SmartPLS 4.0 software, to test the measurement model (Outer Model) and structural model (Inner Model), as well as direct and indirect hypothesis testing.

4. Results And Discussion

4.1 Research Results

4.1.1 Outer Model

The outer model consists of validity and reliability tests. The resulting factor loading value if > 0.70 can be said to be valid. Cronbach's alpha coefficient is used to test reliability. Measurement is said to be reliable if the Cronbach's alpha value (α) > 0.70 . The following are α the loading factors and Cronbach's alpha values of each variable:

- a. Digital Literacy has four indicators with loading factor values of 0.718 - 0.862 and a reliability value of 0.979.
- b. Self-efficacy has three indicators with loading factor values of 0.753 - 0.886 and a reliability value of 0.978.

- c. Learning independence has eight indicators with a loading factor value of 0.736 – 0.867 and a reliability value of 0.986.

Table 1 Average Variance Extracted (AVE)

Variables	Average Variance Extracted (AVE)
Digital Literacy (X1)	0.636
Self-Efficacy (X2)	0.677
Learning Independence (Y)	0.636

Source: Data processed by researchers (2025)

Based on Table 1, it is known that the AVE value of the Digital Literacy variable (X1) is 0.636, Self-Efficacy (X2) is 0.677, Learning Independence (Y) is 0.636. Based on these results, all research variables have met the requirements > 0.5 and it can be said that the measurement items of this variable have convergent validity.

4.1.2 Inner Model

The inner model is a continuation of the outer model test. Further research with hypothesis testing is compiled by looking at the R-Square, F-Square, Q^2 Predictive Relevance, and Variant Inflation Factor (VIF). Here is a picture of the inner model.

Table 2 R-Square (R²)

Variables	R-square
Self-Efficacy (X2)	0.150
Learning Independence (Y)	0.540

Source: Data processed by researchers (2025)

The criteria for R-Square are 0.67 for the strong model value category, 0.33 for the medium model value category, and 0.19 for the weak model value category. Based on Table 2, the R-Square value for the Self-Efficacy variable is 0.150, which means that the Digital Literacy variable is able to explain the variance of the dependent variable Self-Efficacy by 15%. and is included in the weak category, while 85% is influenced by other factors not examined in this study. Meanwhile, the R-Square value for the latent variable Learning Independence is 0.540, and is included in the strong category, which means that the Digital Literacy and Self-Efficacy variables are able to explain the variance of the dependent variable Learning Independence by 54%.

Table 3 F-Square (F²)

Variables	Literacy (X1)	Self-Efficacy (X2)	Learning Independence (Y)
Digital Literacy (X1)		0.176	0.232
Self-Efficacy (X2)			0.502
Learning Independence (Y)			

Source: Data processed by researchers (2025)

Based on Table 3, variable X1 against X2 and variable have a medium relationship effect with values of 0.176 and 0.232 respectively. Variable X2 against Y has a large relationship effect with a value of 0.502.

Table 4 Q-Square Predictive Relevance (Q²)

Variables	Q ² Predictive Relevance
Learning Independence (Y)	0.520

Source: Data processed by researchers (2025)

Based on Table 4, it is known that the Q-Square for the Learning Independence variable is 0.520, which means that the variable has a high predictive relevance value and is able to predict the dependent variable.

Table 5 Path Coefficient

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
X1 -> X2	0.387	0.393	0.055	6.973	0.000
X1 -> Y	0.354	0.356	0.067	5.249	0.000
X2 -> Y	0.521	0.522	0.059	8,826	0.000

Source: Data processed by researchers (2025)

Based on Table 5, the results of the hypothesis test are as follows:

1. H1: Digital Literacy Has a Direct Influence on Learning Independence

The first hypothesis tests the direct influence of Digital Literacy (X1) on Learning Independence (Y). The path coefficient value (original sample) digital literacy on learning independence is 0.354, which is positive, which means that digital literacy has a positive effect on learning independence. Increasing X1 units will increase Y by 35.4%. Based on bootstrapping calculations, the estimated coefficient value is 0.356, t-statistic 5.249 > 1.96, and p-value 0.000 < 0.05. It is concluded that digital literacy has a direct and significant effect on learning independence. Based on these results, the results obtained are that digital literacy has a positive and significant effect on learning independence (hypothesis accepted). The higher the digital literacy, the more learning independence will increase.

2. H2: Digital Literacy Has a Direct Influence on Self-Efficacy

The second hypothesis tests the effect of Digital Literacy (X1) on Self-Efficacy (X2). The path coefficient value (original sample) of Digital Literacy is 0.387, which is positive, which means that Digital Literacy has a positive effect on Self-Efficacy. An increase in X1 units will increase X2 by 38.7%. Based on bootstrapping calculations, the estimated coefficient value is 0.393, t-statistic 6.973 > 1.96, and p-value 0.000 < 0.05. It is concluded that Digital Literacy has a direct and significant effect on Self-Efficacy. Based on these results, the results obtained are that Digital Literacy has a positive and significant effect on Learning Independence (hypothesis accepted). The higher the Digital Literacy, the higher the Self-Efficacy.

3. H3: Self-Efficacy Has a Direct Influence on Learning Independence

The third hypothesis tests Self-Efficacy (X2) against Learning Independence (Y). The path coefficient value (original sample) Self-Efficacy is 0.521, which is positive, which means that Self-Efficacy has a positive effect on Learning Independence. An increase in X2 units will increase Y by 52.1%. Based on bootstrapping calculations, the estimated coefficient value is 0.522, t-statistic 8.826 > 1.96, and p-value 0.000 < 0.05. It is concluded that Self-Efficacy has a direct and significant effect on Learning Independence. Based on these results, the results obtained are that Self-Efficacy has a positive and significant effect on Learning Independence (hypothesis accepted). The higher the Self-Efficacy, the higher the Learning Independence

Table 6 Specific Indirect Effects

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
X1 -> X2 -> Y	0.202	0.205	0.038	5.265	0.000

Source: Data processed by researchers (2025)

4. **H4: Self-Efficacy Plays a Mediating Role in the Influence of Digital Literacy on Learning Independence.**

Based on the results of the mediation test in Table 4.16, it is known that the indirect effect of Digital Literacy (X1) on Learning Independence (Y) through Self-Efficacy (X2) is 0.202 (original sample column) meaning that there is a positive effect of X1 on Y through X2. An increase in X1 units will increase Y through X2 by 20.2%. Based on the bootstrapping calculation, the estimated coefficient value is 0.205, t-statistic $5.265 > 1.96$, and p-value $0.000 < 0.05$. It is concluded that self-efficacy significantly mediates the relationship between digital literacy and learning independence. In other words, digital literacy indirectly significantly affects learning independence through self-efficacy. The higher the Digital Literacy, the Learning Independence through Self-Efficacy will also increase.

4.2 Discussion

1. **H1: Digital Literacy Has a Direct Influence on Learning Independence**

It can be concluded that the Digital Literacy variable has a direct and significant positive effect on Learning Independence. The higher the level of digital literacy, the higher the level of student learning independence. Conversely, a lower level of digital literacy results in a lower level of learning independence among students. The results of this hypothesis test are consistent with research conducted by Wahyuni et al. (2021) which states that digital literacy affects student learning independence. Students who have high literacy will have high learning independence. According to research by Riswan et al. (2024), digital literacy has a significant and positive effect on learning independence. Students with a high level of digital literacy can use digital technology, use various learning resources, and adjust their learning time and strategies according to their needs. In line with research by Amin et al. (2023) in his research showed that digital literacy skills play an important role in encouraging learning independence, because students who have the ability to access information and learning resources through digital media tend to be more able to learn independently without relying entirely on teacher teaching.

2. **H2: Digital Literacy Has a Direct Influence on Self-Efficacy**

Can be concluded that the Digital Literacy variable has a direct and significant effect on Self-Efficacy. The higher an individual's level of digital literacy, the higher their self-efficacy. Results study according to Adha (2022), digital literacy has an impact positive and significant to attitude self-efficacy students. This show that if digital literacy increases, then efficacy myself will also increased. The research conducted by Amin et al. (2023) stated that students who have skills more digital literacy good own trust a better self big. Digital literacy allows student think more critical and creative because ability for search, filter, and analyzing the data. The same results were also obtained by Nika et al. (2022) in his research, if somebody own level efficacy high self, then own more digital literacy high. On the other hand, if somebody own level efficacy a better self low, then digital literacy will more low.

3. **H3: Self-Efficacy Has a Direct Influence on Learning Independence**

Can concluded that variable Self-Efficacy influential positive in a way direct and significant to Independence Learning. The higher the self-efficacy possessed by students, the higher their level of learning independence. Results study Karmila et al. (2021) showed that there is influence significant positive from self-efficacy to learning independence students. Students with level efficacy a better self tall tend own independence learn more good. In line with study Adnyana (2023) stated that that students who have level efficacy a better self tall will own level independence learn more high too. So tall low self-efficacy owned student will can increase or lower learning independence students. And self-efficacy becomes wrong one factors that can influence learning independence student, because without efficacy high self, learning independent no will created. Students with efficacy high self can face and finish task and work difficult given by the teacher.

4. **H4: Self-Efficacy Plays a Mediating Role in the Influence of Digital Literacy on Learning Independence.**

Self-Efficacy was found to significantly mediate the relationship between Digital Literacy and Learning Independence, indicating that Digital Literacy indirectly influences Learning Independence through Self-Efficacy. This means that higher Digital Literacy leads to

increased Learning Independence, facilitated by Self-Efficacy. This finding is consistent with previous research demonstrating that Digital Literacy positively and significantly enhances Self-Efficacy (Kusyanti et al., 2024; Sari, N., et al., 2025). Furthermore, Self-Efficacy has been shown to positively and significantly impact Learning Independence (Goutama et al., 2023; Patras et al., 2021; Adnyana, 2023). Therefore, effective Digital Literacy not only equips students with essential digital skills but also boosts their self-belief (Self-Efficacy) to effectively utilize these skills, ultimately fostering greater Learning Independence.

5. Conclusion And Suggestions

5.1 Conclusion

Based on the results of the research that has been conducted on the Influence of Digital Literacy on Learning Independence with Student Self-Efficacy Mediation at SMKN 31 Jakarta Students, it can be concluded as follows:

1. Digital literacy has a direct positive and significant effect on learning independence. The direction of the positive relationship indicates that the better digital literacy, the more learning independence will increase.
2. Digital Literacy has a direct, positive and significant effect on Self-Efficacy. The positive direction of the relationship indicates that the better digital literacy, the more self-efficacy will increase.
3. Self-Efficacy has a direct, positive and significant effect on Learning Independence. The direction of the positive relationship indicates that the better Self-Efficacy, the more Learning Independence will increase.
4. Self-Efficacy was found to positively and significantly mediate the relationship between Digital Literacy and Learning Independence. This means that Digital Literacy indirectly influences Learning Independence in a positive and significant way through Self-Efficacy. The positive direction of this relationship indicates that as Digital Literacy improves, Learning Independence will also increase, facilitated by Self-Efficacy.

5.2 Implications

5.2.1 Theoretical Implications

Possessing only access to and technical digital skills is insufficient to foster learning independence; students also need to have a strong belief in their ability to effectively use these digital tools in the learning process. This means not only equipping students with skills, but also psychologically empowering them to become active and autonomous learners within the digital ecosystem.

5.2.2 Practical Implications

The research findings indicate that Learning Independence (Y) achieved its highest average on item Y.4, "When I receive a low exam score, I am motivated to study harder." This suggests students possess a strong intrinsic drive for self-improvement after experiencing setbacks, which is a crucial asset for learning independence. Consistently, for the Digital Literacy (X1) variable, item X1.4, "Discussions of material available on the internet greatly help me in learning," obtained the highest average, confirming that students actively acknowledge and utilize the internet as a vital learning resource. Equally important, item X2.8 from the Self-Efficacy (X2) variable, "Being diligent in studying is important to me," also scored the highest average, demonstrating students' high awareness of the significance of commitment and seriousness in the learning process.

This highlights a substantial existing potential for fostering student learning independence that needs to be optimized. Students, who have already shown internal motivation for improvement and an awareness of the importance of diligent study, should be continuously encouraged to proactively integrate online materials into their learning processes. This means training them not only to access information but also to independently evaluate, analyze, and synthesize it to solve problems or deepen their understanding of material, especially when encountering difficulties. Consequently, diligent study can manifest as an initiative in digital exploration and enhanced digital literacy, which will further strengthen their independence in managing their learning.

5.3 Research Limitations

In this study there are limitations that can be considered in compiling subsequent research. The limitations of the study are as follows:

1. The research is limited to only two variables that influence learning independence.
2. The research results are shown only in the schools studied. It is better if the research results can be useful for other schools in general.
3. This study examines students' learning independence with respondents being the students themselves, so it is possible that it does not describe the actual situation.

5.3 Recommendations for Study Furthermore

Based on several limitations experienced by researchers, there are several suggestions for further researchers. The suggestions given are as follows:

1. Further research can add other variables that can influence learning independence, such as social support, learning styles, disciplinary attitudes, and so on.
2. Further research is needed to examine the influence of digital literacy on learning independence through student self-efficacy as an intervening variable on a larger scale, both in terms of sample, population, and research location.
3. Further research examining students' learning independence can take respondents outside of students, to obtain a more comprehensive picture related to students' learning independence.
4. Based on the findings that the lowest average response for the Learning Independence item was "I complain when I have to study because it's difficult to understand," indicating students' lack of initiative, enthusiasm, and quick surrender when facing difficult material; for Digital Literacy, it was "I know the function and use of hypertext (directional links)," showing a suboptimal understanding of technical digital navigation; and for Self-Efficacy, it was "If I get difficult exam questions, it makes me panic," meaning students need stronger mental resilience and better emotional management when facing academic challenges; then future research can focus on three directions. First, studies could investigate effective strategies to enhance students' learning initiative and persistence when encountering difficult material, possibly through metacognition-based interventions or a growth mindset approach. Second, research could develop and test basic digital literacy training modules that focus on understanding technical functionalities, such as hypertext navigation, to strengthen students' competence in digital environments. Third, studies could design and evaluate programs aimed at reducing academic panic and building student self-efficacy in facing exam challenges, for instance, through stress management techniques or problem-solving training under pressure.

Reference

- [1.] Adha, A. M., "The effect of self-regulated learning and digital literacy on the learning outcomes of economics subjects in students with self-efficacy as an intervening variable," *Journal of Economic, Office, and Accounting Education*, vol. 3, no. 3, pp. 303–320, 2022. [Online]. Available: <https://doi.org/10.21009/jpepa.0303.20>
- [2.] Adnyana, I. M. P., "The Influence of Self-Efficacy and Learning Motivation on Learning Independence (Case Study of STABN Sriwijaya Tangerang Banten Students)," *JIM: Scientific Journal of History Education Students*, vol. 8, no. 4, pp. 5457–5468, 2023.
- [3.] Amin, F., Khasanah, N., and Achmad, C. A., "The Influence of Digital Literacy Independence on Students' Self-Efficacy and Learning Independence," *BIO-EDU: Journal of Biology Education*, vol. 8, no. 3, pp. 177–183, 2023. [Online]. Available: <https://doi.org/10.32938/jbe.v8i3.3824>
- [4.] Anshori, M. I., "Problem Solving Ability Reviewed From Student Learning Independence In Problem Solving Learning Assisted By Schoology," *Jurnal Prasasti Ilmu*, vol. 2, no. 1, pp. 54–59, 2022. [Online]. Available: <https://doi.org/10.24176/jpi.v2i1.6393>
- [5.] Baihaqi, A. I., and Ikaningtyas, M., "Measuring Self-Efficacy, Self-Concept and Learning Motivation After Participating in Thematic KKN Mbkm in Forming Student Learning Independence," *Journal Publicuho*, vol. 5, no. 3, pp. 887–898, 2022. [Online]. Available: <https://doi.org/10.35817/publicuho.v5i3.17>
- [6.] Banat, A., and Martiani, M., "Learning Independence of Physical Education Students Using Google Classroom Media Through Hybrid Learning in Professional Education Learning During the Covid-19 Pandemic," *Journal of*

- Educational Technology (JTP), vol. 13, no. 2, p. 119, 2020. [Online]. Available: <https://doi.org/10.24114/jtp.v13i2.20147>
- [7.] Chandra, A., "The National Education System Law as a Legal Umbrella for Education in Indonesia," *JHIP - Scientific Journal of Educational Sciences*, vol. 6, no. 4, pp. 2715–2720, 2023. [Online]. Available: <https://doi.org/10.54371/jiip.v6i4.1890>
- [8.] Darwin, M., et al., *Quantitative Approach Research Methods*, Indonesian Science Media, 2021.
- [9.] Dashtestani, R., and Hojatpanah, S., "Student Digital Literacy Measure," *PsycTests Dataset*, 2022. [Online]. Available: <https://doi.org/10.1037/t89558-000>
- [10.] Fahri, M. R. S., "Innovative Education in the 21st Century: Realizing Meaningful and Sustainable Learning," *Journal of Elementary, Secondary & Vocational Education*, vol. 1, no. 3, pp. 33–38, 2025. [Online]. Available: <https://artmediapub.id/index.php/IPDMK/article/view/91>
- [11.] Fauzi, N. F., and Usmeldi, U., "Analysis of Digital Literacy Skills of Vocational High School Students," *Ranah Research: Journal of Multidisciplinary Research and Development*, vol. 4, no. 2, pp. 173–180, 2022. [Online]. Available: <https://doi.org/10.38035/rrj.v4i2.466>
- [12.] Ginting, R. V., et al., "Digital Literacy as a Form of Community Empowerment in the Era of Globalization," *Pasopati Journal*, vol. 3, no. 2, pp. 118–122, 2021. [Online]. Available: <https://doi.org/10.14710/pasopati.2021.10869>
- [13.] Goutama, E., Nurjanah, S., and Pratama, A., "The Effect of Student's Digital Literacy and Self-Efficacy on Students Learning Independence with Learning Motivation as an Intervening Variable," *Romeo Review of Multidisciplinary Educational Culture and Pedagogy*, vol. 3, no. 1, pp. 125–136, 2024. [Online]. Available: <https://doi.org/10.55047/romeo.v3i1.1013>
- [14.] Gusnita, G., Melisa, M., and Delyana, H., "Student Learning Independence Through Cooperative Learning TPSQ," *Absis Journal: Journal of Mathematics and Mathematics Education*, vol. 3, no. 2, pp. 286–296, 2021. [Online]. Available: <https://doi.org/10.30606/absis.v3i2.645>
- [15.] Halimah, L., et al., "Implementation of 21st Century Learning for MGMP Teachers in Subang Regency," *Journal of Community Service (Bhakti Jivana)*, vol. 2, no. 1, pp. 1–16, 2025. [Online]. Available: <https://ojs.forumkomunikasidosen.org/index.php/jurnal-bhakti-jivana/article/view/22>
- [16.] Haliza, N., "The Influence of Digital Literacy, Self-Efficacy and Income Expectations on the Interest in Entrepreneurship in Students of the Faculty of Economics, State University of Jakarta Class of 2017," *Indonesian Journal of Economy, Business, Entrepreneurship and Finance*, vol. 2, no. 2, pp. 172–186, 2022.
- [17.] Handayani, N. N., "Improving Reading Literacy and Writing Literacy Through Digital Literacy in Elementary School Students in Buleleng District," *Pramana: Journal of Research Results*, vol. 2, no. 2, p. 125, 2022. [Online]. Available: <https://doi.org/10.55115/jp.v2i2.2686>
- [18.] Hariyadi, H., Misnawati, M., and Yusrizal, Y., *Realizing Learning Independence: Independent Learning as the Key to Success for Distance Learning Students*, STIEPARI Press Publishing Agency, 2023.
- [19.] Indriasari, I., and Nastiti, P. R., "The Influence of Digital Literacy, Entrepreneurial Knowledge and Family Environment on Students' Interest in Entrepreneurship with Self-Efficacy as an Intervening Variable," *Scientific Journal of Business Management and Creative Economy*, vol. 4, no. 2, pp. 12–26, 2025.
- [20.] Jacobson, T. E., "Promoting Student Learning and Digital Age Literacy Through Metaliteracy," *Academia Letters*, 2021. [Online]. Available: <https://doi.org/10.20935/al42>
- [21.] Karmila, N., and Raudhoh, S., "The Influence of Self-Efficacy on Students' Learning Independence," *Pedagonal: Scientific Journal of Education*, vol. 5, no. 1, pp. 36–39, 2021. [Online]. Available: <http://doi.org/10.1234/pedagonal.v5i1.1234>
- [22.] Kurniasih, N., et al., "Analysis of Independent Learning of Mathematics of High School Students in Grade XI During Distance Learning," *International Journal of Progressive Mathematics Education*, vol. 1, no. 2, pp. 117–126, 2021.
- [23.] Laily, N., and Wahyuni, D. U., *Self-Efficacy and Innovation Behavior*, 1st ed., Sidoarjo: Indomedia Pustaka, 2018. ISBN: 978-602-6417-78-7

- [24.] Masitoh, S., and Herman, T., “Learning Independence of Grade VII Students Based on Pedagogical Analysis of Mathematics Learning,” JPMI (Journal of Innovative Mathematics Learning), vol. 7, no. 2, pp. 365–376, 2024. [Online]. Available: <https://doi.org/10.22460/jpmi.v7i2.21643>