Cristal International Journal of Interdisciplinary Research
https://doi.org/ 10.64042/cijir.v2i1.22
https://cijir.cristaljournal.com/index.php/cijir/index

Volume 2 Issue 1 (2026) 1-11
E-ISSN 3080-4779 |

Project-Based Learning Combined with Library Visits and Its Influence on Digital Literacy in the Denpasar Area, Bali

GDA Wicaksana[1*], Ni Kadek Ayu Pradnya Paramitha[2], Herryanto[3], Fabian Bohm[4], Jacinto de Oliveira Junior[5], Agostinho dos Santos Gonçalves[6], Sebastião Pereira[7], Tibor Lovas[8], Muhammad Febrian Rachmadhan Amri[9]

[1]Retail Management, Business & Technology Faculty, Institute Desain dan Bisnis Bali, Indonesia
[2]Digital Business, Business & Technology Faculty, Institute Desain dan Bisnis Bali, Indonesia
[3]Five Smile Group, Germany
[4]University of Applied Sciences Darmstadt, Germany
[5]Instituto Superior Cristal, Timor Leste
[6]Instituto Superior Cristal, Timor Leste
[7]Instituto Superior Cristal, Timor Leste
[8]University of Economics Bratislava, Slovakia
[9]Information & Communication System, Business & Technology Faculty, Institute Desain dan Bisnis Bali

Corresponding Author: dharmaarya@idbbali.ac.id[1*]

ABSTRACT

Digital literacy has become a crucial competence in responding to the demands of 21st-century education, particularly in higher education settings where students are expected to critically access, evaluate, and utilize digital information. This study aims to examine the influence of Project-Based Learning (PjBL) integrated with library visiting activities on university students' digital literacy in Denpasar, Bali. The research employed a quantitative correlational design involving 100 undergraduate students from several higher education institutions in Bali during the 2024/2025 academic year. Data were collected through a structured questionnaire using a five-point Likert scale. The research instruments were validated using the Pearson Product–Moment correlation and tested for reliability using Cronbach's Alpha, which indicated high levels of validity and reliability for both variables. Simple linear regression analysis was conducted to test the research hypothesis. The results revealed that Project-Based Learning integrated with library visiting did not have a statistically significant effect on students' digital literacy, as indicated by a significance value of 0.851 (> 0.05). These findings suggest that although PjBL and library visits are theoretically associated with digital literacy development, their implementation in this context has not yet effectively enhanced students' digital literacy skills. The study highlights the importance of strengthening technology integration, optimizing digital library resources, and providing structured digital literacy training to ensure that project-based learning contributes meaningfully to the development of students' digital competencies.

Keywords: Project-Based Learning; Library Visiting; Digital Literacy; Higher Education; 21st-Century Skills

INTRODUCTION

In responding to the demands of 21st-century education, literacy is no longer understood merely as the basic ability to read and write. Instead, it has evolved into a comprehensive competence that encompasses the abilities to locate, evaluate, interpret, and communicate information across various media, particularly digital platforms that have become central to contemporary learning processes (Zuhri, Suwindia, & Winangun, 2024). Alongside the rapid advancement of science and technology, students' access to information has increased substantially. The internet, digital devices, and social media provide vast sources of information; however, they simultaneously require advanced literacy skills to ensure that students do not remain passive consumers of information but are able to critically and ethically produce and process knowledge.

Technological advancement has enabled students to obtain information more quickly and efficiently. A wide range of online educational resources, including scholarly articles, instructional videos, interactive modules, and AI-based learning tools, has made learning more dynamic and contextualized (Annisa et al., 2025). For instance, students can independently use search engines, tutorial videos, or collaborative platforms to address learning-related questions. Nevertheless, this ease of access presents significant challenges. While the abundance of information expands learning opportunities, insufficient digital literacy particularly the ability to critically evaluate sources may result in learning outcomes that are unreliable or even misleading (Costa et al., 2019).

Low levels of literacy competence can significantly affect the quality of information acquired by students. Learners who lack the ability to assess the credibility of sources tend to accept inaccurate information without adequate evaluation, which may lead to misconceptions and underdeveloped critical thinking skills. Moreover, limited knowledge of effective information-search strategies can cause students to spend excessive time on irrelevant search results, thereby constraining the overall quality of their learning experiences (Tandiwara, Erwing, & Asmah, 2025). Strong digital literacy is therefore essential to ensure that students not only locate information but also understand its context, relevance, and validity.

Accordingly, the development of digital literacy is widely regarded as a crucial priority in contemporary education. In various schools, digital literacy has become an integral component of instructional strategies aimed at equipping students with 21st-century skills such as critical thinking, creativity, and collaboration. Research indicates that digital literacy not only facilitates access to information but also supports higher thinking skills required in modern learning environments (Zuhri et al., 2024). These competencies extend beyond understanding digital content to include ethical technology use, digital safety, and the capacity to participate actively and responsibly in digital spaces.

Teachers play a pivotal role in shaping students' literacy development. Educators are no longer solely transmitters of knowledge but also facilitators who guide students through processes of information searching and evaluation. Effective instructional strategies may include project-based learning or task-based activities that integrate digital information retrieval to solve authentic problems, thereby embedding digital literacy within meaningful learning experiences (Lestari & Iryanti, 2024). Through such approaches, students are taught not merely how to use technology, but how to employ it critically and productively for learning purposes.

Furthermore, recent studies have demonstrated that the implementation of digital literacy across primary and secondary education levels has a positive impact on students' readiness to meet the challenges of 21st-century education. For example, research conducted at SD Negeri 81 Palembang revealed that integrating digital literacy into classroom instruction enhanced students' ability to locate and utilize information for academic tasks, as well as increased their engagement in learning activities (Diani, Andayani, Monika, Priana, & Ariska, 2025). Other studies have reported that the use of interactive learning media combined with digital literacy training for both students and teachers at the junior secondary level significantly improved digital skills (Muhlis et al., 2024). These findings underscore that digital literacy is not merely a supplementary element but a fundamental pillar of technology-integrated modern education.

The development of digital literacy also contributes to students' character education and social values. Research examining digital literacy within the context of character education in primary schools has found that digital literacy can be integrated into instructional programs to strengthen character values such as responsibility, cooperation, and ethical technology use (Longkutoy, Rorimpandey, & Pangkey, 2025). This evidence suggests that digital literacy extends beyond technical proficiency and provides an essential value-based foundation for the wise and ethical use of technology.

Despite its importance, challenges in developing digital literacy persist, particularly among university students in Indonesia, including those in Bali. One major challenge lies in disparities in literacy competence between students from urban and rural backgrounds, as well as across different socioeconomic groups. If left unaddressed, these disparities may widen learning gaps. Therefore, strengthening digital literacy must be aligned with efforts to cultivate a literacy culture that supports lifelong learning. Students should be trained not only to process information for academic purposes but also to apply it in real-life contexts, including future professional environments that increasingly rely on digital technology and information (Pratama, Ashari, Zulkarnain, & Sabrina, 2025). Digital literacy fosters critical dispositions, adaptability to technological change, and readiness to face challenges beyond the university setting, which can be facilitated through various instructional strategies, one of which is Project-Based Learning (PjBL).

Project-Based Learning (PjBL) has gained recognition as an effective pedagogical approach for enhancing higher-order thinking skills, collaboration, and problem-solving abilities. This model situates students in authentic contexts through project work that requires investigation, planning, and the creation of tangible products as concrete representations of conceptual understanding. Recent studies indicate that the implementation of PjBL improves students' collaborative skills and active engagement, particularly within the framework of the "Kurikulum Merdeka", which emphasizes learner-centered instruction (Fazhari et al., 2023). These findings are consistent with other research confirming that PjBL significantly increases learning motivation through structured, collaborative, and meaningful project activities (Lestari et al., 2023; da Costa et al., 2019). Moreover, the integration of PjBL with technological approaches, educational games, or applied design has been shown to enhance its effectiveness across educational levels. Yulisnawati et al. (2025), for instance, reported that the use of educational games within a PjBL framework had a significant impact on improving students' mathematical critical thinking skills, as games promote active interaction and strategic analysis.

In the implementation of Project-Based Learning, supporting resources are essential to ensure the successful completion of projects. Consequently, libraries serve as

one of the primary options for students to obtain relevant learning materials. School libraries constitute a fundamental component of instructional practice, as schools function as centers of teaching and learning activities between teachers and students, where learning extends beyond classroom settings to include library-based learning (Syam et al., 2021). Educational processes cannot operate optimally without adequate learning resources for both educators and learners. Therefore, the establishment of libraries must be accompanied by effective management and services to support teaching and learning processes efficiently. In addition, libraries play a crucial role in enabling students and teachers to keep pace with developments in science and technology. School libraries, situated within educational institutions, function as information centers for both students and teachers, making their presence essential for supporting educational activities (Akbar et al., 2021).

Based on these considerations, the present study is deemed necessary, given that the digitalization of literacy is no longer optional, particularly in higher education institutions that offer programs explicitly emphasizing digital competencies. Accordingly, research focusing on the influence of Project-Based Learning integrated with library visits on students' literacy awareness represents a relevant and compelling topic for further investigation.

METHOD

This study adopts a quantitative research approach with a correlational design aimed at examining the relationships and potential influence between two related variables. A correlational framework was selected to identify the degree and direction of association between the variables without manipulating the research setting. The research was conducted among undergraduate students enrolled in the 2024/2025 academic year in Bali, with the population represented by students from several higher education institutions across the region. From this population, a total of 100 students were selected as research participants, which was considered sufficient to represent the target group and to support statistical analysis.

Data collection was conducted using a structured questionnaire developed specifically for the purpose of this study. The questionnaire employed a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), to capture respondents' perceptions and attitudes toward the variables under investigation. The use of a Likert scale enabled the quantification of subjective responses into numerical data suitable for statistical testing and interpretation.

Prior to distribution, the research instrument underwent a content validity evaluation using the Gregory formula, involving assessments from two expert validators. This procedure was conducted to ensure that the questionnaire items were conceptually relevant, clearly worded, and aligned with the research objectives. Feedback from the experts was used to refine the instrument, thereby enhancing its clarity and appropriateness for the target respondents.

Once the data were collected, a series of statistical analyses were performed to ensure the accuracy and reliability of the results. First, item validity testing was conducted using the Pearson Product–Moment correlation coefficient, with particular attention paid to the two-tailed significance (Sig. 2-tailed) values. This analysis aimed to determine whether each questionnaire item had a statistically significant correlation with the total score, indicating that the item effectively measured the intended construct.

Following the validity analysis, the reliability of the instrument was assessed using Cronbach's Alpha. Reliability testing was essential to evaluate the internal consistency of

the questionnaire, ensuring that the items measured the constructions in a stable and consistent manner. A satisfactory Cronbach's Alpha significance indicated that the instrument was dependable and suitable for further analysis.

After confirming the validity and reliability of the data, regression analysis was employed to test the research hypotheses. The regression test was used to examine the extent to which the independent variable influenced the dependent variable and to determine the strength and significance of this relationship. This analytical step allowed the researcher to draw empirical conclusions regarding the proposed hypotheses and to interpret the practical implications of the findings within the context of higher education students in Bali.

RESULTS AND DISCUSSIONS

The following section presents the questionnaire data developed to examine the variables of Project-Based Learning Integrated by Library Visiting (X) and Digital Literacy. The questionnaire was designed as a structured research instrument to capture respondents' perceptions, experiences, and levels of engagement related to the implementation of project-based learning activities that are systematically integrated with library visitation programs. This learning model emphasizes student-centered inquiry, collaborative problem-solving, and the effective use of information resources available in both physical and digital library environments.

The items related to Project-Based Learning Integrated by Library Visiting focus on several key dimensions, including students' ability to plan and complete projects, their interaction with library resources, and their motivation to seek information independently. These indicators are intended to measure how library-based project activities support meaningful learning experiences and encourage students to become active knowledge seekers.

In addition, the digital literacy variable is assessed through questionnaire items that explore respondents' competencies in accessing, evaluating, and utilizing digital information responsibly. This includes the ability to use digital tools, search engines, and online academic resources effectively, as well as to critically assess the credibility and relevance of digital content. The integration of digital literacy within project-based learning is considered essential in preparing students to meet the demands of 21st-century education.

Overall, the questionnaire data serves as an empirical foundation for analyzing the relationship between project-based learning integrated with library visiting and students' digital literacy skills. The findings derived from these data are expected to provide valuable insights into the effectiveness of this instructional approach in enhancing students' learning outcomes and information literacy competencies.

Table 1 Validity of PjBL integrated by Library Visiting

No	Code	Sig	Category
1	LP1	0.471**	Valid
2	LP2	0.765**	Valid
3	LP3	0.746**	Valid
4	LP4	0.822**	Valid
5	LP5	0.702**	Valid

Based on the data in Table 1, all 5 questions in the PjBL Integrated by Library Visiting questionnaire are valid because the SPSS data shows a (**) sign indicating that the statement is valid. The following are the results of the reliability test on the PjBL Integrated by Library Visiting questionnaire.

Table 2 Reliability of PjBL integrated by Library Visiting

Reliability Statistics	
Cronbach's Alpha	N of Items
.864	5

Based on the data in Table 3, all 5 questions in the PjBL Integrated by Library Visiting questionnaire are reliable because the SPSS data shows a value of 0.864 in the Cronbach Alpha value, indicating that the statement is highly reliable. Next is the validity data from the digital literacy questionnaire, which is shown in the table below.

Table 3 Validity of Purchase Decision

No	Code	Sig	Category
1	Y1	0.904**	Valid
2	Y2	0.927**	Valid
3	Y3	0.759**	Valid
4	Y4	0.797**	Valid
5	Y5	0.896**	Valid

Based on the data in Table 3, all five questions in the digital literacy questionnaire are valid, as the SPSS data shows a (**) sign indicating that the statement is valid. The following are the results of the reliability test on the digital literacy questionnaire.

Table 4 Reliability of Purchase Decision

Reliability Statistics	
Cronbach's Alpha	N of Items
.905	5

Based on the data in Table 4, all five questions in the digital literacy questionnaire are reliable, as the SPSS data shows a Cronbach's Alpha value of 0.905, indicating high reliability. After both variables demonstrated valid and reliable results, a regression test was conducted, with the following results:

Table 5 Regression Result

One-Sample Kolmogorov-Smirnov Test			
		LP	LD
N		100	100
Normal Parameters[a,b]	Mean	18.2900	21.6000
	Std. Deviation	4.85194	3.22240
Most Extreme Differences	Absolute	.158	.162
	Positive	.152	.146
	Negative	-.158	-.162

Test Statistic			.158	.162
Asymp. Sig. (2-tailed)[c]			.000	.000
Monte Carlo Sig. (2-tailed)[d]	Sig.		.000	.000
	99% Confidence Interval	Lower Bound	.000	.000
		Upper Bound	.000	.000

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

d. Lilliefors' method based on 10000 Monte Carlo samples with starting seed 2000000.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.371	1	.371	.035	.851[b]
	Residual	1027.629	98	10.486		
	Total	1028.000	99			

a. Dependent Variable: LD

b. Predictors: (Constant), LP

The findings of this study indicate that the Project-Based Learning (PjBL) model integrated with library visiting activities does not exert a significant influence on university students' digital literacy in Denpasar, Bali. This conclusion is supported by the regression analysis, which yielded a significance value of 0.851 (> 0.05), indicating that the alternative hypothesis was rejected. Accordingly, PjBL Integrated by Library Visiting cannot be considered a strong predictor of digital literacy within the context of this study. Although digital literacy is theoretically associated with project-based learning and access to information resources, the empirical results reveal a more complex set of dynamics.

Conceptually, digital literacy represents a critical 21st-century competency encompassing the ability to access, evaluate, process, and communicate information effectively through digital media (Zuhri et al., 2024). In higher education contexts, digital literacy plays a vital role in supporting learning processes, research activities, and participation in the global information ecosystem. Likewise, PjBL is widely regarded as a pedagogical approach capable of fostering critical thinking skills, creativity, collaboration, and the use of technology in project completion, thereby theoretically contributing to the enhancement of students' digital literacy (Lestari & Iryanti, 2024; Fazhari et al., 2023). However, the findings of this study demonstrate that such a relationship has not yet materialized in a statistically significant manner.

One explanation for the non-significant effect of PjBL Integrated by Library Visiting on digital literacy lies in implementation-related factors. PjBL requires in-depth investigative activities, collaborative engagement, and systematic use of digital resources. Nevertheless, when PjBL is implemented merely at a procedural level without addressing the substantive dimensions of technology-based problem solving, the learning process fails to provide meaningful digital experiences. Marlina et al. (2025) emphasizes that the effectiveness of PjBL is highly dependent on the readiness of instructional tools, the quality of student worksheets, and structured technology integration. If PjBL activities prioritize conventional task completion without intensive utilization of digital technologies, their contribution to students' digital literacy remains minimal.

Furthermore, the library visiting component in this study also appears to have provided limited reinforcement for students' digital literacy development. In the digital era, university libraries should function not only as repositories of physical collections but also as hubs for digital information access, data literacy resources, and information literacy laboratories (Akbar et al., 2021; Syam et al., 2021). When the libraries visited by students have not fully transitioned into digital libraries equipped with electronic databases, e-journals, e-learning tools, and digital literacy training programs, library visits tend to increase awareness of physical collections rather than comprehensively enhance digital literacy skills. This condition may help explain why the integration of PjBL with library activities did not yield significant outcomes.

Another contributing factor may relate to students' learning culture. Pratama et al. (2025) argue that Indonesian university students from diverse socioeconomic backgrounds continue to experience digital literacy disparities due to unequal access to technology, varying frequencies of digital resource use, and limited exposure to information literacy training. Consequently, even when students engage in PjBL and library-based activities, improvements in digital literacy do not occur automatically in the absence of digitally oriented learning habits. Digital literacy is shaped not only by formal instructional activities but also by supportive technological environments and students' intrinsic motivation (da Costa et al., 2019) to explore digital media.

In addition to student-related factors, lecturers' competencies in designing and facilitating technology-enhanced PjBL may also influence outcomes. Romatul and Aini (2024) highlight that the success of PjBL is strongly affected by educators' ability to integrate content, technology, and project tasks into a cohesive learning framework. When lecturers implement PjBL in a traditional manner without reinforcing digital elements, opportunities to enhance students' digital literacy become limited. For instance, projects may focus primarily on report writing or presentations without requiring students to critically search for, evaluate, and process digital sources.

The high validity and reliability test results of the research instruments indicate that the measurement tools were capable of accurately capturing indicators of PjBL Integrated by Library Visiting and digital literacy. However, robust instruments do not necessarily guarantee significant inter-variable effects when the intervention itself lacks strength at the implementation level. This issue is further reflected in the normality test results, which revealed a non-normal data distribution, suggesting substantial variability in students' digital literacy levels. While some students demonstrated high digital literacy, others remained at low to moderate levels, thereby influencing the overall statistical relationship between variables.

These findings also suggest that students' digital literacy may be more strongly influenced by external factors than by PjBL and library visits alone. Social media exposure, everyday technology use, self-directed learning, and internet accessibility may serve as more dominant predictors. Tandiwara et al. (2025) similarly found that digital literacy develops more rapidly through intensive interaction with digital platforms than through formal instruction when such instruction is not explicitly designed with a strong digital orientation. Thus, the results of this study indicate the need to reposition PjBL design to better align with the demands of digital literacy in the modern era.

Overall, this study offers important practical implications for higher education institutions. Universities should strengthen the integration of technology across all components of project-based learning. Enhancing digital library infrastructures, providing digital literacy training for both students and lecturers, and optimizing competency-based curricula with a focus on digital skills represent strategic steps

forward. Moreover, PjBL implementation should emphasize the use of digital platforms such as learning management systems, online collaborative tools, data analytics, and digital content creation to ensure that digital literacy develops systematically through authentic learning experiences.

CONCLUSIONS

Based on the findings of the study examining the effect of Project-Based Learning integrated with library visits on students' digital literacy in Denpasar, Bali, it can be concluded that the research instruments employed demonstrated excellent levels of validity and reliability. The validity testing using the Pearson Product Moment correlation indicated that all questionnaire items for both the Project-Based Learning integrated with library visiting variable and the digital literacy variable were valid. Similarly, the reliability analysis using Cronbach's Alpha yielded coefficients exceeding 0.86 for both variables, indicating an exceedingly high level of internal consistency.

Nevertheless, the results of the simple linear regression analysis revealed that Project-Based Learning integrated with library visiting did not have a statistically significant effect on students' digital literacy, as evidenced by a significance value of 0.851 (> 0.05). Consequently, the alternative hypothesis (Ha) was rejected, while the null hypothesis (H_0) was accepted. This finding suggests that the integration of Project-Based Learning and library visits has not been empirically proven to significantly contribute to the enhancement of students' digital literacy in the research context. The results imply that although students are familiar with digital technologies, the development of digital literacy is not solely determined by project-based instructional approaches or library visit activities.

Therefore, structured training programs, workshops, or targeted digital literacy guidance are necessary to strengthen students' abilities to critically and ethically select, evaluate, and utilize digital information. In addition, collaboration between lecturers and librarians is essential in designing learning projects that explicitly integrate the use of digital information resources available in the library.

ACKNOWLEDGMENTS

The authors would like to express their sincere gratitude to all parties who have contributed to the successful completion of this study. Special appreciation is extended to the undergraduate students of the Information and Technology System, Digital Business and Retail Management programs in Bali who willingly participated as respondents and provided valuable data for this research. The authors also acknowledge the academic support and research facilities provided by Institute Desain dan Bisnis Bali, which facilitated the data collection and analysis process. Furthermore, the authors convey their deepest gratitude to colleagues and expert validators for their constructive feedback and professional guidance during the instrument validation and research refinement stages. Finally, heartfelt thanks are extended to all collaborators and institutions, both national and international, for their continuous support, cooperation, and encouragement throughout the research and publication process.

REFERENCES

Annisa, D. F., Utomo, P., & Costa, A. da. (2025). Digital Transformation in Guidance and Counseling: The Influence of Website Media on Students' Self-Awareness. *Al-Musyrif: Jurnal Bimbingan Dan Konseling Islam*, *8*(1), 74–89. https://doi.org/10.38073/almusyrif.v8i1.2499

Costa, A. da, Goncalves, A. D. S., Pereira, S., & Hitipeuw, I. (2019, March 25). *The Impact of Smartphone on Universitarian Psychological Wellbeing*. https://doi.org/10.4108/eai.21-11-2018.2282266

da Costa, A., Hanurawan, F., Atmoko, A., & Hitipeuw, I. (2019). The model of grade point average academic of timor-leste S in Indonesia. *International Journal of Scientific and Technology Research*, *8*(6), 213–216.

Diani, R., Andayani, T., Monika, S., Priana, A., & Ariska, D. (2025). *Implementasi literasi digital dalam pembelajaran di sekolah dasar: Studi kasus di SD Negeri 81 Palembang*. Jurnal Pendidikan Dasar, 15(1), 45–58.

Fazhari, R. A., Nurlaili, N., Siregar, N., Ritonga, A. F., & Barutu, H. (2023). *Penerapan model pembelajaran Project Basic Learning (PjBL) terhadap kemampuan kerja sama peserta didik pada Kurikulum Merdeka di SD Negeri 060816 Medan Area Tahun Pelajaran 2023/2024*. Jurnal Pendidikan Tambusai.

Ginting, Y. B., Tamba, L., & Gultom, C. R. (2025). *Pengaruh Project-Based Learning terhadap keterampilan siswa pada pemahaman berita di SMP Negeri 2 Sibolangit Tahun Pembelajaran 2025/2026*. Pendas: Jurnal Ilmiah Pendidikan Dasar.

Juanta, P., Tanadi, E., Angelin, P., & Parta, T. (2025). *Pengaruh model pembelajaran berbasis proyek (PjBL) terhadap kemampuan pemecahan masalah mahasiswa ilmu komputer dalam pengembangan aplikasi*. INSOLOGI: Jurnal Sains dan Teknologi, 4(3), 597–609.

Lestari, D., & Iryanti, F. (2024). *Strategi pembelajaran berbasis digital dalam meningkatkan kompetensi literasi abad ke-21*. Jurnal Inovasi Teknologi Pendidikan, 12(2), 134–148.

Lestari, E., Juaini, M., & Rokhmat, J. (2023). *Penerapan Project Based Learning untuk meningkatkan motivasi belajar peserta didik*. Journal of Classroom Action Research, 5(3), 198–202.

Longkutoy, S., Rorimpandey, W., & Pangkey, H. (2025). *Integrasi literasi digital dalam pendidikan karakter di sekolah dasar*. Jurnal Pendidikan Karakter, 9(1), 22–35.

Marlina, R., Miaz, Y., Farida, F., & Ardipal. (2025). *The influence of Project Based Learning LKPD in improving 21st century skills for class V elementary school students*. Jurnal Penelitian Pendidikan IPA, 11(1), 634–641.

Muhlis, M., Salim, A., Nurcahyono, B., Hasanah, R., & Putri, M. (2024). *Pelatihan literasi digital berbasis media pembelajaran interaktif untuk siswa dan guru SMP*. Jurnal Teknologi Pendidikan, 18(3), 210–225.

Nugraha, M. T., & Mardiyati, I. (2024). *Innovations in Project-Based Learning (PBL) strategies for elementary school students*. International Journal of Basic Educational Research, 1(2), 35–40.

Pratama, Y., Ashari, F., Zulkarnain, M., & Sabrina, L. (2025). *Tantangan literasi digital mahasiswa di perguruan tinggi Indonesia: Analisis konteks sosial dan ekonomi*. Jurnal Pendidikan Tinggi, 7(2), 98–115.

Rizal, M. S., Murtadho, N., Hanafi, Y., Ananda, R., & Mufarizuddin, M. (2025). *The effectiveness of Project-Based Learning in enhancing social competence among elementary school students*. Journal of Integrated Elementary Education.

Romatul, P. R., & Aini, A. (2024). *Penerapan pembelajaran berbasis Project Based Learning (PjBL) untuk meningkatkan keterampilan kolaborasi siswa pada materi perubahan lingkungan di SMAN 15 Surabaya*. Jurnal Inovasi Pembelajaran Biologi.

Sanchez, G. R., & Reyes, S. (2025). *Enhancing Project-Based Learning: A framework for optimizing structural design and implementation — A systematic review with a sustainable focus*. Sustainability, 17(11), 4978.

Tandiwara, H., Erwing, M., & Asmah, N. (2025). *Pengaruh literasi digital terhadap kemampuan siswa dalam mengevaluasi informasi daring*. Jurnal Literasi Digital, 5(1), 55–70.

Yulisnawati, Y., Yusritawati, I., & Zaenal, R. M. (2025). *Efektivitas model pembelajaran Project Based Learning melalui game edukasi terhadap kemampuan pemecahan masalah matematis siswa*. Symmetry: Pasundan Journal of Research in Mathematics Learning and Education.

Zuhri, A., Suwindia, I. M., & Winangun, I. P. (2024). *Literasi digital sebagai kompetensi utama dalam pembelajaran abad ke-21*. Jurnal Pendidikan dan Teknologi, 14(2), 101–115.

Zuhri, A., Suwindia, I. M., Winangun, I. P., & Rahmawati, S. (2024). *Penguatan literasi digital dalam lingkungan sekolah: Tinjauan aspek etika dan keamanan digital*. Jurnal Transformasi Pendidikan, 11(3), 176–190.