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Integrating Technology into Problem-Based Learning: A Practical Implementation

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ABSTRACT

In alignment with the *Kurikulum Merdeka*, Problem-Based Learning (PBL) has been widely promoted as a strategy to enhance critical thinking, collaboration, and problem-solving skills. The integration of technology into PBL further strengthens its potential by providing multimodal resources and interactive opportunities for learners. However, limited research has examined students' readiness to participate in technology-enhanced PBL within Indonesian EFL classrooms, creating a gap in understanding the feasibility of its implementation. This study aims to investigate how technology integration is applied in PBL and to evaluate students' readiness to engage in this approach. An exploratory sequential mixed-methods design was employed. Participants included one English teacher and ninety-seven tenth-grade students from three classes. Instruments consisted of observation sheets, field notes, and a readiness questionnaire adapted from Dalton and Gottlieb's framework. Data collection began with classroom observations to identify teacher practices, followed by the administration of the questionnaire to measure student readiness. Qualitative data were analyzed using Miles and Huberman's model, while quantitative data were analyzed descriptively. The findings revealed that the teacher successfully integrated videos and PowerPoint slides across PBL stages, supporting contextual understanding and engagement. Nevertheless, students demonstrated only moderate readiness across effort, willingness, and technological capacity.

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INTRODUCTION

The shift in Indonesia's educational policy toward the *Kurikulum Merdeka* marks a significant transformation in how teaching and learning processes are designed and implemented. This curriculum is intended to improve the overall quality of education by emphasizing student-centered approaches, flexibility, and competency-based learning. Unlike previous curricula, which were often criticized for being overly rigid and teacher-dominated, *Kurikulum Merdeka* seeks to empower learners to take more active roles in constructing knowledge and developing the skills needed to thrive in a rapidly changing world. The policy explicitly promotes innovative instructional strategies such as Problem-Based Learning (PBL), project-based learning, and differentiated instruction, all of which are considered compatible with the goals of fostering independence, creativity, and lifelong learning (Suwastini et al., 2021). This shift represents not only a structural reform but also a pedagogical one, encouraging teachers to move away from traditional rote learning practices and embrace methodologies that prioritize critical engagement, collaboration, and authentic problem-solving.

Among these strategies, Problem-Based Learning (PBL) has gained considerable recognition for its potential to nurture 21st-century competencies. PBL emphasizes problem-solving, critical thinking, collaboration, and communication, four skills regarded as essential for learners navigating complex modern realities (Ilwandri et al., 2023). Through carefully designed problem scenarios, students are not merely passive recipients of knowledge but are instead challenged to engage actively in identifying problems, analyzing relevant information, and proposing solutions (Drolia et al., 2020). By anchoring learning activities in real-world problems, PBL also creates authentic learning experiences that mirror the complexity of professional and everyday contexts (Ferreira & Trudel, 2012). Such experiences encourage self-directed learning, as students must take responsibility for their progress by gathering information, evaluating resources, and presenting their findings. The dynamic nature of PBL also fosters social skills, as learners work collaboratively, negotiate meaning, and share responsibilities in small group discussions (Lavidas et al., 2024). These aspects of PBL reflect a paradigm shift in education, one that aligns with the overarching goals of *Kurikulum Merdeka* to prepare students for lifelong adaptability and meaningful participation in society.

Parallel to the adoption of PBL, the integration of technology in education has been widely recognized as a catalyst for innovation. Technology has transformed the ways in which teachers deliver content and how students access, process, and produce knowledge (Aravantinos et al., 2024). In the context of language learning, technological tools and platforms provide rich input, multimodal resources, and interactive opportunities that extend far beyond the traditional classroom setting. For example, digital media such as videos, online collaborative platforms, and

presentation tools can offer students visual, auditory, and textual input simultaneously, thereby supporting diverse learning styles (Clyde & Delohery, 2005). Technology also enables interactive collaboration, where learners can jointly construct meaning, share feedback, and co-create products in ways that would be more limited in a conventional classroom (Papadakis et al., 2023). As such, technology not only enhances teaching effectiveness but also increases student engagement, motivation, and learning outcomes.

The combination of Problem-Based Learning and technology integration holds significant potential to create a dynamic and enriched learning environment. By embedding technological tools within the phases of PBL, teachers can contextualize problems with multimedia, facilitate group work with digital platforms, and support research with online resources. This integration has the capacity to strengthen not only linguistic competence but also digital literacy, which is increasingly seen as a fundamental skill in the 21st century (Liu et al., 2021). A technology-enhanced PBL framework therefore prepares students not only to master academic content but also to navigate the digital world responsibly and creatively. Such an approach resonates strongly with the vision of *Kurikulum Merdeka*, which emphasizes not only academic excellence but also the cultivation of independent, adaptable, and technologically literate learners.

Although previous studies have explored teachers' perceptions and practices related to technology integration within PBL, there remains a noticeable gap in research focusing on students' readiness to engage in this type of learning environment, particularly in the context of Indonesian English as a Foreign Language (EFL) classrooms. Much of the existing literature highlights the benefits of technology-enhanced PBL, such as improved motivation, deeper understanding, and increased opportunities for collaboration. However, these benefits may not be fully realized if students lack the readiness to engage actively. Readiness in this context encompasses several dimensions, including effort, willingness, and capacity to participate in technology-supported learning activities. Effort refers to the extent to which students are prepared to dedicate time and energy to tasks; willingness reflects attitudes and openness to new learning approaches; and capacity involves digital literacy and technological competence. Without adequate readiness, students may face difficulties in assuming active roles, collaborating effectively, or using digital tools productively, which in turn limits the potential of PBL and technology integration.

This gap is particularly relevant in Indonesia, where infrastructural challenges such as uneven access to reliable internet connections and limited availability of personal devices may further complicate technology-enhanced learning. Moreover, cultural factors, including students' prior experiences with teacher-centered instruction, may influence their level of comfort and engagement in more

autonomous and collaborative approaches like PBL. For these reasons, examining students' readiness is critical to understanding not only the feasibility but also the sustainability of technology-integrated PBL in Indonesian schools.

Given these considerations, the present study seeks to contribute to the growing body of literature on educational innovation in Indonesia by focusing on the intersection between PBL, technology integration, and student readiness. Specifically, it addresses two guiding research questions: (1) How is technology integration implemented in Problem-Based Learning by the English teacher? and (2) How ready are students to participate in technology-integrated PBL? By investigating both teacher practices and student readiness, this study provides a more holistic understanding of the challenges and opportunities associated with implementing technology-enhanced PBL in EFL classrooms. The findings are expected to inform not only teachers and school administrators but also policymakers, highlighting areas that require support, such as professional development for teachers, digital literacy training for students, and infrastructural investments in schools.

In conclusion, the integration of technology within Problem-Based Learning represents a promising pedagogical innovation aligned with the principles of *Kurikulum Merdeka*. Yet, its effectiveness depends largely on the extent to which students are ready to engage with this approach. By examining teacher implementation and student readiness, this study offers valuable insights into the practical realities of adopting technology-enhanced PBL in Indonesia, bridging the gap between policy aspirations and classroom practices.

METHOD

This study adopted an exploratory sequential mixed-methods design to gain a comprehensive understanding of the implementation of technology-integrated Problem-Based Learning (PBL) and the readiness of students to participate in such a learning model. The research began with a qualitative phase, which aimed to examine the practices of an English teacher in embedding technology into the stages of PBL. One English teacher and ninety-seven tenth-grade students from three classes in a senior high school in Bali were selected as participants, providing a representative sample of the context under study. Data collection in the qualitative phase relied on classroom observations, which were conducted using a structured observation sheet and supported by detailed field notes to capture classroom interactions and teaching strategies in depth. This phase provided insights into how the teacher used technological tools, such as multimedia resources and presentation software, to introduce and facilitate problem-solving tasks in line with the principles of PBL. The qualitative data were then analyzed following Miles and Huberman's model, which involves data reduction, data display, and conclusion drawing,

enabling the researchers to systematically identify emerging patterns, challenges, and opportunities related to technology integration in classroom practice.

Following the qualitative phase, the study proceeded with a quantitative phase to measure students' readiness to engage in technology-supported PBL activities. The readiness questionnaire was adapted from Dalton and Gottlieb's framework, which assesses three key dimensions: effort, willingness, and capacity. Effort refers to the extent to which students invest energy and persistence in completing assigned learning tasks, willingness reflects their attitudes and openness toward participating in technology-enhanced learning, and capacity highlights their digital literacy and ability to effectively use technological tools. The questionnaire was administered to all student participants after the observation phase to ensure that the data captured not only perceptions but also experiences related to actual classroom practice. Quantitative data were analyzed using descriptive statistics to calculate mean scores and identify the general trends in student readiness. This phase complemented the qualitative findings by highlighting not only the potential benefits but also the limitations of technology integration from the learner's perspective. The sequential design allowed for triangulation of data, providing a richer and more reliable picture of the current state of technology-integrated PBL implementation. Overall, the methodological approach ensured that both teacher practices and student readiness were examined in a balanced and systematic manner, laying the groundwork for practical recommendations in advancing technology-enhanced PBL in Indonesian EFL classrooms.

RESULTS AND DISCUSSION

Results

The classroom observations revealed that the English teacher at SMAN 1 Singaraja followed the essential phases of Problem-Based Learning (PBL) while integrating various forms of technology into each stage of instruction. In the problem presentation phase, the teacher frequently used multimedia resources to contextualize the learning material and spark students' interest. For example, when teaching narrative texts, the lesson began with a short video clip of the Timun Mas folktale, followed by PowerPoint slides containing images of the main characters, key vocabulary, and guiding questions. This combination of audiovisual media successfully captured students' attention and provided them with a clear context for the problem they were expected to solve, which in this case involved analyzing the story's structure, moral values, and language features.

During the group discussion phase, students were divided into small groups of four to five members and provided with digital worksheets embedded in the PowerPoint presentation. These worksheets served as structured guides for discussion, prompting students to identify and classify aspects of the narrative text.

The teacher moved between groups to monitor progress and offer clarification, occasionally projecting model answers or discussion prompts on the classroom screen to guide collective understanding. While some groups demonstrated a high level of interaction, others engaged less actively, with participation uneven among members.

The independent research phase was designed to encourage students to search for supplementary materials online, such as additional examples of folktales or explanations of narrative structures. However, engagement varied considerably. A few groups took the initiative to explore multiple online sources and integrated new insights into their findings, while others relied almost entirely on teacher-prepared materials. Technical limitations contributed to these differences, as not all students brought personal devices, and the school's internet connection was at times slow or unstable, which restricted the extent of online research.

In the presentation and feedback stage, each group delivered their findings to the class using PowerPoint slides, often enhanced with images or diagrams to visually represent the plot, setting, and characters. The feedback process was conducted through question-and-answer sessions, during which the teacher and peers offered comments or asked clarifying questions. Groups that used more visually appealing slides tended to capture greater attention and receive more interactive feedback, while those with less engaging slides had fewer follow-up questions from their peers. Finally, the quantitative phase of the study, which employed a readiness questionnaire adapted from Dalton and Gottlieb's (2003) framework, provided additional insights into students' preparedness for technology-integrated PBL.

Table 1. Descriptive Statistics of Total Readiness

N (Valid)	**97**
N (Missing)	0
Mean	99.1134
Std. Deviation	8.41981

The descriptive statistical analysis of students' total readiness demonstrated that data were obtained from 97 valid participants with no missing cases, ensuring the completeness of the dataset. The mean score was 99.11, indicating that the overall level of student readiness for technology-integrated Problem-Based Learning was within a sufficient range. The standard deviation of 8.42 suggests a moderate degree of variability in students' readiness levels, meaning that while the majority of students clustered around the average score, there were some variations in individual performance. This distribution reflects that although most learners demonstrated comparable levels of readiness, a few students either exceeded or fell below the average, thereby highlighting the need for differentiated support to address diverse readiness levels.

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Table 2. Readiness Levels Across Dimensions and Key Evidence

Dimension	Very Ready	Ready	Sufficient	Less Ready	Not Ready	Key Evidence / Notes
Effort			✓			Students complete assigned tasks but seldom exceed minimum requirements; independent initiative beyond provided resources is limited.
Willingness			✓			Generally positive attitudes toward technology; some hesitation to take speaking roles in group presentations.
Capacity			✓			Digital literacy is moderate; proficient with basic presentation tools (e.g., PowerPoint) but less familiar with collaborative platforms (e.g., Google Docs, Padlet).
Overall			✓			Students are open to technology-enhanced PBL but need greater autonomy, confidence, and technology skills for maximum engagement.

Table 2 indicates that students' readiness is consistently classified as Sufficient across all three measured dimensions—effort, willingness, and capacity—as well as for the overall index. In terms of effort, students tend to complete assigned tasks but seldom move beyond minimum requirements, which signals limited self-initiated exploration and persistence. Willingness is also rated as sufficient, reflecting generally positive attitudes toward technology integration in learning activities, although some students hesitate to assume speaking roles during group presentations. Capacity is sufficient rather than strong; students demonstrate basic digital literacy and can operate presentation software such as PowerPoint, yet they are less familiar with collaborative platforms like Google Docs or Padlet. Taken together, these patterns portray a cohort that meets baseline expectations but has not yet internalized the dispositions associated with proactive, technology-mediated learning.

The accompanying evidence suggests that readiness for technology-enhanced problem-based learning is present but not optimal. Students appear open to using digital tools, though gaps in autonomy, confidence, and tool-specific proficiency limit deeper engagement. Pedagogical responses should therefore prioritize structured opportunities that reward initiative, gradual increases in task complexity, and explicit practice with collaborative platforms to cultivate both competence and comfort. Targeted micro-training, guided group presentations, and formative feedback cycles may help translate sufficient readiness into robust, self-directed participation. Sustained monitoring of these interventions would allow

instructors to document incremental gains and to adjust supports in ways that move students from sufficient to ready or very ready classifications.

Discussion

The findings indicate that the English teacher at SMAN 1 Singaraja has effectively initiated the integration of technology within a PBL framework by making use of multimedia resources, presentation software, and online materials to support the learning process. This integration aligns with the goals of the Kurikulum Merdeka, which encourages active, student-centered learning through authentic problem-solving tasks. The use of videos, images, and structured digital worksheets provides students with richer input and creates opportunities for multimodal learning, thereby catering to different learning preferences (Sutiyono et al., 2022). However, despite these positive aspects, the overall level of student readiness suggests that the potential of technology-enhanced PBL has not yet been fully realized.

One of the main challenges lies in the uneven participation among group members. Observations revealed that in many groups certain students assumed dominant roles and handled the majority of tasks, whereas others contributed minimally. This imbalance diminishes the collaborative nature of PBL and may limit learning opportunities for less active members. Such findings are consistent with Suryani et al. (2024), who emphasize that, without structured role allocation, group-based learning can lead to unequal engagement. Assigning specific roles—such as leader, researcher, presenter, and note-taker—and rotating them in subsequent projects could ensure that all students have equitable opportunities to develop problem-solving and communication skills.

Another notable pattern is a tendency for students to rely heavily on teacher-provided resources. While these materials serve as important scaffolds, they may inadvertently reduce students' motivation to seek additional information independently. Within the PBL model, independent inquiry is a central element that enables learners to construct knowledge actively. Talandron-Felipe (2019) argues that fostering research autonomy is essential for developing higher-order thinking skills; yet, in this study, many students engaged only superficially with online research. This points to the need for targeted interventions, such as pre-PBL workshops on digital research strategies and the critical evaluation of online sources, to prepare students for more independent learning.

The study also highlights infrastructural issues that directly affect the quality of technology integration. Limited internet connectivity and an unequal distribution of personal devices constrain students' ability to engage in richer, more interactive online activities. According to the SAMR model of technology integration, the school is currently operating at the substitution or augmentation levels, using technology to enhance traditional tasks rather than reaching the higher levels of modification

or redefinition, where technology transforms learning in innovative ways. Addressing infrastructure constraints would enable the incorporation of more advanced collaborative tools and platforms, thereby moving toward the transformative potential envisioned by the model (Mandasari et al., 2025).

The readiness scores, while moderate, suggest a promising foundation for future improvement. Willingness emerged as the strongest dimension, indicating that students are generally open to using technology in their learning. However, moderate scores in effort and capacity point to gaps in both self-directed learning habits and digital competencies. This finding supports the conclusion that readiness training should precede the full implementation of technology-enhanced PBL. Such training might include simulated PBL tasks that focus on teamwork, role rotation, and the use of collaborative digital platforms before students engage in full-scale projects (Istiara & Hastomo, 2023).

Overall, the integration of technology in PBL at SMAN 1 Singaraja demonstrates both strengths and areas for development. While multimedia-supported instruction and structured group activities have laid a solid foundation, achieving the full benefits of technology-enhanced PBL will require deliberate strategies to balance group participation, strengthen research autonomy, overcome infrastructural limitations, and enhance students' technological capacity. These efforts will not only improve the effectiveness of PBL in this context but also equip students with the skills necessary for lifelong learning in an increasingly digital world. The findings suggest that, although the teacher successfully embedded technology within each phase of PBL, student engagement and readiness remain at a moderate level. This aligns with previous studies, which have found that PBL enhances motivation but requires structured scaffolding for optimal results. Pedagogical implications include the need for gradual guidance in using digital tools, pre-training in group communication, and improved technological infrastructure.

CONCLUSION

This study shows that technology was successfully embedded across the phases of problem-based learning, enriching instruction through multimedia and structured digital activities. Yet students' readiness remained at a sufficient level across effort, willingness, and capacity: they were generally positive toward technology but often relied on teacher-provided resources, displayed uneven participation within groups, and faced infrastructural constraints that limited more transformative uses of digital tools. These findings imply the need for preparatory readiness training, explicit role rotation in groups, scaffolded tasks that reward initiative, and systematic practice with collaborative platforms and digital research skills. Strengthening internet access and device availability is likewise essential to

move practice from substitution or augmentation toward modification and redefinition in the SAMR model.

This work has several limitations: it is based on a single school context with a modest sample, relies on descriptive statistics and self-report measures of readiness, and does not track longer-term or causal effects on learning outcomes. Future studies should employ multi-site or comparative designs, incorporate pre–post or quasi-experimental evaluations, and include objective performance indicators (e.g., products, presentations, or rubric-based assessments) alongside readiness measures. Researchers should also examine how specific scaffolds—role rotation, micro-training in digital inquiry, and structured peer feedback—affect participation equity and autonomy, and how improvements in infrastructure and teacher professional development shift technology use to higher SAMR levels. These steps would provide clearer evidence on how to convert sufficient readiness into consistently high levels of engagement and achievement in technology-enhanced PBL.

REFERENCES

Aravantinos, S., Lavidas, K., Voulgari, I., Papadakis, S., Karalis, T., & Komis, V. (2024). Educational approaches with AI in primary school settings: A systematic review of the literature available in Scopus. *Education Sciences, 14*(7), 744. https://doi.org/10.3390/educsci14070744

Clyde, W., & Delohery, A. (2005). *Using technology in teaching*. Yale University Press. https://doi.org/10.12987/9780300133325

Dalton, C. C., & Gottlieb, L. N. (2003). The concept of readiness to change. *Journal of Advanced Nursing, 42*(2), 108–117. https://doi.org/10.1046/j.1365-2648.2003.02593.x

Dalton, C. C., & Gottlieb, L. N. (2003). The concept of readiness to change. Journal of Advanced Nursing, 42(2), 108–117. https://doi.org/10.1046/j.1365-2648.2003.02593.x

Drolia, M., Sifaki, E., Papadakis, S., & Kalogiannakis, M. (2020). An overview of mobile learning for refugee students: Juxtaposing refugee needs with mobile applications' characteristics. *Challenges, 11*(2), 31. https://doi.org/10.3390/challe11020031

Ferreira, M. M., & Trudel, A. R. (2012). The impact of problem-based learning (PBL) on student attitudes toward science, problem-solving skills, and sense of community in the classroom. *Journal of Classroom Interaction, 47*(1), 23–30. https://eric.ed.gov/?id=EJ974653

Ilwandri, Rahman, A., Santosa, T. A., Zulkifli, Suharyat, Y., & Suhaimi. (2023). The effect of problem-based learning–STEM on students' 21st-century skills in Indonesia: A meta-analysis. *LITERACY: International Scientific Journals of Social, Education, Humanities, 2*(1), 151–162. https://doi.org/10.56910/literacy.v2i1.550

Istiara, F., & Hastomo, T. (2023). Exploring lecturers and administrative staffs' strategies to hone EFL students' digital literacy. *JOALL (Journal of Applied Linguistics and Literature), 8*(1), 151–172. https://doi.org/10.33369/joall.v8i1.25568

Lavidas, K., Voulgari, I., Papadakis, S., Athanassopoulos, S., Anastasiou, A., Filippidi, A., Komis, V., & Karacapilidis, N. (2024). Determinants of humanities and social sciences students' intentions to use artificial intelligence applications for academic purposes. *Information, 15*(6), 314. https://doi.org/10.3390/info15060314

Liu, M., Shi, Y., Pan, Z., Li, C. L., Pan, X., & Lopez, F. (2021). Examining middle school teachers' implementation of a technology-enriched problem-based learning program: Motivational factors, challenges, and strategies. *Journal of Research on Technology in Education*. Advance online publication. https://doi.org/10.1080/15391523.2020.1768183

Mandasari, B., Basthomi, Y., Hastomo, T., Afrianto, Hamzah, I., & Aminatun, D. (2025). The snapshots of Indonesian pre-service English teachers' perspectives on integrating technology-based tools to rural schools. *Voices of English Language Education Society, 9*(1), 42–57. https://doi.org/10.29408/veles.v9i1.27965

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd ed.). Sage Publications.

Papadakis, S., Kiv, A. E., Kravtsov, H., Osadchyi, V. V., Marienko, M. V., Pinchuk, O. P., & Semerikov, S. O. (2023). Revolutionizing education: Using computer simulation and cloud-based smart technology to facilitate successful open learning. In *Joint proceedings of the 10th Illia O. Teplytskyi Workshop on Computer Simulation in Education, and Workshop on Cloud-based Smart Technologies for Open Education (CoSinEi and CSTOE 2022) co-located with ACNS Conference on Cloud and Immersive Technologies* (No. 3358, pp. 1–18). CEUR Workshop Proceedings. http://ds.knu.edu.ua/jspui/handle/123456789/5086

Suryani, A., Setiawan, I., Muhdar, S., & Oktaviani, F. S. (2024). The comparison of effectiveness of PjBL and PBL models on students' cognitive learning outcomes. *Al-Ishlah: Jurnal Pendidikan, 16*(1), 194–207. https://doi.org/10.35445/alishlah.v16i1.4094

Sutiyono, A., Hastomo, T., & Tanod, M. J. (2022). Educators' perception towards early childhood education in technology integration: A case study. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini, 6*(6), 7323–7333. https://doi.org/10.31004/obsesi.v6i6.3837

Suwastini, N. K. A., Puspawati, N. W. N., Adnyani, N. L. P. S., Dantes, G. R., & Rusnalasari, Z. D. (2021). Problem-based learning and 21st-century skills: Are they compatible? *EduLite: Journal of English Education, Literature and Culture, 6*(2), 326–340. https://doi.org/10.30659/e.6.2.326-340

Talandron-Felipe, M. M. P. (2019). The role of technology identity among students in rural areas using a web-based tutoring system. In *Proceedings of the 27th*

International Conference on Computers in Education (ICCE 2019) (pp. 194–196). https://doi.org/10.58459/icce.2019.309