

## **Strengthening Literacy Among Elementary School Students Through the Artificial Intelligence-Based Learning Platform “APEL” (Children Who Love Literacy) in the Upper Classes of SDN 61 Singkawang**

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### **Abstract**

The low reading comprehension ability of upper-grade students at *SDN 61 Singkawang* is the main background of this study. Based on the 2025 Education Report, students' competencies in understanding, interpreting, and evaluating texts remain relatively low. This condition encourages the development of APEL (*Anak Pecinta Literasi*), an AI-based learning platform integrated into the *PUDING* website, designed with a self-regulated active learning approach as a virtual tutor. This study aims to explain the implementation and measure the impact of the platform on strengthening students' literacy competencies. The method used is a qualitative descriptive approach. The learning process is carried out in four stages, namely exercises in identifying the main idea, analyzing the elements of 5W+1H, understanding the intrinsic elements of the story, and developing paragraphs. The results of the study indicate an increase in active participation and student learning independence. The instant feedback feature and the available learning records allow teachers to monitor student progress more accurately and continuously. Teachers also responded positively to the application of this technology. The main factor supporting success is the role of AI as a personal companion, while the biggest challenge comes from limited internet access. This research concludes that the APEL platform has the potential to be a creative solution for overcoming literacy problems through systematic, autonomous, and reflective habituation.

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**Keywords:** *artificial intelligence; reading skills; learning media; elementary school; virtual tutor*

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### **INTRODUCTION**

Literacy skills are the main pillars in building analytical thinking and serve as the foundation for lifelong learning. At the elementary school level, strengthening this capacity is a priority because its success greatly affects the mastery of other fields of study. However, the reality on the ground shows that students' literacy competence, especially in deep reading comprehension, still needs improvement (A Al Roomy, 2022; Fogarty et al., 2020; Greenleaf et al., 2023).

This indication is supported by data from the Education Report Card of SDN 61 Singkawang in 2025. Despite a positive trend, the numerical achievement in the literacy aspect among upper-grade students remains below expectations. In the dimension of searching for and identifying explicit information in texts (L1), the average student score was 64.69. In the dimension of interpreting and understanding reading content (L2), the score was 63.55. As for the dimension of evaluating and reflecting on texts (L3), the average score was only 58.43. This fact indicates a discrepancy between reading habituation activities that have been implemented, such as the 15-minute reading program, and students' actual comprehension outcomes (Lestari & Ramadan, 2025; Nizma & Kusumawardani, 2023; Nurani et al., n.d.). Students may be fluent in reading, but they are not yet optimal in exploring meaning, analyzing, and critiquing reading materials (Li et al., 2016; Rohmah, 2015).

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This problem is crucial because the ability to comprehend texts is an essential requirement for the development of critical thinking (Arifin, 2020). If not addressed promptly, students will face obstacles in following the learning process at higher levels of education. Therefore, an innovative approach is needed that not only promotes reading habits but also systematically and individually trains higher-order cognitive processes (Changcai et al., 2025; Lihua, 2025; Moir, 2017).

Stiggins (2002) emphasized that student-centered assessment functions not only as a tool for measuring outcomes but also as a means of learning. Descriptive and specific feedback helps students identify areas of weakness and determine steps for improvement. On the APEL platform, the automated feedback feature powered by artificial intelligence and the storage of learning track records enable a continuous formative assessment process, both for students and teachers (Kapoor et al., 2026; Ramanujam & Chakraborty, 2025; Scholapurapu, 2025).

A number of previous studies have demonstrated the positive potential of technology in improving literacy skills. Kosmas, Ioannou, and Zaphiris (2025), in their research on the adoption of artificial intelligence in early-grade literacy learning, found that co-design methods involving AI can increase student engagement in reading comprehension. Similarly, Silor and Silor (2025) stated that AI-based learning tools can significantly improve reading comprehension, while emphasizing that teachers remain in control when designing contextual materials tailored to students' characteristics. These studies confirm that AI integration is not merely a technological trend but a pedagogical necessity (Alam & Mohanty, 2023; Hamzah et al., 2024; Mehdaoui, 2024; Pedro et al., 2019).

Departing from these problems, this research presents an innovation in the form of a learning platform called PUDING (Digital Learning Library), which is strengthened by APEL (Children Who Love Literacy). APEL is an artificial intelligence system that functions as a virtual tutor. The platform was developed based on the principles of Self-Regulated Active Learning, encouraging students to learn independently and proactively through interactive AI guidance. The learning materials can be accessed through a website and are designed to foster educational interactions that spark curiosity, deepen text comprehension, and enhance critical reasoning and writing skills.

Based on this description, this study focuses on analyzing the implementation process of the artificial intelligence-based APEL learning platform in strengthening literacy among upper-grade students at SDN 61 Singkawang, as well as evaluating its effectiveness in improving literacy skills, particularly in comprehension, analysis, and text evaluation. This study aims to describe the systematic steps for implementing APEL and to examine its contribution to enhancing students' literacy capacity. The results are expected to provide practical insights for teachers in integrating AI-based technology into literacy instruction. Therefore, it is recommended that schools continue to optimize the use of the APEL platform with adequate infrastructure support and teacher training so that its implementation can be more effective and sustainable.

## METHOD

This study used a descriptive qualitative research design with a supportive quantitative approach to provide a comprehensive understanding of the implementation of the APEL platform in strengthening students' literacy skills. The qualitative approach is used to explore the learning process, student engagement, and teacher responses, while the quantitative aspect is reflected in the analysis of student progress scores and learning outcomes during the implementation.

This research was conducted in SDN 61 Singkawang, with a focus on high-grade students, namely grades IV, V, and VI. The mini research activity will take place throughout November 2025. The research subjects are students at this level who are actively involved in literacy habituation programs using the APEL platform.

The implementation steps follow a predefined flow as follows:

1. Preparation Phase: The researcher and the teacher verify the readiness of the supporting infrastructure, such as the internet network, gadgets, and technical understanding of the platform. Students are introduced to the learning objectives and access mechanisms to the PUDDING APEL website via the <https://s.id/anakpecintaliterasi> link .
2. Implementation Phase: Students undergo four stages of training progressively:
  - a) **Stage 1 (Identify Key Ideas):** Utilize the "Main Idea Space" app to practice defining key sentences in various paragraphs. Students start from the easiest level (Start) and can improve their level after achieving a minimum score of 80 consistently.
  - b) **Stage 2 (5W+1H Analysis):** Using the "RAPI" application to practice identifying the what, who, when, where, why, and how elements in a reading.
  - c) **Stage 3 (Intrinsic Element Analysis):** Using the "CERIA" application to analyze the elements of the story such as theme, characters, plot, and setting.
  - d) **Stage 4 (Paragraph Expansion):** Using the "Paragraph Flourish" app to practice developing ideas into whole paragraphs based on a specific theme.

Each stage begins with an introduction to the material through videos from sources such as Ruang Siswa or YouTube. The exercises are carried out collectively at the school under the guidance of the teacher, and continued independently by the students in their respective homes. Progress evaluations are conducted weekly, usually on Fridays.

**Monitoring and Evaluation Phase:** Teachers access the "History" feature available in each app to download student progress data. This data is then used as material for discussion and reflection for future learning planning.

## RESULT AND DISCUSSION

### Analysis of Research Results

From the observation and data analysis process during the research, a number of important findings were successfully identified.

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First, there has been a significant increase in the level of student involvement in literacy activities. The students show high enthusiasm when interacting with the app, especially because of its interactive nature and providing immediate responses. This is in line with the findings of Kosmas, et al. (2025) which state that AI integration can trigger increased learning participation. Students no longer feel bored with the usual reading routine, as they are motivated to complete challenges at any level of difficulty.

Second, independence in learning is starting to be seen. The principle of Self-Regulated Learning appears when students consciously choose a difficulty level, repeat the exercise if the grade target has not been achieved, and check their track record to see progress. They learn to set personal goals, such as the desire to move up to the intermediate level immediately, and try to achieve them through diligent practice (drilling). This confirms that the APEL platform has succeeded in fostering active and reflective learning habits.

Third, in terms of improving literacy skills, the quality of student responses showed improvement. At the beginning of the implementation, many students have difficulty distinguishing between the main idea and the explanatory idea, or are only able to mention a small part of the elements of 5W+1H. After going through a series of exercises with guidance and correction from APEL, students' answers became more complete, structured, and accurate. APEL plays the role of a patient tutor who provides clarification, a role that is difficult to perform individually by teachers in a class with a large number of students. The process of pouring the results of the analysis in description format also helps train students' writing skills, as stated by Stiggins (2002) that description-based assessments have a positive impact on the ability to articulate ideas.

Fourth, the position of teachers remains crucial even though technology is involved. Teachers not only act as technical facilitators, but also as designers of learning experiences. It is the teacher who selects the introductory material (video), sets the level-up criteria (at least 80 in some experiments), and most importantly, leads weekly evaluations to discuss the obstacles students face and provide encouragement. This proves the view of Silor & Silor (2025) that the effectiveness of AI-based tools is highly dependent on the active role of teachers in designing and contextualizing teaching materials.

Fifth, the learning history recording feature connected to Google Sheets through program code in Lovable has proven to be very useful for teachers in monitoring. Teachers can quickly identify which students have reached the Advanced level, which students are still at the Start level, as well as the patterns of errors that often appear. This data is the basis for more targeted interventions, for example by paying special attention to students who experience obstacles. This documentation system has succeeded in answering the evaluation problem that has been less than optimal due to limited time and resources.

The most significant obstacle encountered is the instability of the internet connection. Although the platform is designed to be lightweight and accessible at speeds of 1 Mbps, the reality is that in some locations where students live, the internet network is inadequate or even

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unavailable. As a result, independent training at home cannot run optimally. As a temporary solution, practice time at school is added or teachers lend devices with connection sharing. This factor is an important evaluation material for future development, for example by adding features that can be accessed offline in a limited way.

The response from fellow teachers was very encouraging. They see this platform as a breakthrough that makes it easier for teachers to get used to and monitor literacy. Some teachers have even expressed interest in adopting this platform in their respective classrooms. This indicates that these good practices have the potential to be replicated more widely.

In addition, the availability of a learning progress tracking feature provides significant benefits for monitoring and evaluation. Teachers can easily identify students' performance levels, detect common learning difficulties, and design more targeted interventions. This data-driven approach enhances the effectiveness of formative assessment and supports continuous improvement in the learning process.

However, several challenges were identified during the implementation. The most significant constraint was the instability of internet access, which limited students' ability to engage in independent learning outside the classroom. This indicates that technological innovation in education must be supported by adequate infrastructure to ensure equitable access for all students. Moreover, variations in students' digital literacy levels also influenced the effectiveness of platform utilization.

Overall, the findings demonstrate that the APEL platform is effective in enhancing literacy skills and fostering active, independent learning. The integration of artificial intelligence as a virtual tutor provides a personalized learning experience that supports continuous feedback and skill development. Nevertheless, to optimize its implementation, it is necessary to strengthen infrastructure support, improve teacher readiness in utilizing digital tools, and develop adaptive features that can accommodate varying levels of student access and ability.

## CONCLUSION

The implementation of the APEL artificial intelligence-based learning platform in upper grades at SDN 61 Singkawang was conducted through four systematic stages—main idea identification, 5W+1H analysis, intrinsic element analysis, and paragraph development—each structured with progressive levels of difficulty (Beginner, Intermediate, Advanced) and supported by automated feedback and learning history features. The program integrates in-class instruction with independent at-home practice and weekly evaluations, resulting in increased student participation, greater learning autonomy, improved text analysis skills, and more efficient teacher monitoring and assessment. APEL's personalized feedback enables students to independently identify and correct errors, while its tracking system supports more targeted pedagogical interventions. Overall, this practice demonstrates that integrating artificial intelligence as a virtual learning companion, alongside the essential role of teachers as facilitators and designers, can effectively enhance literacy development. For future research, it is recommended to explore the

scalability and adaptability of APEL across diverse educational contexts, particularly in schools with varying levels of technological infrastructure, as well as to examine its long-term impact on students’ higher-order literacy and critical thinking skills.

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