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ANALYSIS OF CHANGES IN LEARNING PATTERNS AND READING LITERACY OUTCOMES OF NABIRE ADVENTIST ELEMENTARY SCHOOL STUDENTS POST-IMPLEMENTATION OF ARTIFICIAL INTELLIGENCE TECHNOLOGY (A CASE STUDY)

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ABSTRACT

This study aims to analyze student perceptions and shifts in Self-Regulated Learning (SRL) patterns and reading literacy strategies within the specific context of SD Advent Nabire. Employing a qualitative intrinsic case study design, data were gathered through observation, in-depth interviews, and document analysis. The findings reveal that AI tools, such as Cici and Dola, foster student autonomy through instant feedback mechanisms. Theoretically, this study identifies a redefinition of cognitive control within SRL, where AI functions as digital scaffolding while simultaneously posing a risk of dependency that may degrade deep information processing. These results underscore a necessary shift in the teacher's role from an information transmitter to a critical facilitator and highlight the urgency of digital ethics policies to safeguard students' cognitive integrity in resource-constrained environments.

INTRODUCTION

The integration of technology in education within developing regions like Nabire faces significant infrastructural constraints. However, UNESCO (Miao et al., 2021) asserts that AI can equalize educational quality if managed through inclusive strategies. This potential establishes an urgent need for smart technology at Nabire Adventist Elementary School to bridge the gap in access to quality literacy materials. While AI promises adaptive learning paths that detect unique student profiles (Hwang et al., 2020), its implementation at the elementary level is not without risks. Specifically, generative tools may erode critical thinking and academic integrity if used merely as a shortcut (Dwivedi et al., 2023).

Current literature highlights a dichotomy in the impact of AI on K-12 education. On one hand, AI-based design can enhance engagement and basic literacy (Chiu, 2021; Su & Yang, 2023), acting as a "scaffolding" that fosters independence (Luckin & Cukurova, 2019). On the other hand, the dominance of systematic reviews and impact studies (Fitria, 2021; Tang et al., 2021) often overlooks the granular, qualitative shifts in student behavior. Despite these insights, a significant research gap remains: There is a lack of empirical evidence regarding how students in remote,

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resource-constrained areas navigate the tension between AI-driven autonomy and cognitive dependency. Most studies focus on motivation in well-equipped urban settings, leaving the qualitative dynamics of text comprehension strategies in underdeveloped regions underexplored.

This research addresses this gap by exploring the perceptions and experiences of students at Nabire Adventist Elementary School. The study aims to analyze the shifts in learning patterns—specifically independence and motivation—and investigate qualitative changes in reading literacy strategies. Theoretically, this study contributes to Human-Computer Interaction (HCI) theories in primary education. Practically, it provides a basis for school administrators to formulate ethical AI implementation strategies that safeguard students' cognitive integrity.

RESEARCH METHOD

This study employs a qualitative approach with an intrinsic case study design to achieve a "thick description" of the AI integration phenomenon at Nabire Adventist Elementary School (Stake, 1995). This design was selected to capture the nuanced dynamics of technology adaptation within the unique socio-technical constraints of a developing region.

The research participants were selected through purposive sampling to provide a multi-perspective view of AI implementation. They include three students (Naava, Karen, and Joshua) from Grades V and VI, representing varying levels of AI engagement, two core teachers, and one curriculum coordinator. Data were triangulated through three primary techniques: in-depth interviews, participant observation of classroom interactions, and document analysis of student learning outcomes and literacy artifacts.

Data analysis followed the interactive model by Miles, Huberman, and Saldaña (2020), consisting of three concurrent flows:

Data Condensation: Distilling complex field notes and transcripts into core thematic categories related to AI usage.

Data Display: Organizing the condensed data into analytical matrices to visualize shifts in learning patterns.

Conclusion Drawing and Verification: Identifying emerging themes and validating them through cross-case comparison to ensure the findings accurately reflect the impact of AI on reading literacy strategies.

RESULT AND DISCUSSION

The findings are categorized into three core themes reflecting the impact of AI integration at Nabire Adventist Elementary School.

Transformation of Learning Patterns: Toward Guided Independence

The integration of generative AI, specifically "Cici" and "Dola," has shifted student interaction from passive reception to active inquiry. Students utilize AI as an immediate feedback mechanism, allowing for internal comprehensionchecking without constant teacher intervention.

> *"I use Dola AI or Cici AI almost every day... I enjoy using AI to look up meanings of words or difficult expressions... I can test it directly in the Cici AI app."* (Interview with Naava and Joshua, November 17, 2025)

This transition reflects a constructivist approach where students actively build understanding (Birsyada, 2014). Furthermore, the psychological dimension of AI, noted by Karen as a "non-judgmental partners create a safe learning environment that fosters intrinsic motivation (Zourmpakis et al., 2023). This aligns with the "AI-as-Scaffolding" concept (Luckin & Cukurova, 2019), where structured digital assistance enables students to solve literacy problems independently.

Figure 1. Student activity using AI applications to support text comprehension.

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Source: Personal documentation.

Cognitive Challenges and the Redefined Role of the Teacher

Despite the efficiency gains, a risk of "cognitive shortcutting" emerges. Students noted that AI summaries occasionally strip away narrative depth. To counter this, teachers have shifted their pedagogical role from information transmitters to critical facilitators.

Mrs. Elisabeth, for instance, intervened by pivoting from written summaries to oral reasoning and locally contextualized assignments (e.g., connecting stories to Lake Paniai). This strategy confirms that in an AI-enhanced environment, the teacher's role is to ensure students process information deeply rather than merely copying outputs (Basic et al., 2023; Celik, 2023). This approach embodies critical pedagogy, requiring students to critique the validity and context of AI-generated content (Birsyada, 2015).

Figure 2. Student answer verification process using an AI application.

Source: Personal documentation.

Ethics, Privacy, and School Governance

The rapid adoption of AI has outpaced formal school policy. Mr. Claudio, the Curriculum Coordinator, highlighted a critical gap in institutional oversight:

> *"Current policies are still in the form of oral guidelines, but we recognize the urgency of formalizing a written policy regulating copyright, ethics, and plagiarism."* (Interview with Mr. Claudio, November 17, 2025)

This lack of formal framework emphasizes the need for "AI Literacy"—understanding the machine's logic and ethical limitations rather than just its functional use (Ng et al., 2021; Kong & Zhang, 2023). Effective integration in the Society 5.0 era must be underpinned by ethical guidelines to ensure technology serves human development while safeguarding data privacy (Adams et al., 2023; Birsyada & Siswanta, 2021).

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CONCLUSIONS

The integration of AI at Nabire Adventist Elementary School has successfully fostered Self-Regulated Learning (SRL) and enhanced literacy motivation by providing a personalized, low-anxiety learning environment. Tools like Cici and Dola function as effective digital scaffolding; however, their success depends on pedagogical interventions that prevent cognitive dependency and the erosion of critical thinking. To sustain these gains, it is recommended that the institution immediately formalize digital ethics policies and strengthen AI literacy for **educators**. These steps are crucial to ensuring that technology catalyzes deep learning while maintaining the teacher's vital role as a critical facilitator.

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