

Beyond traditional methods: how Elementary teachers in DepEd Dingras District I navigate AI-powered tools – a qualitative inquiry

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Abstract: This qualitative case study examines how elementary teachers in DepEd Dingras District I adopt AI-powered tools, exploring their experiences, challenges, and perceptions. The research addresses three key questions: (1) how teachers discover, learn, and integrate AI into daily instruction; (2) technical, pedagogical, and systemic barriers they face; and (3) their views on AI's role in improving teaching efficiency and student engagement compared to traditional methods. Using purposive and snowball sampling, 10–15 teachers with AI experience were selected for in-depth interviews until thematic saturation was achieved. Findings reveal that AI enhances efficiency through task automation and personalized instruction, yet barriers such as technological intimidation, infrastructure gaps, and privacy concerns hinder adoption. Teachers employ hybrid strategies, blending AI with traditional methods, while emphasizing the need for structured training and peer collaboration. The study concludes that successful AI integration requires a multi-level approach—phased teacher training, infrastructure upgrades, and policy frameworks for ethical implementation. Recommendations include competency-based professional development, equitable resource allocation, and pilot testing in Dingras District I to refine scalable solutions. This research contributes to understanding AI adoption in Philippine public elementary schools, balancing innovation with pedagogical integrity.

Keywords: AI Adoption in Education, Teacher Technology Integration, Barriers to AI Implementation

Date Submitted: May 10, 2025

Date Accepted: May 15, 2025

Date Published: May 19, 2025

INTRODUCTION

Elementary teachers are increasingly adopting AI tools to enhance pedagogy, streamline administrative tasks, and promote equitable learning. The primary drivers include efficiency gains through automated grading and lesson planning (Darmawan et al., 2024; Sugiarso et al., 2024), personalized learning via adaptive AI systems (Ruslim & Khalid, 2024; Zulkarnain & Yunus, 2023), and support for hybrid education models through interactive platforms (Клеба et al., 2024). Institutional training programs have proven crucial for successful implementation, boosting teacher confidence in AI utilization (He & Chung, 2024). However, ethical concerns regarding data privacy, algorithmic bias, and technological over-reliance present ongoing challenges (YUMBUL & SULAK, 2024).

In classroom applications, AI demonstrates transformative potential across multiple domains. Lesson planning tools like ChatGPT and MagicSchool generate customized content while reducing preparation time (Kiryakova, 2024). Assessment systems employing neural networks automate grading with high objectivity (Liu, 2024), and platforms like Quizizz enhance digital literacy (Andriani et al., 2023). AI-driven classroom management tools analyze student behavior to optimize learning environments (Kim & Kim, 2024), while interactive applications foster engagement through adaptive content (Bansal, 2023; Saputra et al., 2024). However,

global adoption varies significantly, with developing nations facing infrastructure limitations and training deficits that hinder implementation (Lubis et al., 2024).

The integration of AI in rural and underserved schools encounters multifaceted barriers. Infrastructure challenges including unreliable internet connectivity and inadequate hardware persist (Lubis et al., 2024; Xu, 2024), compounded by cultural mismatches between AI systems and local educational contexts (Singh & Jindal, 2024). Teacher apprehension stemming from insufficient training further slows adoption (Souza et al., 2024), while policy gaps perpetuate inequitable access ("Leveraging AI To Bridge Educational Inequities," 2024). Successful case studies, such as Brazil's nationwide AI education initiative (Isotani et al., 2023), demonstrate that targeted investments and public-private partnerships can overcome these obstacles.

Empirical evidence highlights AI's positive impact on educational outcomes. Teachers benefit from reduced administrative burdens and enhanced instructional capabilities (Joel et al., 2024), while students show improved academic performance through personalized learning systems (Annuš & Kmet', 2024). AI tools have proven particularly effective in STEM education, with adaptive platforms boosting math proficiency (Pramukawati et al., 2024), and in developing 21st-century skills through project-based applications (Aravantinos et al., 2024). Nevertheless, persistent challenges including technological disparities (Kumar, 2024) and ethical concerns (Dubey, 2024) underscore the need for comprehensive policy frameworks.

To fully realize AI's educational potential, policymakers must prioritize three key areas: infrastructure development to ensure equitable access (Nasser, 2024), robust teacher training programs (Pramukawati et al., 2024), and ethical guidelines addressing data privacy and algorithmic transparency (Xiao et al., 2025). Strategic investments following models like India's collaborative funding approach (Singh & Jindal, 2024) can help bridge the digital divide while maintaining pedagogical quality. As AI continues to evolve, its thoughtful integration promises to transform elementary education, provided implementation addresses both technological capabilities and human factors.

Statement of the problem

This study was conducted to answer the research titled "Beyond Traditional Methods: How Elementary Teachers in DepEd Dingras District I Navigate AI-Powered Tools – A Qualitative Inquiry".

Specifically, it opts to answer the following questions:

1. How do elementary teachers in Dingras District I discover, learn, and integrate AI tools into their daily instruction?
2. Barriers that elementary teachers in Dingras face when using AI-powered tools:
 - a. technical;
 - b. pedagogical; and
 - c. systematic.
3. How do teachers view the role of AI in improving their teaching efficiency and student engagement compared to traditional methods?

METHODOLOGY

Research design

This study employs a qualitative case study approach (Yin, 2018) to explore how elementary teachers in DepEd Dingras District I navigate AI-powered tools in their instructional practices.

The design is grounded in an interpretivist paradigm (Creswell & Poth, 2018), which prioritizes understanding participants lived experiences and subjective meanings as they adopt AI technologies. Data will be collected through semi-structured interviews (Brinkmann & Kvale, 2015) with 10 purposively sampled teachers who have firsthand experience using AI tools like ChatGPT, adaptive learning platforms, or automated grading systems. Interviews will focus on three core themes aligned with the research questions: (1) discovery and integration processes, (2) technical/pedagogical/systemic barriers, and (3) perceived impacts on teaching efficiency and student engagement.

Respondents and locale of the study

This study focuses on elementary school teachers within the DepEd Dingras District I who have experience using AI-powered tools in their teaching practices. The research population includes public elementary teachers (Grades 1–6) who have actively integrated or experimented with AI-based technologies, such as ChatGPT, adaptive learning platforms, or AI-assisted lesson planning tools. To ensure diverse perspectives, both tech-savvy educators and those with limited experience in AI will be considered. Given the qualitative nature of this inquiry, the study will employ purposive sampling to select participants who can provide meaningful insights into how they navigate AI in education.

Research instrument

This study employs a semi-structured interview guide as the primary data collection tool to examine how elementary teachers in DepEd Dingras District I navigate AI-powered tools in their instructional practices. The instrument consists of five core open-ended questions designed to elicit rich, detailed responses from the target population, public elementary teachers (Grades 1–6) who have experience using AI tools such as ChatGPT, adaptive learning platforms, or automated grading systems.

Data analyses procedure

Qualitative responses were exported to Microsoft Excel for thematic analysis using Braun & Clarke's framework. After anonymizing respondents (R1-R10), I coded emerging patterns about AI adoption barriers and benefits. Peer debriefing validated the coding structure, while member checking with three participants ensured accuracy. Negative cases were examined to strengthen the findings' credibility and depth.

FINDINGS AND DISCUSSION

Perceived benefits

The research theme highlights how AI tools significantly enhance teaching efficiency by reducing time spent on routine tasks while maintaining instructional quality (Zhao, 2023; Sipahioğlu, 2024). Participants consistently reported that AI streamlines labor-intensive processes like assessment creation (Vetrivel et al., 2024), with one teacher noting the ability to generate multiple quiz variants in minutes rather than hours (P5). This time-saving advantage allows educators to reallocate effort toward personalized instruction (Silva et al., 2025), as evidenced by the need to adapt AI-generated materials to student levels (P5). The perceived improvement in teaching effectiveness (P3) stems not only from reduced workload but also from

AI's capacity to provide rapid access to diverse educational resources (P1) (Sahito et al., 2024). Importantly, teachers emphasized the accessibility of these tools, with even technologically modest educators finding them usable (P3) (Sibug et al., 2024).

Benefits in adopting AI

Teachers report that AI significantly enhances student engagement through gamification (Delello et al., 2024), enabling interactive learning experiences that were previously time-prohibitive to create (P1, P10). The technology's capacity to automate labor-intensive tasks like assessment generation (P1, P7) and lesson planning (P3) creates substantial efficiency gains (Taşkın, 2025), allowing educators to reallocate time toward instructional refinement. Notably, participants employ a strategic hybrid approach (Boumediene & Bouakkaz, 2024), leveraging AI for preparatory work while maintaining traditional delivery methods when pedagogically appropriate (P5). Beyond classroom applications, AI serves as a powerful professional development tool (Evangelista et al., 2023), evolving from basic content generation to sophisticated functions like curriculum alignment and research synthesis (P5, P9). The theme further reveals AI's growing role in data-driven instruction (Rasheed et al., 2023), particularly in personalizing learning materials and generating actionable feedback to inform teaching decisions (P3, P9).

Adoption requirements

Participants identified basic digital literacy as a fundamental requirement (Sibug et al., 2024), with one teacher emphasizing that computer competence is non-negotiable for effective AI tool utilization (P4). This finding is compounded by expressed anxieties about technological transitions (Agonas et al., 2024), where educators report feeling overwhelmed when encountering unfamiliar systems (P5).

Adoption barriers

Technological intimidation emerges as a significant challenge (Mastul et al., 2023), with teachers expressing discomfort when encountering unfamiliar systems (P9). Compounding this issue are severe time constraints from existing workloads that limit opportunities for experimentation (P10) (Rodrigo, 2021). Privacy concerns regarding student data protection create additional hesitancy (P1) (Berg, 2024), while the lack of institutional support leaves educators to navigate AI implementation independently (P6) (Estrellado & Miranda, 2023). Reliability issues further undermine confidence (Delello et al., 2024), as irrelevant AI-generated content requires additional vetting (P2).

Implementation strategies

Participants advocate for a gradual adoption process (Pramukawati et al., 2024), beginning with simple, user-friendly tools to build confidence and competence (P1). Teachers emphasize the value of peer networks as critical support systems (Evangelista et al., 2023), where colleagues provide informal training and troubleshooting assistance (P8). Importantly, successful implementation requires careful alignment with existing curricular objectives (Silva et al., 2025),

with educators recommending focused application of AI to complement rather than disrupt established teaching plans (P10).

Identified risks

Participants express concerns about potential over-reliance (Berg, 2024), fearing excessive dependence on tools that may become unavailable during technical disruptions (P4, P10). Accuracy issues emerge as another significant risk (Taşkın, 2025), with teachers wary of misinformation in AI-generated content (P6). Privacy considerations further complicate adoption (Boumediene & Bouakkaz, 2024), as educators question how to protect sensitive student data when using these tools (P2).

Mitigation strategies

Participants advocate using AI as a supplementary rather than primary resource (P8) (Delello et al., 2024), maintaining human oversight of instructional content. Teachers simultaneously emphasize preserving critical thinking development by limiting over-reliance on automated solutions (P1) (Taşkın, 2025). These approaches demonstrate educators' cautious balancing of technological efficiency with pedagogical integrity (Chisom et al., 2024).

CONCLUSIONS AND RECOMMENDATIONS

This qualitative study explored the adoption of AI tools among elementary teachers in DepEd Dingras District I. The findings confirm that AI enhances teaching efficiency by automating administrative tasks, personalizing instruction, and improving student engagement—echoing prior research on AI's transformative potential in lesson planning and assessment (Silva et al., 2025; Sahito et al., 2024). However, the study also highlights persistent barriers, including technological intimidation, time constraints, and privacy concerns, which mirror broader challenges identified in Philippine public schools (Mastul et al., 2023; Estrellado & Miranda, 2023). Teachers' cautious yet strategic integration of AI—using hybrid approaches and peer collaboration—reflects the literature's emphasis on gradual adoption and professional development (Evangelista et al., 2023; Pramukawati et al., 2024). Despite AI's benefits, participants raised ethical and pedagogical risks, such as over-reliance and data privacy, reinforcing concerns in global studies (Berg, 2024; Delello et al., 2024). Ultimately, this study underscores the need for structured training, institutional support, and policy frameworks to optimize AI adoption, ensuring that technological advancements align with equitable and effective pedagogy in Philippine elementary education.

The findings underscore the necessity for comprehensive teacher training programs, institutional infrastructure upgrades, and clear policy guidelines to facilitate sustainable AI integration in Philippine elementary schools. Structured professional development should address both technical competencies and pedagogical strategies for AI use, while schools require improved digital resources and technical support to mitigate accessibility gaps. At the policy level, the Department of Education must establish frameworks for ethical AI implementation, including data privacy protocols and equitable access measures, to ensure these technologies enhance rather than exacerbate educational disparities. Only through this multi-level approach—combining capacity-building, resource allocation, and governance—can AI tools be effectively

harnessed to transform teaching practices while safeguarding educational quality and inclusivity in public elementary education.

To maximize the benefits of AI while addressing identified challenges, a three-pronged implementation strategy is recommended. First, DepEd should develop a phased, competency-based teacher training program that progresses from basic digital literacy to advanced AI integration techniques, incorporating peer mentoring systems to sustain adoption. Second, infrastructure improvements must prioritize reliable internet connectivity and provision of AI-compatible devices, with targeted funding for underserved schools to prevent digital divides. Finally, policy reforms should establish clear guidelines on ethical AI use, including standardized data privacy measures and quality control protocols for AI-generated educational materials. These interventions should be piloted in Dingras District I as a model for scalable implementation, with continuous feedback mechanisms to refine approaches based on teacher experiences and student outcomes. This balanced framework ensures AI adoption enhances pedagogical effectiveness while mitigating risks associated with technological integration in resource-constrained educational settings.

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