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ARTIFICIAL INTELLIGENCE (AI) AWARENESS AND THEIR UTILIZATION ON THE TEACHING STRATEGIES AMONG ELEMENTARY SCHOOL TEACHERS

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ABSTRACT

The study aimed to assess teachers' AI awareness in adaptation, productivity, ethics, and governance, and evaluate AI-based strategies in personalization, instruction, assessment, feedback, and classroom management. Furthermore, the study investigated the significant relationship between teachers' AI awareness and utilization and their teaching strategies using AI. A descriptive-correlational research design was employed, involving 92 elementary school teachers from the Pangantucan South District, Division of Bukidnon, during the 2025–2026 school year. Data were collected using a validated researcher-made instrument, pilot-tested with a Cronbach's alpha of 0.82, and achieved a reliability coefficient of 0.983 in the main study. Descriptive statistics, including mean and standard deviation, were used to determine the levels of AI awareness and teaching strategies, while Pearson's r was utilized to assess significant relationships between the variables. Findings revealed that teachers frequently utilized AI across all measured dimensions, yet their AI-based teaching strategies were only moderately effective. Moreover, significant relationships were found between teachers' AI awareness and utilization particularly in AI impact, productivity enhancement, and governance and their teaching strategies. The study concluded that teachers' familiarity with AI provides a strong foundation for continued integration, but there is a need to enhance the depth and effectiveness of AI-based instructional strategies. Recommendations include ongoing professional development for teachers, structured support and guidelines from school administrators, and further research on long-term effects and ethical frameworks for AI integration in elementary education.

***KEYWORDS*:** (AI) Artificial Intelligence Awareness, Teaching Strategies, Elementary Teachers.

INTRODUCTION

In the rapidly evolving educational landscape, technological advancements have significantly reshaped teaching and learning modalities. One of the most transformative innovations is Artificial Intelligence (AI), which has started to influence pedagogical strategies across educational levels. However, despite its potential to enhance personalized learning, automate assessments, and support differentiated instruction, AI remains underutilized in many elementary schools, particularly in developing countries like the Philippines. There is still a heavy reliance on traditional methods, with many teachers lacking both access and exposure to AI-powered tools that could otherwise improve learning outcomes and efficiency.

The current gap in the integration of AI in teaching strategies among elementary school teachers can be attributed to several interrelated factors. These include inadequate professional development opportunities focused on AI, limited digital infrastructure in public schools, and the absence of clear policies and frameworks to guide AI adoption in basic education. Moreover, a significant number of teachers express uncertainty or apprehension regarding the use of AI, often due to insufficient digital literacy or fear of technology replacing human roles in teaching. These concerns are compounded by a lack of empirical research exploring how AI can be meaningfully and contextually embedded in elementary-level instruction in the Philippine setting.

This problematic situation is further aggravated by the increasing demands for 21st-century education, which calls for innovative and learner-centered teaching strategies. As the Department of Education pushes for the development of critical thinking, creativity, and digital literacy among Filipino learners, there is a pressing need to equip teachers with emerging technologies that can support these goals. However, the disconnect between policy aspirations and classroom realities such as overburdened teachers, limited technical support, and inconsistent internet connectivity continues to hinder effective AI integration in the public elementary education sector.

Amidst these challenges, several Filipino scholars and education authorities have underscored the potential of AI to support teacher efficiency and improve learning outcomes. According to Mercado (2023), AI-based tools such as intelligent tutoring systems, chatbots, and learning analytics platforms can help teachers provide timely feedback, identify learners' academic needs, and facilitate individualized instruction. Similarly, the study by Ramos and Villanueva

(2022) emphasized the role of AI in supporting inclusive education by catering to diverse learning styles and needs, particularly in multilingual and multicultural classrooms common in the Philippines.

Rosqueta (2025) conducted an in-depth qualitative study among elementary teachers in DepEd, documenting firsthand how they discover, learn, and integrate AI-powered tools into instruction. Participants identified benefits such as automated quiz creation and personalized learning paths, yet also cited significant barriers, including technical intimidation, lack of infrastructure, and data privacy concerns. Teachers often combined AI tools with traditional methods creating a hybrid teaching approach that balances innovation with instructional integrity.

Sibug, Clemente, and Reyes (2024) reported on a conference study surveying Filipino teachers across multiple regions, revealing a generally positive yet cautious outlook toward classroom AI integration. Despite expressing anxiety and reservations, participants welcomed the idea of AI as a complement—not replacement—to conventional pedagogy, especially for tailoring instruction and reducing administrative workload.

As such, this study was situated within a critical intersection of technological advancement and educational reform. It seeks to investigate how elementary school teachers in the Philippines utilize AI in their teaching strategies, identify barriers to effective adoption, and propose actionable recommendations. By contributing empirical data and insights, the study aims to bridge the gap between technological innovation and practical classroom application, ultimately supporting the professional growth of teachers and the holistic development of Filipino learners.

Conceptual Framework of the Study

This study was anchored to the Technology Acceptance Model (TAM) developed by Davis (1989), which posits that the adoption and utilization of technological innovations such as Artificial Intelligence (AI) are largely determined by two key factors: perceived usefulness and perceived ease of use. In the context of education, TAM provides a valuable lens to examine how teachers' acceptance and integration of AI tools into their teaching strategies are shaped by their beliefs about how such tools can enhance instructional delivery and learning outcomes. This theory is highly relevant as the Philippine basic education system increasingly advocates for digital transformation to meet 21st-century learning standards.

Artificial Intelligence, as a transformative technology, has the potential to improve educational practices by offering adaptive learning environments, personalized instruction,

automated assessments, and real-time feedback. In the Philippine setting, however, the integration of AI in elementary education remains at a nascent stage due to several contextual challenges, including limited teacher training on digital tools, inadequate infrastructure, and lack of AI-specific policy guidelines. These barriers are echoed in the findings of Ramos and Villanueva (2022), who emphasized that while Filipino teachers acknowledge the value of AI in inclusive and differentiated instruction, the lack of support mechanisms and digital literacy continues to hinder its practical application in the classroom.

The conceptual framework of this study was structured around two primary variables: the independent variable, which is the utilization of Artificial Intelligence (including dimensions such as access to AI tools, frequency of use, types of AI technologies used, and teacher readiness); and the dependent variable, which is the teaching strategies of elementary school teachers (including lesson planning, instructional delivery, classroom management, assessment, and learner engagement). This framework seeks to understand how AI utilization affects and possibly transforms teaching strategies, especially in adapting instruction to learner diversity, improving classroom efficiency, and fostering more student-centered pedagogies.

Additionally, this study acknowledges the influence of moderating variables such as the availability of digital infrastructure, the level of administrative and policy support, and opportunities for teacher professional development. According to the Department of Science and Technology – Science Education Institute (DOST-SEI, 2023), the implementation of AI in Philippine education requires strategic investment in teacher training, resource provision, and research-based innovation models. Furthermore, the Department of Education (DepEd, 2024), through its MATATAG Agenda, underscores the integration of digital technologies and modern instructional tools as essential elements in revitalizing teaching and learning processes. These national frameworks align with the aims of this study, reinforcing its significance in contributing to educational transformation.

By exploring the interplay between AI utilization and teaching strategies, this study contributes to the growing body of knowledge that supports technology-driven educational reforms. It is particularly significant for stakeholders in the Philippine basic education sector who are working to align classroom practices with global digital competencies. Through its conceptual framework, the study not only aims to identify current practices and barriers but also to propose strategic recommendations that could inform policy, curriculum development, and teacher capacity-building initiatives. Ultimately, the framework provides a scholarly

foundation for examining how AI can be a catalyst for more responsive, inclusive, and innovative teaching in elementary education.

As shown in the schematic diagram, the independent variable on the left side contains the teacher's artificial intelligence awareness in terms of AI adaption and integration, AI impact and productivity enhancement, and AI governance, ethics, and risk awareness. On the right side of the diagram is teachers' teaching strategies of elementary school teachers using AI in terms of personalized and adaptive instruction using AI, AI-enhanced assessment, feedback, and content creation, and AI integration for classroom management and instructional efficiency. Figure 1 presents the schematic diagram of the study.

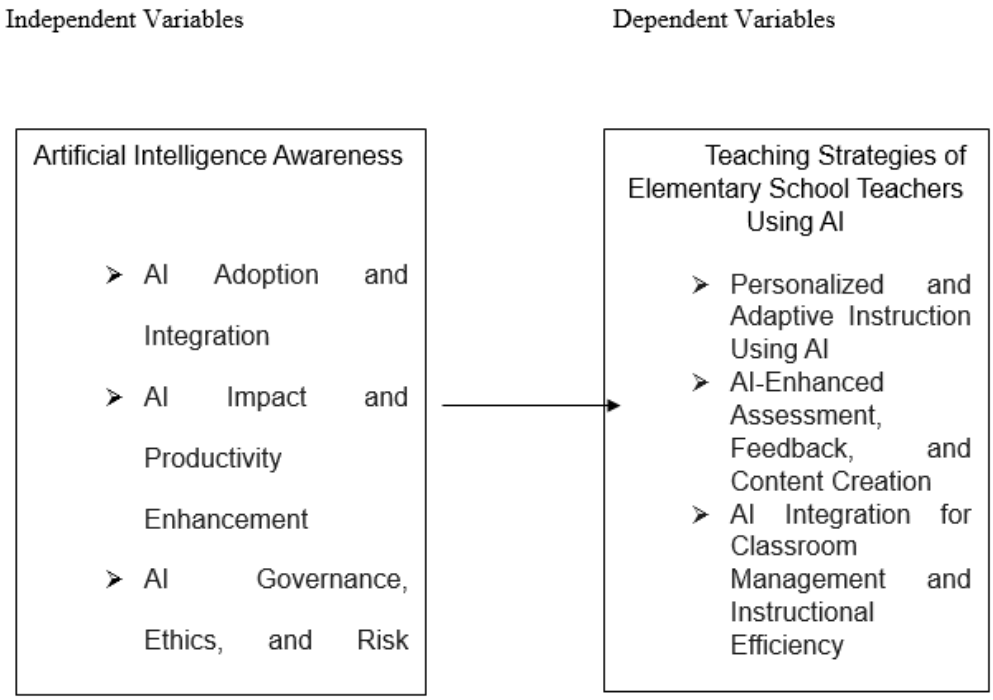

Figure 1. A schematic diagram showing the relationships of variables.

Significance of the Study

This study on the utilization of Artificial Intelligence (AI) in the teaching strategies of elementary school teachers holds substantial relevance to various stakeholders in the Philippine education system. As the demands of 21st-century learning continue to grow, understanding the impact of AI on pedagogical practices is crucial to ensuring responsive, inclusive, and innovative approaches to basic education.

To the learners, they were the primary beneficiaries of this study, as the effective use of AI in classroom instruction is expected to promote personalized learning experiences, foster learner engagement, and support diverse learning needs. With AI-assisted tools such as adaptive

learning platforms and intelligent tutoring systems, learners may receive immediate feedback, targeted interventions, and varied content delivery based on their individual pace and abilities. This study would contribute to the improvement of teaching strategies that nurture critical thinking, creativity, and digital literacy among elementary learners, thereby enhancing overall academic performance and learning outcomes.

To the teachers, for elementary school teachers, this study serves as a valuable reference on how AI can be practically integrated into everyday teaching strategies. It would offer insights into the kinds of AI tools available, their potential benefits in instructional planning and assessment, and the challenges associated with their adoption. The findings of the study can guide teachers in developing more efficient and innovative instructional practices, equipping them with the competencies needed to thrive in technology-enhanced learning environments. Moreover, it encourages teachers to become lifelong learners by adapting to emerging technologies that support professional growth and pedagogical effectiveness.

To the school administrators, school administrators played a critical role in facilitating AI integration by providing necessary infrastructure, training opportunities, and policy support. This study would aid school heads and district supervisors in understanding the current level of AI utilization among teachers, the enablers and barriers affecting its implementation, and the implications for curriculum delivery and school management. The results of the study can inform data-driven decision-making on resource allocation, ICT program development, and the formulation of school-based policies that support digital transformation in basic education.

To future researchers, this study offered a rich foundation for future research in the fields of educational technology, teacher development, and instructional innovation. Documenting current practices and challenges in AI integration, it opens avenues for further studies on impact evaluation, comparative research across different regions or school types, and longitudinal analysis of AI's influence on learner achievement. Future researchers can build upon this study to explore more advanced applications of AI or design intervention programs that support digital equity and inclusion in the Philippine education context.

Definition of Terms

The following terms were defined in this study to ensure easy understanding.

AI Adaptation and Integration. AI Adaptation and Integration refers to the process through which teachers and schools begin to accept, utilize, and incorporate artificial intelligence tools into instructional practices, classroom activities, and educational decision-making. It

involves both the initial acceptance of AI technologies and their continuous integration into teaching and learning systems.

AI-Enhanced Assessment, Feedback, and Content Creation. AI-Enhanced Assessment, Feedback, and Content Creation refers to the use of artificial intelligence tools to assist in designing instructional materials, generating assessments, providing instant feedback, and adapting content to match learning objectives and individual student needs.

AI Impact and Productivity Enhancement. AI Impact and Productivity Enhancement refers to the AI Impact and Productivity Enhancement refers to the improvement of teaching effectiveness and instructional efficiency through the use of AI tools. This includes reducing manual tasks, streamlining lesson preparation, and increasing the overall productivity of educators in the classroom.

AI Integration for Classroom Management and Instructional Efficiency. AI Integration for Classroom Management and Instructional Efficiency refers to
The application of AI tools to support classroom operations, such as attendance tracking, behavior monitoring, time management, and instructional planning. It enhances the organization and flow of teaching while supporting data-informed decisions.

AI Governance, Ethics, and Risk Awareness. AI Governance, Ethics, and Risk Awareness refers to an understanding of the responsible use of artificial intelligence in education. This includes awareness of ethical practices, data privacy, fairness, and accountability to ensure that AI use supports the safety and rights of learners and educators.

Artificial Intelligence Utilization. Artificial Intelligence Utilization refers to the extent to which teachers apply AI tools in instructional tasks, lesson delivery, learner evaluation, and classroom activities. It encompasses both the frequency and purpose of AI use in teaching and learning.

Personalized and Adaptive Instruction Using AI. Personalized and Adaptive Instruction Using AI refers to the delivery of learning experiences that are tailored to individual student needs, preferences, and learning progress through AI systems. These tools modify instructional approaches in real-time to support better learning outcomes.

Teaching Strategies of Elementary School Teachers. Teaching Strategies of Elementary School Teachers refers to the instructional methods and techniques used by elementary educators to promote learning. These strategies include lesson planning, content delivery, assessment, and classroom engagement, and may be enhanced through the integration of AI tools.

The Methodology

Research Design

The investigation utilized the descriptive-correlational research design. Data gathered was analyzed quantitatively. Descriptive method was used for the study to describe the teacher's artificial intelligence utilization in terms of AI adoption and integration, AI impact and productivity enhancement, and AI governance, ethics, and risk awareness; find out the teachers' teaching strategies of elementary school teachers using AI in terms of: personalized and adaptive instruction using AI, AI enhanced assessment, feedback, and content creation, and AI integration for classroom management and instructional efficiency; and the correlate the significant relationship between the level of the teacher's artificial intelligence utilization and their teaching strategies using AI.

Research Locale

This study was conducted in the elementary schools under the jurisdiction of Pangantucan South District, one of the educational districts within the Division of Bukidnon, during School Year 2025–2026. The Pangantucan South District is a rural educational cluster situated in the municipality of Pangantucan, located in the southwestern part of Bukidnon Province, Northern Mindanao, Philippines.

Pangantucan is a first-class municipality known for its rich agricultural lands, diverse cultural heritage, and proximity to the majestic Mount Kalatungan Range Natural Park, a protected area that serves as one of the biodiversity hotspots in the country. The municipality is predominantly inhabited by indigenous people (notably the Manobo tribe), lowland settlers, and farmers whose livelihood centers on corn, sugarcane, coffee, banana, and vegetable farming. Despite its vast natural resources and growing population, many areas within the municipality remain geographically isolated and disadvantaged, posing challenges to the equitable delivery of basic education services.

The Pangantucan South District office is based at Langcataon Central Elementary School, which serves as the district's administrative and instructional hub. The district encompasses several elementary schools scattered across remote barangays, namely: Kipaducan Elementary School, New Iloilo Elementary School, Balogo Elementary School, Malipayon Elementary School, Kimanait Elementary School, Payad Elementary School, Bangahan Elementary School, and Upper Rancho Elementary School.

These schools cater to multi-grade learners and operate in far-flung communities characterized by rugged terrain, intermittent access to electricity and internet, and limited

transportation infrastructure. Teachers often walk long distances or ride motorcycles over unpaved roads just to reach their stations, while learners cross rivers or footpaths to attend classes.

Given these contextual realities, Pangantucan South District presents a relevant and meaningful setting for studying educational interventions—particularly those aimed at improving school-based programs such as disaster risk reduction, learner support, and inclusive education. The selected schools provide a rich ground for observing the implementation of educational practices in a rural, multicultural, and disaster-prone context, making the findings of this study potentially valuable for both local and national education stakeholders. Figure 2 shows the map of Pangantucan, Bukidnon.

Respondents of the Study

The respondents of the study are the 92 elementary teachers in Pangantucan South District, Division of Bukidnon, school year 2025-2026. Total enumeration sampling was employed in this study. This is a type of purposive sampling technique where the entire population that meets the defined criteria is included as respondents. This approach eliminates sampling bias and allows for making the findings more reflective of the actual conditions and behaviors within the district.

Sampling Procedure

Total enumeration sampling was employed in this study. This is a type of purposive sampling technique where all members of a clearly defined population were included as respondents. In this case, all teachers from the elementary schools of Pangantucan South District who were involved in school health campaigns were considered participants. This method was appropriate when the entire population is small and accessible, and when it is crucial to capture comprehensive data without omitting any relevant individuals (Lavrakas, 2018). Total enumeration eliminates sampling bias by ensuring that every eligible member of the population is represented, leading to more accurate and complete findings.

This approach was especially beneficial in institutional or school-based research where the entire population shares a specific role or responsibility, such as involvement in school health initiatives. According to Creswell and Creswell (2018), total population sampling provides opportunities to examine trends and patterns across the full scope of the target group, making the results more reflective of the actual practices and conditions in the field. While this technique may require more resources and coordination, it was justified in this study because

the population is well-defined, manageable in size, and directly related to the research objective. Moreover, it strengthened the internal validity of the study since data were collected from all potential information sources within the context.

Research Instrument

The research instrument utilized in this study was researcher-made. It was content validated and pilot tested to test its validity and reliability. It would involve 30 elementary teachers in the pilot testing of the research questionnaire. The two questionnaires were on the artificial intelligence utilization in the teaching strategies of elementary school teachers. The teacher's artificial intelligence utilization includes the AI adoption and integration, AI impact and productivity enhancement, and AI governance, ethics, and risk awareness. The teaching strategies of elementary school teachers using AI consider personalized and adaptive instruction using AI, AI-enhanced assessment, feedback, and content creation, and AI integration for classroom management and instructional efficiency.

Validation of the instrument

The said questionnaires were piloted at Kadingilan Central Elementary School to test their validity and reliability. A pilot test with 30 elementary grade teachers was conducted, and the instrument demonstrated strong internal consistency (Cronbach's Alpha = 0.82). Feedback from participants confirmed the clarity and relevance of the items, ensuring both face and construct validity.

Scoring Procedure

The Likert Scale was used to answer on the teacher's artificial intelligence utilization following the scoring procedure:

Numerical Rating	Range	Descriptive Rating	Qualitative Interpretation
5	4.20-5.00	Strongly Agree	Highly Utilized
4	3.40-4.19	Agree	Frequently Utilized
3	2.60-3.39	Neither	Frequently Utilized
2	1.80-2.59	Disagree	Minimally Utilized
1	1.00-1.79	Strongly Disagree	Not Utilized

The Likert Scale that was used to answer the teachers' teaching strategies of elementary school teachers using AI, following the scoring procedure:

Numerical Rating	Range	Descriptive Rating	Qualitative Interpretation
5	4.20-5.00	Strongly Agree	Highly Effective
4	3.40-4.19	Agree	Moderately Effective
3	2.60-3.39	Neither	Effective

2	1.80-2.59	Disagree	Less Effective
1	1.00-1.79	Strongly Disagree	Not Effective

Data Gathering Procedure

A formal request for the data collection was secured from the Schools' Division Superintendent, then to the Public Schools' District Supervisor and school administrators, to allow the researcher to administer the survey questionnaire. The researcher personally visits the schools to administer and retrieve the questionnaire. As soon as the research questionnaires were collected, the researcher immediately checked, tallied, tabulated, presented, and analyzed the data to be gathered as part of the main text of this study.

FINDINGS

The level of the teacher's artificial intelligence awareness in terms of AI adaptation and integration, AI impact and productivity enhancement, AI governance, ethics, and risk awareness was frequently utilized.

The level of teachers' teaching strategies of elementary school teachers using AI in terms of personalized and adaptive instruction using AI, AI-enhanced assessment, feedback, and AI integration for classroom management and instructional efficiency were all moderately effective.

The test of the significant relationship between the level of the teacher's artificial intelligence awareness and utilization in terms of AI impact and productivity enhancement, and AI governance, ethics, and risk awareness, had significant relationships with the teaching strategies using AI.

CONCLUSIONS

Elementary school teachers demonstrate a generally high level of awareness and utilization of artificial intelligence. Teachers frequently utilize AI in terms of adaptation and integration, impact on productivity, governance, ethics, and risk awareness. This suggests that teachers are already familiar with AI concepts and tools and are able to recognize their value in supporting instructional and professional tasks. Such awareness reflects a positive disposition toward AI and provides a strong foundation for its continued and expanded use in educational settings.

Teachers' AI-based teaching strategies are present but remain at a moderate level of effectiveness. Although teachers are aware of and frequently utilize AI, their teaching strategies using AI, particularly in personalized and adaptive instruction, AI-enhanced

assessment and feedback, and classroom management and instructional efficiency, are only moderately effective. This implies that while AI is being used in classrooms, there is still room to improve how deeply and skillfully it is integrated into instructional practices to maximize its potential impact on teaching and learning.

Teachers' awareness and utilization of AI significantly influence their teaching strategies using AI. The significant relationships found between AI awareness and utilization, especially in terms of AI impact and productivity enhancement, AI governance, ethics, and risk awareness, and teaching strategies using AI, indicate that higher levels of AI understanding and responsible use are associated with more effective AI-based teaching practices. This conclusion highlights the importance of strengthening teachers' AI knowledge, skills, and ethical awareness to enhance the quality and effectiveness of AI-supported instruction in elementary education.

RECOMMENDATIONS

Teachers were encouraged to continue, to enhance their knowledge and skills in artificial intelligence, particularly in applying AI tools for personalized instruction, assessment, feedback, and classroom management. Attending professional development programs, online courses, or workshops on AI integration can help them move from moderate to highly effective AI-based teaching strategies. Additionally, teachers could practice ethical and responsible use of AI in classrooms to maximize its benefits while mitigating risks associated with bias, privacy, and data security.

School administrators were advised to provide structured support and resources for AI integration in teaching. This includes ensuring access to AI technologies, offering training programs, creating clear guidelines for AI usage, and promoting collaboration among teachers to share best practices. Administrators could also encourage monitoring and evaluation of AI applications in the classroom to ensure that AI contributes effectively to student learning outcomes and overall instructional efficiency.

Teachers are the sole forerunners in the setting who may continue to discover new teaching strategies using artificial intelligence as an aid to the classroom environment.

Future researchers are encouraged to explore the impact of AI utilization on student learning outcomes and teacher performance through the direct and indirect effects of these variables. Studies could examine how different AI tools affect specific teaching strategies, the challenges faced by teachers in implementing AI, and the best practices for sustainable AI adoption in elementary education. Research could also focus on the development of

frameworks for ethical and responsible AI integration to guide both teachers and school administrators.

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