Artificial Intelligence (AI) Literacy as a Predictor of Teachers' Pedagogical Innovation and Technology Integration

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ABSTRACT

Artificial intelligence (AI) is increasingly influencing teachers' instructional planning, learning design, assessment, feedback, and professional work. This study examined whether teachers' AI literacy predicts pedagogical innovation and technology integration among the 68 permanent teachers of Maydolong National High School, Maydolong District, Eastern Samar. A quantitative, non-experimental predictive-correlational design was used, with total population sampling. Data were gathered through an adapted questionnaire measuring AI literacy, pedagogical innovation, technology integration, technology access, AI experience, and AI-related training. The findings showed very high AI literacy (M = 4.587, SD = 0.409), very high pedagogical innovation (M = 4.423, SD = 0.490), and very high frequency of technology integration (M = 4.366, SD = 0.462). Critical Evaluation of AI was the highest AI-literacy dimension (M = 4.728), while AI for Professional Learning was the lowest, although still very high (M = 4.403). Pearson correlation revealed a strong positive relationship between AI literacy and pedagogical innovation ($r = .685$, $p < .001$), but a negligible and non-significant relationship between AI literacy and general technology integration ($r = -.009$, $p = .940$). Simple linear regression showed that AI literacy significantly predicted pedagogical innovation, explaining 47.0% of its variance ($\beta = .685$, $R^2 = .470$, $p < .001$), but did not predict technology integration ($\beta = -.009$, $R^2 \approx .000$, $p = .940$). The findings indicate that AI literacy is particularly relevant to pedagogical innovation, whereas broader technology integration is likely shaped by additional contextual factors such as infrastructure, access, professional development, and institutional support.

Keywords: Artificial Intelligence Literacy; Pedagogical Innovation; Technology Integration; Teachers; Predictive-Correlational Research; Basic Education

INTRODUCTION

Artificial intelligence has rapidly evolved from a specialized technological field into a pervasive component of contemporary education. AI-enabled applications are increasingly used for lesson planning, content generation, assessment, personalized learning, feedback, instructional decision-making, and professional work. These developments have changed not only the tools available to teachers but also the knowledge, skills, judgment, and professional competencies expected of them.

AI literacy is therefore more extensive than the ability to operate an AI application. It involves understanding AI concepts and capabilities, using AI appropriately, evaluating AI-generated outputs, creating with AI, and addressing ethical issues such as privacy, bias, accuracy, transparency, intellectual property, accountability, and human oversight. The present study follows the teacher-oriented framing reflected in the original manuscript and its cited literature, including Long and Magerko (2020), Ng et al. (2021), and the UNESCO AI Competency Framework for Teachers (Miao & Cukurova, 2024).

Sperling et al. (2024), in a scoping review of AI literacy in teacher education, found that AI literacy is an emerging research area but remains comparatively underdeveloped in teacher education. Their review also

emphasized that teacher AI literacy encompasses theoretical knowledge, practical knowledge, and professional judgment. Recent empirical research provides further support for the importance of teachers' AI literacy. Du et al. (2024), for example, found that AI literacy among K–12 teachers was significantly related to self-efficacy in learning AI, perceptions of AI for social good, and awareness of AI ethics. Their findings suggest that AI literacy is not simply a technical competence but is associated with teachers' beliefs, confidence, ethical awareness, and willingness to engage with AI.

Similarly, Ding et al. (2024) investigated AI literacy and AI integration among middle school science teachers participating in professional development. Their findings showed increased teacher AI literacy following case-based professional development and indicated that teachers developed new ideas for integrating AI into teaching.

The increasing importance of AI literacy is also evident in the Philippine educational context. The Department of Education (DepEd) has increasingly recognized AI as an important component of educational modernization. In 2025, DepEd established the Education Center for AI Research (E-CAIR) to support the development of AI-powered solutions for teaching, learning, and school administration. By 2026, DepEd had further articulated responsible AI integration through initiatives emphasizing AI in education, education on AI, and AI for education systems, while highlighting ethical, inclusive, transparent, and human-centered implementation.

Pedagogical innovation involves the introduction, adaptation, or development of new approaches to teaching, learning, assessment, classroom interaction, and instructional design. In the context of AI, pedagogical innovation may include AI-supported personalized learning, adaptive instructional activities, AI-assisted feedback, collaborative human-AI learning, redesigned assessments, inquiry-based learning supported by AI, and creative uses of generative AI.

Zhao and Huang (2025), who examined the relationship between AI literacy and teaching innovation, their study investigated the psychological mechanisms through which AI literacy may promote teaching innovation, including behavioral attitudes, subjective norms, and perceived behavioral control. The study provides important evidence that AI literacy may be associated with teachers' capacity to innovate rather than merely with their willingness to use AI.

At the same time, technology integration remains a critical concern in contemporary education. Technology integration refers to the purposeful incorporation of digital technologies into teaching and learning in ways that support curricular objectives, instructional strategies, assessment, student engagement, and learning outcomes. Effective technology integration is therefore not simply the frequency of technology use but the degree to which technology is meaningfully connected to pedagogy and content.

The importance of AI literacy becomes especially clear when AI is considered in relation to pedagogical innovation. Teachers with stronger AI literacy may be better positioned to experiment with instructional approaches, redesign learning activities, differentiate instruction, create resources, and evaluate AI-supported possibilities. In contrast, technology integration is a broader construct that includes the use of digital tools for planning, teaching, assessment, communication, collaboration, and other professional activities. A teacher may therefore have high AI literacy without necessarily using technology more frequently across all professional tasks.

Akram et al. (2022), in a systematic review of teachers' perceptions of technology integration, emphasized that teachers' technological knowledge, skills, and attitudes play important roles in effective technology integration. The review highlights that teachers are central to determining how technology becomes incorporated into teaching-learning practices.

The present study therefore proposes to examine artificial intelligence literacy as a predictor of teachers' pedagogical innovation and technology integration. Specifically, it seeks to determine whether teachers who demonstrate higher levels of AI literacy also demonstrate higher levels of pedagogical innovation and

technology integration. By investigating these relationships, the study aims to contribute empirical evidence to the growing body of research on teacher AI competencies and provide information that may guide professional development, instructional supervision, technology planning, and school-level AI initiatives.

The study is anchored on the premise that meaningful AI integration in education requires more than access to technology. Teachers need the capacity to understand AI, apply it appropriately, critically evaluate its outputs, recognize its ethical implications, and translate its possibilities into sound pedagogical practices. Thus, understanding whether AI literacy predicts teachers' pedagogical innovation and technology integration may provide a useful basis for developing more targeted and context-responsive professional learning programs.

Consequently, the present study focuses on AI literacy as the predictor variable and teachers' pedagogical innovation and technology integration as criterion variables. The study seeks to determine whether variations in teachers' AI literacy are associated with differences in their innovative pedagogical practices and their meaningful use of technology in teaching.

LITERATURE REVIEW

AI literacy has increasingly been conceptualized as a multidimensional professional competence rather than as simple operational familiarity with AI tools. Long and Magerko (2020) described AI literacy in terms of competencies needed to understand, use, evaluate, and critically engage with AI. Ng et al. (2021) similarly emphasized conceptual understanding, application, evaluation, and ethical awareness. For teachers, this broader conception is important because AI use occurs within instructional, assessment, professional, and ethical contexts. The UNESCO AI Competency Framework for Teachers further frames teacher AI competence around human-centered mindset, ethics, AI foundations and applications, AI pedagogy, and professional learning (Miao & Cukurova, 2024).

Recent teacher-focused evidence supports the multidimensional nature of AI literacy. Sperling et al. (2024), in a scoping review of AI literacy in teacher education, noted that the field is still developing but that teacher AI literacy includes theoretical knowledge, practical knowledge, and professional judgment. Du et al. (2024) found that teacher AI literacy was associated with self-efficacy in learning AI, perceptions of AI for social good, and awareness of AI ethics. Ding et al. (2024) likewise reported that case-based professional development could strengthen teacher AI literacy and stimulate new ideas for classroom AI integration. More recent work continues to connect AI literacy with teacher professional competencies and AI-TPACK development (Aldemir et al., 2025; Deshen et al., 2026). Collectively, these studies suggest that AI literacy can provide a foundation for teachers' informed and responsible instructional use of AI.

Pedagogical innovation refers to teachers' capacity to introduce, adapt, redesign, and evaluate instructional practices in response to learner needs and changing educational conditions. In AI-supported environments, innovation may involve personalized learning, redesigned learning activities, AI-assisted feedback, inquiry-oriented tasks, new assessment approaches, and collaborative human-AI learning. Liao and Wang (2026) found a significant positive relationship between AI literacy and teaching innovation behavior among university teachers, while Aldemir et al. (2025) documented the development of emerging AI-TPACK competencies following an AI-literacy learning experience. These findings provide a plausible empirical basis for examining AI literacy as a predictor of pedagogical innovation, while recognizing that the present cross-sectional design cannot establish causal effects.

Technology integration is broader than AI adoption. It concerns the purposeful use of digital technologies in planning, teaching, assessment, communication, collaboration, and professional practice, with alignment to curricular and pedagogical goals. Akram et al. (2022), in a systematic review, emphasized the importance of teachers' technological knowledge, skills, and attitudes in determining how technology becomes integrated into teaching-learning practices. Lin et al. (2025) provide a useful distinction: their study examined AI technology adoption among mathematics teachers and found AI literacy to be a significant determinant within an extended technology-acceptance model. Because AI-specific engagement is narrower than general

educational technology integration, a strong relationship between AI literacy and AI adoption does not necessarily imply a relationship with broad technology use.

The literature therefore suggests two related but distinguishable pathways. First, AI literacy may be closely connected with pedagogical innovation because understanding AI capabilities and limitations can support experimentation, instructional redesign, critical evaluation, and responsible pedagogical decision-making. Second, broad technology integration may depend on a wider set of contextual conditions, including infrastructure, access, organizational support, technology acceptance, and professional development. Fang and Qian (2026) found that organizational support can strengthen teacher AI literacy through innovation capability and technology acceptance, while Deshen et al. (2026) highlighted the relationship between the digital divide and teacher AI literacy. These findings support a contextual interpretation in which individual AI competence is necessary but not sufficient to explain all forms of technology use.

In the Philippine context, the relevance of this issue is reinforced by DepEd's continuing development of AI-related initiatives. DepEd launched the Education Center for AI Research (E-CAIR) in February 2025 to advance AI-powered solutions for teaching, learning, and school administration. In February 2026, DepEd also highlighted responsible AI integration, including safeguards, transparency, human oversight, and a framework emphasizing AI in Education, Education on AI, and AI for Education Systems. These policy developments make teacher AI literacy and its relationship with instructional innovation and technology integration especially relevant to Philippine basic education.

Despite the growing literature, an empirical gap remains. Much of the emerging evidence focuses on AI literacy development, AI-specific adoption, preservice teachers, higher education, or large-scale technology-acceptance models. Fewer studies examine, within a Philippine basic-education school context, whether teachers' multidimensional AI literacy is associated with both pedagogical innovation and broader technology integration. The present study addresses this gap by examining all permanent teachers in one public secondary school and by distinguishing AI literacy as a predictor of pedagogical innovation from its possible relationship with general technology integration.

Objectives of the Study

The study aims to determine whether teachers' artificial intelligence literacy predicts their pedagogical innovation and technology integration. Specifically, it seeks to:

1. describe the respondents' profile in terms of age, years of teaching experience, and attendance in AI-related training;
2. determine the level of teachers' AI literacy in terms of AI concepts and foundations, AI application skills, critical evaluation of AI, ethics/privacy/responsible AI, AI pedagogical knowledge, and AI for professional learning;
3. determine the level of teachers' pedagogical innovation in terms of contextualized teaching and resources, learner-centered innovation, collaboration and continuous innovation, instructional experimentation and adaptation, and assessment and feedback innovation;
4. determine the frequency of teachers' technology integration in terms of technology for lesson planning and preparation, teaching and learning, assessment and feedback, and professional practice;
5. determine the relationship between AI literacy and pedagogical innovation and between AI literacy and technology integration; and
6. determine whether AI literacy significantly predicts teachers' pedagogical innovation and technology integration.

Hypotheses

$H_0$1: There is no significant relationship between teachers' AI literacy and pedagogical innovation.

$H_0$2: There is no significant relationship between teachers' AI literacy and technology integration.

H_o3: Teachers' AI literacy does not significantly predict their pedagogical innovation.

H_o4: Teachers' AI literacy does not significantly predict their technology integration.

METHODOLOGY

Research Design

This study employed a quantitative, non-experimental predictive-correlational research design to determine whether teachers' artificial intelligence (AI) literacy significantly predicts their pedagogical innovation and technology integration.

A quantitative approach is appropriate because the study collected numerical data through a structured survey instrument and statistically analyzed the levels and relationships among the variables. The study did not involve an intervention or manipulation of participants' AI literacy, pedagogical innovation, or technology integration. Instead, it measured the existing conditions among the participating teachers.

The predictive-correlational design is particularly appropriate because the study sought not only to determine whether AI literacy is significantly related to teachers' pedagogical innovation and technology integration but also whether AI literacy can statistically predict these two criterion variables. Predictive research is concerned with determining whether one or more variables can be used to estimate or explain variation in another variable.

In the study, AI literacy served as the predictor variable, while pedagogical innovation and technology integration served as the criterion variables.

Research Locale and Respondents

The study was conducted at Maydolong National High School, Maydolong District, Schools Division of Eastern Samar, Region VIII–Eastern Visayas, Philippines. The participants were the 68 permanent teachers of the school. Total population sampling was used because the target population was manageable and accessible.

While this study provides valuable insights into the pedagogical innovation and technology integration among teachers, it was conducted at a single site, Maydolong National High School, Maydolong, Eastern Samar which may limit the generalizability of the findings. The school is a large public high school with 68 permanent teachers. The school was selected due to accessibility of the respondents. Despite the following reasons, future research is encouraged to include multiple schools across diverse settings such as urban and rural institutions, as well as schools with varying levels of access to technology and AI utilization to enhance external validity and provide a broader understanding of how AI serves as a predictor in teachers' pedagogical innovation and technology integration.

Research Instrument

The study utilized a structured, self-administered researcher-developed and adapted questionnaire informed by established literature on teacher AI literacy, AI competencies, pedagogical innovation, and technology integration, particularly Younis (2025), the UNESCO AI Competency Framework for Teachers (Miao & Cukurova, 2024), and related technology-integration literature. The instrument contained 78 core items distributed across three principal constructs: AI Literacy (35 items), Pedagogical Innovation (20 items), and Technology Integration (23 items). A fifth part gathered contextual information on technology access, AI experience, and related teaching conditions.

The AI Literacy Scale consisted of 35 items across six dimensions: AI Concepts and Foundations (6 items), AI Application Skills (6 items), Critical Evaluation of AI (6 items), Ethics, Privacy and Responsible AI (6 items), AI Pedagogical Knowledge (6 items), and AI for Professional Learning (5 items). The Pedagogical Innovation

Scale contained 20 items covering contextualized teaching and resources, learner-centered innovation, collaboration and continuous innovation, instructional experimentation and adaptation, and assessment and feedback innovation. The Technology Integration Scale contained 23 items distributed across technology for lesson planning and preparation (5 items), teaching and learning (7 items), assessment and feedback (5 items), and professional practice (6 items).

For the AI Literacy and Pedagogical Innovation scales, respondents rated their level of agreement using a five-point Likert scale from 5 = Strongly Agree to 1 = Strongly Disagree. For Technology Integration, respondents indicated frequency using a five-point scale from 5 = Always to 1 = Rarely. The contextual section recorded information about technology access, AI experience, and AI-related training.

The instrument underwent expert content validation before administration. The validation process focused on the relevance, clarity, appropriateness, comprehensiveness, alignment of items with the intended constructs, and suitability of the wording for the target respondents. The instrument was then pilot-tested with teachers comparable to the study participants but excluded from the final sample. The pilot test was intended to examine item clarity, comprehensibility, and contextual appropriateness and to provide evidence of internal consistency. The reported reliability evidence was strong: Cronbach's alpha was .972 for the 35-item AI Literacy Scale, .957 for the 20-item Pedagogical Innovation Scale, and .947 for the 23-item Technology Integration Scale. These coefficients exceed the commonly used .70 threshold for acceptable internal consistency.

Data Collection and Ethics

The researcher secured the required institutional and DepEd permissions, informed participants about the purpose and procedures of the study, obtained informed consent, and maintained confidentiality and voluntary participation. Completed questionnaires were checked, encoded, and subjected to the planned statistical analyses.

Data Analysis

Frequency and percentage were used to describe respondents' age, years of teaching experience, and AI-related training attendance, directly addressing Objective 1. Weighted mean and standard deviation were used to determine the levels of AI literacy and pedagogical innovation and the frequency of technology integration, addressing Objectives 2–4. Pearson product-moment correlation was used to test the relationships between AI literacy and each criterion variable, addressing Objective 5. Simple linear regression was used to determine whether AI literacy significantly predicted pedagogical innovation and technology integration, addressing Objective 6. Statistical decisions were made at the 0.05 level of significance.

The profile percentages were computed using the total of 68 valid respondents.

RESULTS AND DISCUSSION

This part of the study presents the results and discussion of the study entitled "Artificial Intelligence (AI) Literacy as a Predictor of Teachers' Pedagogical Innovation and Technology Integration." The data were obtained from 68 teachers through total population sampling. The findings are organized according to the major variables of the study: teachers' artificial intelligence (AI) literacy, pedagogical innovation, and technology integration.

This part also presents technology access and AI experience as contextual variables. Descriptive statistics, including the mean and standard deviation, were used to determine the level of the major variables. Cronbach's alpha was used to establish the internal consistency of the research instrument. Pearson product-moment correlation was employed to determine the relationships among the major variables, while simple linear regression was used to determine whether AI literacy significantly predicts pedagogical innovation and technology integration.

The interpretation of Parts II and III followed the scale: 4.21–5.00 = Very High, 3.41–4.20 = High, 2.61–3.40 = Moderate, 1.81–2.60 = Low, and 1.00–1.80 = Very Low. For Part IV, the corresponding frequency interpretation was used, with 4.21–5.00 interpreted as Always and 3.41–4.20 as Often.

3.1 Respondent Profile

The respondents' profile was included as the first results section to directly answer Objective 1. All 68 teachers were included through total population sampling. The profile variables were age, years of teaching experience, and attendance in AI-related training.

Table 1. Profile of respondents by age

Age group	Frequency (f)	Percentage (%)
60 years and above	5	7.4
50–59 years	11	16.2
40–49 years	16	23.5
30–39 years	29	42.6
20–29 years	7	10.3
Total	68	100.0

Table 2. Profile of respondents by years of teaching experience

Years of teaching experience	Frequency (f)	Percentage (%)
1–5 years	10	14.7
6–10 years	17	25.0
11–15 years	19	27.9
16–20 years	14	20.6
20 years and above	8	11.8
Total	68	100.0

Table 3. Respondents' attendance in AI-related training

AI-related training attended	Frequency (f)	Percentage (%)
Yes	43	63.2
No	25	36.8
Total	68	100.0

The age distribution shows that the largest group of respondents was 30–39 years old (29 teachers, 42.6%), followed by those aged 40–49 (16, 23.5%) and 50–59 (11, 16.2%). Teachers aged 20–29 comprised 10.3%, while 7.4% were 60 years old and above. The faculty was therefore composed largely of mid-career teachers, while still representing younger and older age groups.

In terms of teaching experience, the largest group had 11–15 years of experience (19 teachers, 27.9%), followed by 6–10 years (17, 25.0%) and 16–20 years (14, 20.6%). Teachers with 1–5 years comprised 14.7%, while those with 20 years and above comprised 11.8%. The distribution indicates a faculty with substantial accumulated teaching experience, which is relevant context when interpreting the reported levels of pedagogical innovation and technology use.

For AI-related training, 43 respondents (63.2%) reported attending AI-related training or seminars, while 25 (36.8%) had not. Although AI professional development had reached a majority of teachers, more than one-third remained without reported AI-related training. This supports the recommendation for sustained, accessible, and differentiated school-based AI professional learning.

For AI-related training, 43 respondents (63.2%) reported having attended AI-related training or seminars, while 25 (36.8%) had not. Thus, AI professional development had reached a majority of teachers, but more than one-third remained without reported AI-related training. This finding provides important context for the relatively lower mean for AI for Professional Learning (M = 4.403).

3.2 Level of Teachers' AI Literacy

Table 4. Teachers' AI literacy by dimension

AI literacy dimension	M	SD	Interpretation
Critical Evaluation of AI	4.728	0.348	Very High
Ethics, Privacy and Responsible AI	4.708	0.413	Very High
AI Application Skills	4.578	0.414	Very High
AI Concepts and Foundations	4.569	0.483	Very High
AI Pedagogical Knowledge	4.510	0.484	Very High
AI for Professional Learning	4.403	0.616	Very High
Overall AI Literacy	4.587	0.409	Very High

Teachers reported a very high level of AI literacy (M = 4.587, SD = 0.409). Critical Evaluation of AI obtained the highest mean (M = 4.728), indicating strong perceived capacity to verify AI-generated information, recognize inaccuracies, and judge AI outputs. Ethics, Privacy and Responsible AI was also highly rated (M = 4.708). AI for Professional Learning had the lowest mean (M = 4.403), although it remained very high. This pattern suggests that respondents felt more confident in evaluating and responsibly using AI than in continuously using AI as a professional-learning resource. The result reinforces the importance of sustained professional learning.

This result is consistent with the conceptualization in the original manuscript that AI literacy includes technical, critical, pedagogical, and ethical dimensions rather than simple tool operation. It also corresponds with the cited studies of Du et al. (2024), Ding et al. (2024), Aldemir et al. (2025), and Deshen et al. (2026), which emphasize teacher learning, ethical awareness, and the movement from basic knowledge toward purposeful instructional application.

3.3 Level of Teachers' Pedagogical Innovation

Table 5. Teachers' pedagogical innovation by dimension

Pedagogical innovation dimension	M	SD	Interpretation
Contextualized Teaching and Resources	4.539	0.423	Very High
Learner-Centered Innovation	4.465	0.436	Very High
Collaboration and Continuous Innovation	4.422	0.617	Very High
Instructional Experimentation and Adaptation	4.416	0.575	Very High
Assessment and Feedback Innovation	4.265	0.592	Very High
Overall Pedagogical Innovation	4.423	0.490	Very High

Pedagogical innovation was very high overall (M = 4.423, SD = 0.490). Contextualized Teaching and Resources had the highest mean (M = 4.539), followed by Learner-Centered Innovation (M = 4.465).

Assessment and Feedback Innovation had the lowest mean (M = 4.265), although it remained very high. This suggests that teachers perceive themselves as especially strong in adapting learning resources to context and supporting learner-centered practices, while assessment innovation may offer a more specific area for professional development.

The result shows AI as an enabling competency for instructional experimentation and redesign. It also aligns with the cited work of Liao and Wang (2026) and Aldemir et al. (2025), which links AI-related competence with innovative teaching possibilities.

The present results therefore suggest that teachers are already highly innovative, but assessment innovation may be an area where targeted professional development can further strengthen practice.

3.4 Level of Teachers' Technology Integration

Table 6. Teachers' technology integration by dimension

Technology integration dimension	M	SD	Interpretation
Technology for Lesson Planning and Preparation	4.659	0.430	Always
Technology for Teaching and Learning	4.569	0.470	Always
Technology for Assessment and Feedback	4.121	0.709	Often
Technology for Professional Practice	4.105	0.569	Often
Overall Technology Integration	4.366	0.462	Always

Teachers reported a very high frequency of technology integration (M = 4.366, SD = 0.462). Technology for Lesson Planning and Preparation had the highest mean (M = 4.659), followed by Technology for Teaching and Learning (M = 4.569). Technology for Assessment and Feedback (M = 4.121) and Technology for Professional Practice (M = 4.105) were lower.

Technology is used for lesson planning, preparation of learning resources, classroom instruction, assessment, feedback, communication, and professional practice. However, the high level of technology integration should not automatically be interpreted as evidence that AI literacy is responsible for this integration. This distinction becomes particularly important when the correlation and regression results are examined. Recent research supports this conceptual distinction. Lin, Zhang, and Xiong (2025), for example, found that AI literacy was a significant determinant of AI technology engagement among mathematics teachers, but their model examined AI-specific engagement rather than broad technology integration. Their findings indicate that AI literacy can matter substantially for AI-related technology behavior without necessarily implying that it determines all forms of educational technology use.

3.5.A Relationship Between AI Literacy and Pedagogical Innovation

Table 7. Relationship between AI literacy and pedagogical innovation

Variables	r	p-value	Decision/Interpretation
AI Literacy – Pedagogical Innovation	0.685	< .001	Strong positive, significant; reject H_o1

AI literacy had a strong positive and statistically significant relationship with pedagogical innovation ($r = .685$, $p < .001$). Teachers who reported higher AI literacy also tended to report higher pedagogical innovation. This result directly supports the study's first relational hypothesis and is consistent with the cited research linking AI literacy with teaching innovation. Because the design is non-experimental and cross-sectional, the finding should be described as an association, not proof that increasing AI literacy will necessarily cause an increase in pedagogical innovation.

This means that teachers who reported higher AI literacy also tended to report higher levels of pedagogical innovation. The result provides empirical support for the first major proposition of the study.

The finding is strongly consistent with Liao and Wang (2026), who examined 362 private university teachers in Shanghai and found that AI literacy had a significant positive influence on teaching innovation behavior. Their study is particularly comparable because both studies directly examine AI literacy as a predictor or influence on teacher innovation. Du et al. (2024) provide additional support from a different perspective. Their study found that AI literacy was directly related to perceptions of AI for social good, self-efficacy in learning AI, and awareness of AI ethics. These factors can create conditions that make teachers more willing and capable of experimenting with AI-supported teaching approaches.

The consistency of these findings strengthens the interpretation that AI literacy is not merely a technical skill. It can function as a professional capacity that supports teachers in experimenting with new approaches, evaluating instructional possibilities, and redesigning learning experiences.

3.5.B Relationship Between AI Literacy and Technology Integration

Table 8. Relationship between AI literacy and technology integration

Predictor	B	β	t
AI Literacy – Technology Integration	-.009	.940	Negligible, non-significant; fail to reject H_o2

AI literacy was not significantly related to general technology integration ($r = -.009$, $p = .940$). This is an important finding because technology integration in the present study is broader than AI use. Teachers may use presentation software, online resources, multimedia, digital assessment systems, communication platforms, and other technologies regardless of their AI literacy. The contextual results further suggest that access to school-provided devices, multimedia equipment, internet connectivity, institutional support, and professional learning may be more relevant to explaining broad technology integration.

However, high average levels do not necessarily mean that the variables are significantly related at the individual level. Lin et al. (2025) found that AI literacy significantly contributed to AI technology engagement among mathematics teachers. However, their outcome variable was specifically AI technology adoption/engagement, whereas the present study's technology-integration scale encompasses a much broader range of activities, including lesson planning, multimedia instruction, assessment, feedback, communication, professional development, and digital resources. This distinction may explain why the present study did not reproduce the significant technology-use relationship found in AI-specific adoption studies. The finding is also compatible with research emphasizing the importance of contextual factors. Fang and Qian (2026), based on 10,683 teachers, found that organizational support contributed significantly to AI literacy through innovation capability and technology acceptance. Their results demonstrate that teachers' technology-related competencies are shaped by institutional conditions rather than by individual competence alone.

Deshen et al. (2026) likewise found that the digital divide was significantly associated with teachers' AI literacy, reinforcing the role of contextual and resource-related conditions. Therefore, the non-significant relationship in the present study should not be interpreted as evidence that AI literacy is irrelevant to technology use. Rather, it suggests that AI literacy alone is insufficient to explain broad technology integration.

3.6.A Predictive Effect of AI Literacy on Pedagogical Innovation

Table 9. Regression model predicting pedagogical innovation from AI literacy

Predictor	B	β	t	p
Constant	0.659	—	1.332	.187

AI Literacy	0.821	0.685	7.646	< .001

R = .685; R^2 = .470; Adjusted R^2 = .462; F(1,66) = 58.46, p < .001. AI literacy significantly predicted pedagogical innovation and explained approximately 47.0% of the variance in teachers' reported pedagogical innovation. The standardized coefficient was positive and significant (β = .685, p < .001). The regression equation was: Pedagogical Innovation = 0.659 + 0.821(AI Literacy). The intercept was not statistically significant (t = 1.332, p = .187). The earlier source notation of "1.87" is treated as a transcription error; the revised table reports the internally consistent t-value and corresponding p-value.

This is the strongest inferential result of the study. It suggests that AI literacy is statistically useful for estimating differences in teachers' pedagogical innovation within this sample.

The result closely parallels the findings of Liao and Wang (2026), who reported that AI literacy significantly positively influenced teaching innovation behavior among 362 private university teachers in Shanghai.

The present study extends that finding to a different educational context. While Liao and Wang (2026) examined private university educators, the present study involved teachers in a basic education context. Despite differences in educational level and sample size, both studies point toward the same conclusion: AI literacy is positively associated with teachers' capacity for instructional innovation. The result is also theoretically consistent with emerging AI-TPACK research. Aldemir et al. (2025) demonstrated that structured AI-literacy experiences can foster subject-specific AI applications and emerging AI-TPACK competencies. Therefore, the present regression result adds empirical support to the proposition that AI literacy can contribute to teachers' pedagogical innovation.

3.6.B Predictive Effect of AI Literacy on Technology Integration

Table 10. Regression model predicting technology integration from AI literacy

Predictor	B	β	t	p
Constant	4.416	—	6.892	< .001
AI Literacy	-0.011	-0.009	-0.076	.940

R ≈ .009; R^2 ≈ .000; Adjusted R^2 ≈ -.015; F(1,66) ≈ 0.006, p = .940. AI literacy did not significantly predict technology integration. The model explained essentially none of the variance in general technology integration. This finding should not be interpreted as evidence that AI literacy has no value. Instead, it indicates that AI literacy alone was insufficient to explain variation in the broad technology-integration measure used in this study.

This finding differs from studies that examine AI-specific adoption rather than general technology integration. Lin et al. (2025), for instance, found AI literacy to be a significant determinant of teachers' engagement with AI teaching technologies. The difference may be explained by the broader definition of technology integration used in the present study. Technology integration includes many practices that do not necessarily require AI literacy, such as preparing presentations, using multimedia, accessing online resources, communicating with colleagues, administering digital assessments, and using digital platforms. Consequently, teachers can have high AI literacy without necessarily increasing their use of every category of educational technology. The contextual findings in the present study further support this interpretation.

The findings of Fang and Qian (2026) are particularly relevant here because their large-scale study showed that organizational support, innovation capability, and technology acceptance jointly contribute to teachers' AI literacy and technology-related environments. Thus, technology integration may depend on a combination of teacher competence, access to resources, institutional support, technology acceptance, infrastructure, and opportunities for professional development rather than AI literacy alone.

Integrated Interpretation of the Findings

The results reveal a meaningful distinction among AI literacy, pedagogical innovation, and general technology integration. Teachers reported very high AI literacy, very high pedagogical innovation, and very high overall technology integration. The respondent profile adds useful context: the largest age group was 30–39 years, the largest experience group had 11–15 years of teaching, and 63.2% had attended AI-related training. These characteristics describe the sample but do not establish that age, experience, or training caused the observed levels because those profile variables were not tested as predictors in the present models.

The contextual findings strengthen this interpretation. Teachers reported strong access to personal devices, but lower and more variable access to school-provided devices, multimedia equipment, and internet connectivity. Thus, technology integration is likely to be a function of both teacher competence and environmental conditions. This distinction is a key contribution of the study and should be emphasized in the publication rather than treating all technology use as a single outcome of AI literacy.

Study limitations. The findings should be interpreted within the limits of a single-school, cross-sectional, self-report design. Total population sampling provides strong representation of the participating school but does not support broad generalization. The regression models also included AI literacy as the sole predictor; therefore, contextual factors such as technology access, training quality, institutional support, technology acceptance, and teaching experience were not statistically controlled. Future studies should use larger samples, multiple predictors, longitudinal or intervention designs, and objective or qualitative evidence of classroom practice.

CONCLUSIONS

1. Objective 1: The 68 respondents were predominantly 30–39 years old (42.6%). The largest teaching-experience group had 11–15 years of service (27.9%). A majority (63.2%) had attended AI-related training, while 36.8% had not.
2. Objective 2: Teachers reported a very high level of AI literacy ($M = 4.587$, $SD = 0.409$), with critical evaluation of AI and ethics, privacy, and responsible AI as the strongest dimensions. AI for professional learning was the lowest dimension, although still very high.
3. Objective 3: Teachers reported a very high level of pedagogical innovation ($M = 4.423$, $SD = 0.490$). Contextualized teaching and resources was the strongest dimension, while assessment and feedback innovation was comparatively lower.
4. Objective 4: Teachers reported an overall technology-integration frequency of Always ($M = 4.366$, $SD = 0.462$). Lesson planning and preparation and teaching and learning were the most frequent areas, while assessment and feedback and professional practice were comparatively lower.
5. Objective 5: AI literacy had a strong positive and statistically significant relationship with pedagogical innovation ($r = .685$, $p < .001$), but no significant relationship with technology integration ($r = -.009$, $p = .940$).
6. Objective 6: AI literacy significantly predicted pedagogical innovation ($\beta = .685$, $R^2 = .470$, $p < .001$), but did not significantly predict technology integration ($\beta = -.009$, $R^2 \approx .000$, $p = .940$). Because the design was non-experimental, these findings indicate statistical prediction/association rather than causation.

RECOMMENDATIONS

1. Establish a sustained school-based AI professional development program that moves beyond basic tool orientation toward AI pedagogy, prompt design, critical evaluation, ethics, assessment, and AI-supported lesson redesign. This is particularly warranted because 36.8% of the faculty reported no AI-related training.
2. Prioritize AI for Professional Learning because it received the lowest AI-literacy dimension mean despite remaining very high. Professional learning communities, peer demonstrations, lesson-study sessions, mentoring, and coaching can help convert individual AI competence into shared practice.

3. Develop targeted professional development on AI-supported assessment and feedback because Assessment and Feedback Innovation was the lowest pedagogical-innovation dimension.
4. Strengthen school technology infrastructure, particularly school-provided devices, multimedia equipment, digital learning resources, and internet connectivity. The findings show that personal-device access was stronger than institutional technology access, while AI literacy alone did not predict general technology integration.
5. Use the respondent profile when designing differentiated professional learning. The faculty includes younger teachers, mid-career teachers, and teachers with 20 or more years of experience. Future school-based programs may use peer mentoring and differentiated support rather than a one-size-fits-all approach. However, age and experience should not be treated as determinants without inferential testing.
6. In future research, test whether age, teaching experience, AI-training exposure, technology access, and AI experience significantly explain differences in AI literacy, pedagogical innovation, and technology integration. These variables are now part of the respondent profile but were not included as predictors in the present regression models.
7. Future studies should use larger, multi-school or multi-district samples and consider longitudinal, mixed-methods, or intervention designs. Classroom observations, lesson plans, assessment artifacts, interviews, and actual technology-use evidence can triangulate the self-reported measures.

REFERENCES

1. Akram, H., Abdelrady, A. H., Al-Adwan, A. S., & Ramzan, M. (2022). Teachers' perceptions of technology integration in teaching-learning practices: A systematic review. Frontiers in Psychology, 13, 920317. https://doi.org/10.3389/fpsyg.2022.920317
2. Aldemir, T., Bicer, A., Kılınç, S., Moon, J., & Kwok, M. (2025). Exploring emergent AI-TPACK competencies in a two-week AI literacy module for preservice teachers. Teaching and Teacher Education, 168, 105231. https://doi.org/10.1016/j.tate.2025.105231
3. Department of Education. (2025, February 20). DepEd launches AI center for education. https://www.deped.gov.ph/2025/02/20/deped-launches-ai-center-for-education/
4. Department of Education. (2026, February 26). DepEd, sinusulong ang responsible AI integration sa edukasyon. https://www.deped.gov.ph/2026/02/26/deped-sinusulong-ang-responsible-ai-integration-sa-edukasyon/
5. Deshen, M., Harari, R., & Aharony, N. (2026). Teachers' artificial intelligence (AI) literacy: An exploratory study. Smart Learning Environments, 13, Article 7. https://doi.org/10.1186/s40561-026-00433-5
6. Ding, A.-C. E., Shi, L., Yang, H., & Choi, I. (2024). Enhancing teacher AI literacy and integration through different types of cases in teacher professional development. Computers and Education Open, 6, 100178. https://doi.org/10.1016/j.caeo.2024.100178
7. Du, H., Sun, Y., Jiang, H., Islam, A. Y. M. A., & Gu, X. (2024). Exploring the effects of AI literacy in teacher learning: An empirical study. Humanities and Social Sciences Communications, 11, 559. https://doi.org/10.1057/s41599-024-03101-6
8. Fang, J., & Qian, M. (2026). How organizational support enhances teachers' AI literacy: The chain mediating effects of innovation capability and technology acceptance. Interactive Learning Environments. https://doi.org/10.1080/10494820.2026.2658209
9. Liao, G., & Wang, S. (2026). The impact of artificial intelligence literacy on teaching innovation behaviors among private university teachers in Shanghai, China. International Journal of General Practice Nursing, 3(Special Issue). https://doi.org/10.26689/ijgpn.v3iSpecial.13976
10. Lin, T., Zhang, J., & Xiong, B. (2025). Effects of technology perceptions, teacher beliefs, and AI literacy on AI technology adoption in sustainable mathematics education. Sustainability, 17(8), 3698. https://doi.org/10.3390/su17083698
11. Long, D., & Magerko, B. (2020). What is AI literacy? Competencies and design considerations. In Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems (pp. 1–16). Association for Computing Machinery. https://doi.org/10.1145/3313831.3376727

12. Miao, F., & Cukurova, M. (2024). AI competency framework for teachers. UNESCO.
13. Ng, D. T. K., Leung, J. K. L., Chu, S. K. W., & Qiao, M. S. (2021). Conceptualizing AI literacy: An exploratory review. Computers and Education: Artificial Intelligence, 2, Article 100041. https://doi.org/10.1016/j.caeai.2021.100041
14. Sperling, K., Stenberg, C.-J., McGrath, C., Åkerfeldt, A., Heintz, F., & Stenliden, L. (2024). In search of artificial intelligence (AI) literacy in teacher education: A scoping review. Computers and Education Open, 6, 100169. https://doi.org/10.1016/j.caeo.2024.100169
15. Younis, B. (2025). The artificial intelligence literacy (AIL) scale for teachers: A tool for enhancing AI education. Journal of Digital Learning in Teacher Education, 41(1), 37–56. https://doi.org/10.1080/21532974.2024.2441682