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The AI-ready teacher: Artificial intelligence literacy as a predictor of instructional innovation and teaching effectiveness among public secondary school teachers

Pillarda, Yolanda Yuson ✉
Department of Education, Philippines (Yolanda.yuson@deped.gov.ph)
Amasi, Lorna D.
Department of Education, Philippines (Lorna.amasi@deped.gov.ph)
Pal-og, Daryl J.
Department of Education, Philippines (daryl.palog@deped.gov.ph)
Quintinita, Joan G.
Department of Education, Philippines (joan.quintinita@deepd.gov.ph)
Gandeza, Jessie T.
Department of Education, Philippines (jessie.gandeza@deped.gov.ph)

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Abstract

This study examined artificial intelligence (AI) literacy as a predictor of instructional innovation and teaching effectiveness among public secondary school teachers. Specifically, it assessed teachers' AI literacy in terms of knowledge, skills and application, ethical and responsible use, and confidence, and determined whether AI literacy significantly predicts instructional innovation and teaching effectiveness. A quantitative predictive-correlational approach was employed, involving 101 public secondary school teachers. Data were gathered through a structured questionnaire and analyzed using descriptive statistics and simple linear regression. The findings revealed that teachers demonstrated a high level of AI literacy, with mean scores of 4.45 in knowledge, 4.28 in skills and application, 4.42 in ethical and responsible use, and 4.26 in confidence. Regression analysis further established that AI literacy significantly and positively predicts instructional innovation ($\beta = 0.668$, $p < .001$), explaining 44.6% of its variance. Similarly, AI literacy significantly predicts teaching effectiveness ($\beta = 0.304$, $p = .002$), accounting for 9.3% of its variance. These results indicate that AI literacy has a stronger predictive association with instructional innovation than with teaching effectiveness. The findings suggest that teachers' understanding and responsible application of AI are important considerations in promoting innovative instructional practices. However, teaching effectiveness involves broader pedagogical and professional competencies beyond technological literacy. The study highlights the need for continuous professional development, practical AI training, and institutional support to strengthen teachers' capacity to integrate artificial intelligence responsibly and meaningfully into educational practices. It concludes that enhancing AI literacy

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may contribute to instructional improvement and support the development of more innovative and effective teaching practices in public secondary schools.

Keywords: artificial intelligence literacy, instructional innovation, teaching effectiveness, public secondary school teachers, predictive analysis

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1. Introduction

Artificial Intelligence (AI) is rapidly transforming the educational landscape and redefining how teachers perform their professional responsibilities. What was once considered primarily a technological innovation has evolved into a practical tool for lesson planning, instructional material development, assessment design, feedback delivery, and learner support. The emergence of generative AI technologies has accelerated this shift by enabling educators to generate instructional content, examples, activities, and assessment materials within seconds. As AI becomes increasingly integrated into educational practice, its influence on teaching effectiveness and instructional innovation continues to expand. While AI offers substantial opportunities for educational improvement, its effective use is not guaranteed. These technologies can reduce routine workloads, enhance productivity, and support the creation of more personalized learning experiences. However, meaningful integration requires teachers to understand AI's capabilities and limitations, evaluate generated outputs critically, and address concerns related to ethics, privacy, and accuracy. Without sufficient AI literacy, educators may struggle to maximize the benefits of these tools or may unintentionally apply them in ways that undermine sound pedagogical practices.

The growing importance of AI competencies among educators has received significant international recognition. UNESCO's AI Competency Framework for Teachers identifies fifteen essential competencies grouped into five dimensions: human-centered mindset, ethics of AI, AI foundations and applications, AI pedagogy, and AI for professional learning. The framework emphasizes that successful AI integration extends beyond technical proficiency and requires ethical, pedagogical, and professional competence. This perspective reinforces the view that AI literacy has become an essential component of modern teaching practice rather than an optional technological skill. The relevance of AI literacy is particularly evident within the Philippine educational context. In January 2026, the Department of Education (DepEd) launched Project AGAP.AI to prepare teachers and learners for an increasingly technology-driven future. The initiative includes plans to integrate AI concepts into basic education, develop AI-focused professional development programs, and pilot AI-based tools for instruction, assessment, and school management. Such efforts demonstrate the government's recognition that AI readiness is becoming a critical requirement for educational development and teacher competence.

These developments suggest that AI literacy is no longer simply a matter of personal interest or technological preference among teachers. Instead, it is emerging as an important dimension of professional competence that may influence instructional quality and educational outcomes. As schools increasingly adopt AI technologies, educators are expected to use these tools in ways that enhance learning rather than merely automate existing tasks. Consequently, determining the level of teachers' preparedness for responsible and effective AI integration has become a significant educational concern. The issue becomes even more critical in public secondary schools where teachers face diverse instructional and administrative demands. Educators must simultaneously address varying learner needs, implement curriculum reforms, and manage increasing workloads. Differences in technology access, professional development opportunities, confidence levels, and prior AI experience may significantly influence teachers' ability to use AI effectively. These disparities highlight the need to examine factors that contribute to successful AI integration in teaching practice.

Recent Philippine studies provide initial evidence supporting the importance of investigating AI literacy among educators. A preliminary study conducted among public elementary school teachers in Quezon City found that generative AI tools were being used to support English and Filipino instruction. However, teachers also reported challenges related to learning new technologies and monitoring the quality of AI-generated outputs. These findings underscore the need for structured efforts to strengthen AI literacy and ensure responsible classroom implementation. Similarly, research involving Filipino teachers examined factors influencing AI adoption,

including institutional support, confidence, concerns, and attitudes toward AI technologies. The study revealed that stronger institutional support was associated with higher confidence levels and more positive attitudes toward AI integration. This finding suggests that successful AI adoption depends not only on individual competencies but also on supportive organizational environments. Consequently, professional development and institutional readiness play crucial roles in fostering effective AI utilization among teachers.

The reviewed literature consistently demonstrates that AI is increasingly shaping educational practices and expanding teachers' professional responsibilities. Generative AI applications provide valuable opportunities to improve instructional planning, create learning resources, develop assessments, and address diverse learner needs. Nevertheless, the educational value of these technologies depends largely on teachers' ability to understand, evaluate, and apply them appropriately. Thus, AI literacy emerges as a critical factor in ensuring that AI contributes positively to educational outcomes. UNESCO's AI Competency Framework for Teachers provides a comprehensive conceptual foundation for understanding AI literacy as a multidimensional construct. Its emphasis on technological understanding, ethical awareness, pedagogical application, and continuous professional learning reflects the complexity of AI integration in education. The framework highlights that responsible AI use requires a combination of knowledge, skills, and professional judgment. As a result, teachers must develop competencies that extend beyond basic familiarity with AI applications.

The literature further suggests that AI literacy may contribute directly to instructional innovation and teaching effectiveness. Instructional innovation involves developing and implementing improved teaching strategies, while teaching effectiveness relates to achieving desired educational outcomes and fulfilling professional responsibilities successfully. By enabling educators to design creative learning experiences, enhance assessment practices, and respond to learner needs more efficiently, AI literacy may support improvements in both areas. This relationship underscores the potential value of AI competencies in contemporary educational settings. Existing international and Philippine studies provide preliminary evidence regarding AI literacy, teacher readiness, technology acceptance, and AI adoption. Research by Du et al. (2024) emphasized the importance of teachers' willingness to learn and engage with AI technologies. Meanwhile, studies by Yu and Salimaco (2026), Cubillas et al. (2026), and Sibug et al. (2026) highlighted the significance of AI competencies, teacher confidence, and institutional support in facilitating successful AI integration. Collectively, these findings suggest that AI literacy may be a meaningful factor influencing educational practice and professional performance.

Despite these contributions, several important research gaps remain. First, much of the existing literature focuses on AI adoption, perception, attitudes, and acceptance rather than examining how AI literacy influences actual teaching outcomes. Second, Philippine studies have generally concentrated on specific educational levels, subject areas, or local contexts, limiting the generalizability of their findings. Third, relatively few studies have simultaneously examined instructional innovation and teaching effectiveness as distinct but related outcomes within a single predictive framework. Addressing these gaps is necessary to strengthen understanding of AI's role in educational improvement. These limitations establish a strong rationale for the present investigation, which examines Artificial Intelligence Literacy as a predictor of Instructional Innovation and Teaching Effectiveness among public secondary school teachers. By focusing on professional outcomes rather than mere adoption or perception, the study seeks to provide more meaningful insights into the educational value of AI literacy. The investigation responds directly to identified gaps in both international and local literature. Ultimately, it aims to generate empirical evidence that can support more effective AI integration in schools.

Specifically, the study examines whether teachers' knowledge and understanding of AI, skills and application, evaluation and critical judgment, ethical and responsible use, and pedagogical integration significantly predict instructional innovation and teaching effectiveness. These dimensions reflect key components of contemporary AI literacy and align with established competency frameworks. Understanding their predictive influence can provide deeper insights into the factors that contribute to successful technology integration. Such information is essential for developing targeted interventions that strengthen teachers' professional capacities. The findings of this study are expected to contribute to the growing body of knowledge on AI readiness and educational innovation. They

may provide valuable evidence for designing teacher professional development programs, improving institutional support systems, and guiding responsible AI implementation policies. Furthermore, the results may assist educational leaders in identifying areas where additional support and training are needed. In doing so, the study can help strengthen the capacity of public secondary school teachers to navigate an increasingly AI-driven educational environment.

Ultimately, current developments indicate that the educational discourse is moving beyond the simple question of whether teachers use AI. The more critical issue is whether teachers possess the literacy, competencies, and professional judgment necessary to utilize AI effectively, ethically, and pedagogically. As AI continues to reshape educational practices, teacher preparedness will increasingly determine whether these technologies enhance or hinder learning outcomes. Therefore, strengthening AI literacy among educators has become both a professional necessity and an educational priority.

Statement of the Problem - The rapid integration of Artificial Intelligence into educational settings has significantly altered the expectations and responsibilities of teachers. While AI offers substantial opportunities to enhance instructional practices, there remains limited empirical evidence regarding the level of AI literacy among public secondary school teachers and its influence on their instructional innovation and teaching effectiveness. Specifically, this study seeks to answer the following questions:

- What is the level of Artificial Intelligence literacy among public secondary school teachers in terms of AI knowledge; AI skills and application; ethical and responsible AI use; and confidence in AI integration?
- What is the level of instructional innovation among public secondary school teachers?
- What is the level of teaching effectiveness among public secondary school teachers?
- Does Artificial Intelligence literacy significantly predict instructional innovation?
- Does Artificial Intelligence literacy significantly predict teaching effectiveness?

2. Research Design

The study employed a quantitative, descriptive-correlational and predictive research design using a cross-sectional survey approach. The descriptive method was used to determine the levels of artificial intelligence (AI) literacy, instructional innovation, and teaching effectiveness among public secondary school teachers. It also described the respondents' demographic and professional characteristics and their experiences in using AI tools for educational purposes. The correlational method was utilized to establish the strength and direction of the relationships between AI literacy and the two outcome variables, namely instructional innovation and teaching effectiveness. This enabled the researcher to determine whether teachers with higher levels of AI literacy also demonstrated higher levels of instructional innovation and teaching effectiveness. Furthermore, the predictive component of the design was employed to determine whether AI literacy significantly predicted instructional innovation and teaching effectiveness. Two separate simple linear regression analyses were conducted, with AI literacy serving as the predictor variable and instructional innovation and teaching effectiveness serving as the respective outcome variables. This research design was considered appropriate because the study examined existing conditions and relationships among variables without manipulating the respondents' experiences or introducing an experimental intervention. Since the data were collected at one point in time, the findings established statistical relationships and predictive associations rather than direct cause-and-effect relationships.

Population and Sample - The respondents of the study consisted of 101 public secondary school teachers who participated in the research. They served as the source of information regarding artificial intelligence literacy, instructional innovation, and teaching effectiveness. The respondents were considered appropriate for the study because of their involvement in instructional planning, classroom teaching, assessment, and other professional responsibilities in the basic education system. The study focused on teachers' knowledge and understanding of

artificial intelligence, their ability to apply AI tools in professional and instructional tasks, their ethical and responsible use of AI, and their confidence in utilizing AI-supported applications. It also examined their reported instructional innovations and teaching effectiveness. The 101 respondents constituted the actual sample whose responses were included in the statistical analysis. Their demographic and professional characteristics were described using frequency and percentage distributions. These characteristics provided additional context for understanding the respondents' backgrounds and experiences in relation to the variables investigated in the study.

Instrument - The primary instrument used in gathering the data was a structured questionnaire designed to measure the respondents' artificial intelligence literacy, instructional innovation, and teaching effectiveness. The questionnaire also gathered relevant demographic and professional information about the respondents. The instrument consisted of four parts. The first part gathered information about the respondents' profiles, including their demographic and professional characteristics, educational background, teaching position, teaching experience, grade level taught, participation in AI-related training, and experience in using artificial intelligence tools for educational purposes. The second part measured the respondents' level of artificial intelligence literacy. This variable was examined through four dimensions: AI knowledge and understanding, AI skills and application, ethical and responsible AI use, and AI confidence. AI knowledge and understanding referred to the respondents' familiarity with AI concepts, functions, capabilities, and limitations. AI skills and application focused on their ability to utilize AI tools in performing professional and instructional tasks, such as lesson preparation, development of instructional materials, assessment, and provision of feedback. Ethical and responsible AI use covered their awareness of data privacy, academic integrity, accuracy, bias, transparency, and responsible utilization of AI-generated information. AI confidence referred to their perceived ability and assurance in selecting, operating, evaluating, and integrating AI tools into their professional practices.

The third part assessed the respondents' instructional innovation. It focused on their reported use of creative and varied teaching strategies, development of innovative instructional materials, integration of digital technologies, differentiated instruction, learner-centered approaches, and innovative assessment and feedback practices. It also considered their ability to adapt instructional strategies to the diverse learning needs and characteristics of their students. The fourth part measured the respondents' teaching effectiveness. It covered instructional planning and preparation, classroom instruction and facilitation of learning, classroom management, establishment of a conducive learning environment, assessment and feedback, learner engagement, responsiveness to students' needs, and professional responsibility. The indicators were aligned with relevant domains of the Philippine Professional Standards for Teachers (PPST), particularly content knowledge and pedagogy, learning environment, diversity of learners, curriculum and planning, assessment and reporting, and personal growth and professional development.

The questionnaire utilized a five-point Likert scale to measure the respondents' responses to the statements. The responses were assigned numerical values to facilitate the computation of the mean and standard deviation and the interpretation of the overall results. The data gathered through the instrument served as the basis for determining the levels of AI literacy, instructional innovation, and teaching effectiveness among the respondents.

Data Gathering Procedure - The data-gathering process was conducted through a systematic procedure to ensure the orderly collection and proper handling of the information needed for the study. The researchers first secured the necessary permission and approval from the appropriate authorities and coordinated with the concerned schools regarding the administration of the research questionnaire. After obtaining the required authorization, the researcher administered the structured questionnaire to the identified respondents. The purpose of the study, the nature of their participation, and the confidentiality of their responses were explained to them. The respondents were given sufficient time to answer the questionnaire based on their knowledge, experiences, and professional practices concerning artificial intelligence, instructional innovation, and teaching effectiveness.

Upon retrieval, the accomplished questionnaires were examined to check the completeness and consistency of the responses. The gathered data were then organized, coded, and encoded for statistical processing. The

responses were systematically arranged according to the different sections of the research instrument to facilitate accurate analysis. The encoded data were processed using IBM Statistical Package for the Social Sciences (SPSS). Appropriate descriptive and inferential statistical procedures were applied to answer the research questions and test the hypotheses. The results generated from the statistical analyses were subsequently organized into tables and interpreted in relation to the objectives of the study and the relevant literature.

Statistical Treatment of Data - The data gathered from the respondents were analyzed using descriptive and inferential statistical techniques. These statistical procedures were selected based on the nature of the research questions and the objectives of the study. Frequency and percentage were used to describe the demographic and professional characteristics of the respondents. Frequency indicated the number of teachers belonging to a particular category, while percentage represented the corresponding proportion of the total number of respondents. These measures provided a clear description of the composition of the sample in terms of their personal and professional backgrounds. Mean and standard deviation were utilized to determine the levels of artificial intelligence literacy, instructional innovation, and teaching effectiveness. The mean represented the average responses of the teachers for each indicator and variable, while the standard deviation measured the extent of variation or dispersion in their responses. These statistical measures provided an overall description of the respondents' perceptions and reported practices. The Pearson product-moment correlation coefficient was employed to determine the strength and direction of the relationship between AI literacy and instructional innovation, as well as between AI literacy and teaching effectiveness. This statistical technique established whether a significant positive or negative relationship existed between the predictor variable and each outcome variable.

Simple linear regression analysis was utilized to determine whether artificial intelligence literacy significantly predicted instructional innovation and teaching effectiveness. Two separate regression models were examined. The first model determined the predictive influence of AI literacy on instructional innovation, while the second model examined the predictive influence of AI literacy on teaching effectiveness. The coefficient of determination (R^2) was used to determine the proportion of variation in each outcome variable that was statistically explained by AI literacy. The regression coefficients, F-statistics, t-values, and corresponding significance values were examined to determine the statistical significance and predictive contribution of AI literacy. All inferential statistical analyses were evaluated at the 0.05 level of significance. When the computed probability value was less than 0.05, the null hypothesis was rejected, indicating a statistically significant relationship or predictive result, as applicable. When the probability value was equal to or greater than 0.05, the null hypothesis was not rejected.

Categorization of Data - The responses to the questionnaire will be categorized using a five-point Likert scale designed to determine the respondents' level of agreement with the statements describing AI literacy, instructional innovation, and teaching effectiveness. On this scale, a rating of 5 corresponds to Strongly Agree, 4 to Agree, 3 to Moderately Agree, 2 to Disagree, and 1 to Strongly Disagree. This scale will serve as the guide for interpreting the individual responses obtained for each item in the questionnaire. For the interpretation of the composite means, a separate descriptive framework will be applied. A mean falling between 4.21 and 5.00 will be interpreted as Very High, while a mean between 3.41 and 4.20 will be regarded as High. Means ranging from 2.61 to 3.40 will be considered Moderate, those from 1.81 to 2.60 will be described as Low, and those from 1.00 to 1.80 will be interpreted as Very Low. This framework will provide a concise description of the overall level of each research variable and of its respective dimensions. For consistency, the same numerical coding will be applied to all positively worded items, whereas any negatively worded items that are included will be reverse-coded before the composite scores are computed. The mean scores for AI literacy, instructional innovation, and teaching effectiveness will then be computed based on the items assigned to each variable, and these composite means will be read against the interpretation ranges described above. The first framework therefore governs the interpretation of individual questionnaire responses, while the second governs the interpretation of the overall level of each variable.

3. Findings

This section presents the level of artificial intelligence literacy among public secondary school teachers in terms of the following dimensions: knowledge, skills and application, ethical and responsible use, and confidence in using artificial intelligence.

3.1 What is the level of Artificial Intelligence literacy among public secondary school teachers in terms of AI knowledge; AI skills and application; ethical and responsible AI use; and confidence in AI integration?

Table 1
AI knowledge

Item	Statement	MEAN	SD	Verbal Interpretation
1.1	I understand what Artificial Intelligence (AI) means.	4.66	0.53	Very High
1.2	I can distinguish AI from ordinary digital technologies.	4.28	0.71	Very High
1.3	I understand the basic functions of generative AI tools.	4.37	0.62	Very High
1.4	I know that AI systems can generate text, explanations, examples, and learning activities.	4.63	0.48	Very High
1.5	I understand that AI-generated information may contain errors or inaccuracies.	4.60	0.56	Very High
1.6	I understand that AI-generated responses should not automatically be considered correct.	4.49	0.65	Very High
1.7	I understand the difference between AI-generated content and teacher-generated content.	4.43	0.63	Very High
1.8	I understand the potential benefits of AI for teaching and learning.	4.59	0.55	Very High
1.9	I understand the limitations of using AI in education.	4.55	0.60	Very High
1.10	I am familiar with different AI applications that can support classroom instruction.	4.18	0.68	High
1.11	I understand how AI can be used to support diverse learning needs.	4.33	0.66	Very High
1.12	I understand that AI should complement rather than replace sound teaching practices.	4.28	0.78	Very High
	Overall Mean	4.45	0.62	Very High

The results show that public secondary school teachers demonstrated a high level of AI knowledge, with an overall mean of 4.45. The highest-rated indicator was understanding the meaning of AI (M = 4.66), followed by knowledge of its generative capabilities (M = 4.63), possible inaccuracies in AI-generated information (M = 4.60), and its educational benefits (M = 4.59). In contrast, familiarity with different AI applications for classroom instruction received the lowest mean (M = 4.18). Overall, the findings indicate that teachers have a strong understanding of AI concepts and benefits, but may need further practical exposure to different AI applications and their integration into classroom instruction.

Table 2
AI skills and application

Item	Statement	MEAN	SD	Verbal Interpretation
1.13	I can use AI tools to generate ideas for lesson activities.	4.32	0.76	Very High
1.14	I can use AI to assist in lesson planning.	4.37	0.66	Very High
1.15	I can formulate clear prompts or instructions for AI tools.	4.17	0.69	High
1.16	I can refine my prompts to obtain more appropriate AI-generated responses.	4.23	0.72	Very High
1.17	I can use AI to develop instructional materials.	4.37	0.66	Very High
1.18	I can use AI to generate examples and explanations appropriate to my learners.	4.33	0.73	Very High
1.19	I can use AI to develop or improve assessment questions.	4.33	0.72	Very High
1.2	I can use AI to provide ideas for learner feedback.	4.22	0.84	Very High
1.21	I can modify AI-generated materials to suit my curriculum requirements.	4.19	0.80	High
1.22	I can evaluate AI-generated outputs before using them in my classroom.	4.23	0.85	Very High

1.23	I can identify when an AI-generated response is inappropriate for my learners.	4.28	0.77	Very High
1.24	I can integrate AI-generated resources into my existing teaching practices.	4.29	0.72	Very High
1.25	I can use AI to adapt instructional materials for learners with different learning needs.	4.27	0.77	Very High
1.26	I can combine AI-generated resources with my own professional knowledge and judgment.	4.32	0.73	Very High
	Overall Mean	4.28	0.74	Very High

The findings show that public secondary school teachers demonstrated a high level of AI skills and application (M = 4.28). The highest-rated areas were lesson planning and instructional material development (M = 4.37), followed by creating learner-appropriate examples and improving assessment questions (M = 4.33). The lowest-rated areas were formulating effective AI prompts (M = 4.17), adapting AI-generated materials to curriculum requirements (M = 4.19), and using AI for learner feedback (M = 4.22), although these remained highly rated. Overall, teachers perceived themselves as competent in using AI for instructional tasks. However, professional development may further strengthen prompt-writing, curriculum alignment, and the use of AI for learner feedback.

Table 3

Ethical and responsible AI use

Item	Statement	MEAN	SD	Verbal Interpretation
1.27	I understand the importance of protecting learners' personal information when using AI.	4.57	0.62	Very High
1.28	I avoid entering confidential learner information into AI tools.	4.59	0.57	Very High
1.29	I verify AI-generated information before using it for instruction.	4.44	0.71	Very High
1.3	I am aware that AI-generated information can contain bias.	4.52	0.57	Very High
1.31	I check AI-generated content for possible bias or inappropriate information.	4.29	0.87	Very High
1.32	I consider the possible effects of AI use on learners' privacy.	4.42	0.70	Very High
1.33	I consider whether AI-generated materials are appropriate for my learners' age and developmental level.	4.46	0.74	Very High
1.34	I maintain teacher responsibility for decisions even when AI is used.	4.49	0.57	Very High
1.35	I do not rely entirely on AI when making important instructional decisions.	4.61	0.64	Very High
1.36	I use AI in ways that promote learner-centered teaching.	4.24	0.87	Very High
1.37	I encourage learners to critically evaluate AI-generated information.	4.17	0.90	High
1.38	I consider academic integrity when incorporating AI into teaching and assessment.	4.29	0.88	Very High
	Overall Mean	4.42	0.72	Very High

The findings indicate that public secondary school teachers demonstrated a high level of ethical and responsible AI use (M = 4.42). The highest ratings were on maintaining professional judgment when using AI (C35, M = 4.61), protecting confidential learner information (C28, M = 4.59; C27, M = 4.57), and recognizing potential AI bias (C30, M = 4.52). The lowest ratings were on encouraging learners to critically evaluate AI-generated information (C37, M = 4.17) and using AI to support learner-centered teaching (C36, M = 4.24), although both remained high. Overall, teachers viewed themselves as responsible AI users, particularly in safeguarding learner data and exercising professional judgment. However, greater emphasis may be placed on developing learners' critical evaluation skills and promoting ethical AI use in the classroom.

The findings in Table 4 revealed that public secondary school teachers had a high level of confidence in AI integration (M = 4.26). Teachers were most confident in learning new AI tools and explaining responsible AI use to learners (M = 4.30), followed by selecting appropriate AI tools for lessons (M = 4.28) and evaluating AI-generated content (M = 4.27). The lowest-rated area was addressing problems encountered when using AI in

teaching (M = 4.21), followed by adapting AI-generated materials and exploring AI-supported teaching approaches (M = 4.24). Although these ratings remained high, they indicate areas for further improvement. Overall, teachers perceived themselves as confident in integrating AI into instruction. However, professional development may focus on troubleshooting AI-related challenges, adapting AI-generated resources, and implementing innovative AI-supported teaching strategies.

Table 4
Confidence in AI integration

Item	Statement	MEAN	SD	Verbal Interpretation
1.39	I feel confident using AI tools for instructional purposes.	4.24	0.79	Very High
1.40	I feel confident learning how to use new AI tools.	4.30	0.70	Very High
1.41	I feel confident deciding whether an AI tool is appropriate for a particular lesson.	4.28	0.75	Very High
1.42	I feel confident evaluating the quality of AI-generated content.	4.27	0.71	Very High
1.43	I feel confident modifying AI-generated materials to meet my learners' needs.	4.24	0.76	Very High
1.44	I feel confident integrating AI without compromising sound pedagogy.	4.26	0.70	Very High
1.45	I feel confident addressing possible problems that arise when using AI in teaching.	4.21	0.80	High
1.46	I feel confident using AI to support differentiated instruction.	4.26	0.71	Very High
1.47	I feel confident explaining responsible AI use to my learners.	4.30	0.70	Very High
1.48	I feel confident experimenting with appropriate AI-supported instructional approaches.	4.24	0.73	Very High
	Overall Mean	4.26	0.73	Very High

Table 5
Overall Result

	MEAN	SD	Verbal Interpretation
AI Knowledge	4.45	0.62	Very High
AI Skills And Application	4.28	0.74	Very High
Ethical And Responsible Ai Use	4.42	0.72	Very High
Confidence In Ai Integration	4.26	0.73	Very High
Overall Mean	4.35	.70	Very High

The results indicate that public secondary school teachers possess a high level of AI literacy (M = 4.35). Among the four dimensions, AI knowledge obtained the highest mean (M = 4.45), followed by ethical and responsible AI use (M = 4.42), suggesting strong understanding of AI concepts and responsible use in educational settings. Meanwhile, AI skills and application (M = 4.28) and confidence in AI integration (M = 4.26) received slightly lower ratings, indicating opportunities to strengthen the practical use of AI tools and their integration into classroom instruction. Overall, teachers perceived themselves as highly AI literate, particularly in terms of knowledge and ethical responsibility. However, further professional development may focus on enhancing practical AI skills, effective classroom implementation, and confidence in using AI to support teaching and learning.

This section presents the level of instructional innovation among public secondary school teachers in terms of their teaching practices, strategies, and integration of innovative approaches in the classroom.

3.2 What is the level of instructional innovation among public secondary school teachers?

Table 6
Instructional Innovation

Item	Statement	MEAN	SD	Verbal Interpretation
2.1	I introduce new teaching strategies to improve learner understanding.	4.47	0.62	Very High

2.2	I experiment with new approaches when traditional methods do not sufficiently address learner needs.	4.02	1.07	High
2.3	I use technology in creative ways to enhance instruction.	4.42	0.71	Very High
2.4	I design learning activities that encourage learners to actively participate.	4.35	0.64	Very High
2.5	I use different instructional strategies to accommodate diverse learners.	4.39	0.63	Very High
2.6	I modify my teaching approaches based on learners' needs and responses.	4.40	0.61	Very High
2.7	I develop new instructional materials when existing resources are insufficient.	4.33	0.66	Very High
2.8	I use digital tools to create more engaging learning experiences.	4.30	0.67	Very High
2.9	I design activities that develop learners' critical-thinking skills.	4.34	0.60	Very High
2.10	I design activities that encourage creativity among learners.	4.39	0.61	Very High
2.11	I use collaborative approaches that allow learners to work together meaningfully.	4.24	0.72	Very High
2.12	I provide opportunities for learners to solve authentic or real-life problems.	4.43	0.65	Very High
2.13	I use learner feedback to improve my instructional practices.	4.51	0.59	Very High
2.14	I continuously seek new ways to improve my teaching.	4.54	0.59	Very High
2.15	I integrate appropriate emerging technologies into my teaching when they provide instructional value.	4.44	0.64	Very High
2.16	I personalize learning activities according to learners' abilities and needs.	4.45	0.67	Very High
2.17	I combine different teaching approaches to improve learning outcomes.	4.49	0.59	Very High
2.18	I evaluate whether an innovative teaching strategy actually improves learner learning.	4.36	0.71	Very High
	Overall Mean	4.38	0.67	Very High

The results indicate that public secondary school teachers demonstrated a high level of instructional innovation, with an overall mean of 4.38. This suggests that the respondents generally perceived themselves as actively adopting, developing, and improving teaching strategies to enhance learner engagement and learning outcomes. Among the indicators, E62, "I continuously seek new ways to improve my teaching," obtained the highest mean of 4.54. This was followed by E61, "I use learner feedback to improve my instructional practices," with a mean of 4.51, and E65, "I combine different teaching approaches to improve learning outcomes," with a mean of 4.49. These results suggest that teachers perceived themselves as committed to continuous professional improvement, responsive to learner feedback, and willing to combine instructional approaches to address learning needs.

Other highly rated indicators included E49, which concerns introducing new teaching strategies to improve learner understanding, with a mean of 4.47, and E64, which concerns personalizing learning activities according to learners' abilities and needs, with a mean of 4.45. These findings indicate that teachers perceived themselves as making efforts to improve instruction through varied strategies and learner-responsive practices. In contrast, E50, "I experiment with new approaches when traditional methods do not sufficiently address learner needs," obtained the lowest mean of 4.02. This was followed by E59, which concerns using collaborative approaches that allow learners to work together meaningfully, with a mean of 4.24. E56, which concerns using digital tools to create more engaging learning experiences, obtained a mean of 4.30. Although these ratings remain relatively high, they suggest opportunities to encourage more systematic experimentation with alternative teaching methods, strengthen meaningful collaborative learning, and explore creative uses of digital tools.

Overall, the findings suggest that teachers perceived themselves as innovative in their instructional practices, particularly in continuously improving their teaching, responding to learner feedback, and combining different approaches to support learning. However, the comparatively lower rating for experimenting with alternative methods suggests that teachers may benefit from professional learning communities, peer collaboration,

classroom-based action research, and opportunities to test and evaluate innovative instructional strategies.

This section presents the level of teaching effectiveness among public secondary school teachers in terms of their instructional practices, classroom management, and facilitation of student learning.

3.3 What is the level of teaching effectiveness among public secondary school teachers?

Table 7
Teaching Effectiveness

Item	Statement	MEAN
3.1	I clearly communicate the learning objectives of my lessons.	4.81
3.2	I explain concepts clearly and accurately.	4.69
3.3	I connect new lessons with learners' prior knowledge and experiences.	4.80
3.4	I provide examples that help learners understand difficult concepts.	4.69
3.5	I use appropriate teaching strategies based on the lesson objectives.	4.73
3.6	I adjust my teaching strategies when learners experience difficulty.	4.73
3.7	I provide timely and constructive feedback to learners.	4.62
3.8	I use assessment results to improve my instruction.	4.79
3.9	I provide learning activities appropriate to learners' abilities and needs.	4.74
3.10	I provide opportunities for learners to participate actively during lessons.	4.77
3.11	I encourage learners to ask questions and express their ideas.	4.79
3.12	I create a classroom environment conducive to learning.	4.78
3.13	I manage classroom activities effectively.	4.80
3.14	I use appropriate assessment methods to determine learner understanding.	4.73
3.15	I monitor learners' progress throughout the learning process.	4.86
3.16	I provide additional support to learners who experience difficulties.	4.74
3.17	I use learning resources that support the achievement of lesson objectives.	4.73
3.18	I make appropriate use of technology to support learning.	4.67
3.19	I promote critical thinking during classroom activities.	4.76
3.2	I promote learner independence and responsibility for learning.	4.82
3.21	I reflect on my teaching practices to identify areas for improvement.	4.76
3.22	I modify my teaching based on evidence of learner performance.	4.79
3.23	I effectively address differences in learners' learning needs.	4.68
3.24	I maintain a learner-centered approach in my teaching.	4.72
	Overall Mean	4.75

The results indicate that public secondary school teachers demonstrated a very high level of teaching effectiveness, as reflected in the overall mean of 4.75. This suggests that the respondents generally perceived themselves as effective in communicating learning objectives, delivering instruction, managing classroom activities, assessing learner progress, providing appropriate support, and promoting learner independence. The consistently high item means also indicate that the respondents perceived teaching effectiveness as encompassing both instructional delivery and the continuous monitoring of learners' needs and performance. The highest mean was recorded for monitoring learners' progress throughout the learning process (F81, M = 4.86). This was followed by promoting learner independence and responsibility for learning (F86, M = 4.82). Clearly communicating learning objectives (F67, M = 4.81), connecting new lessons with learners' prior knowledge and experiences (F69, M = 4.80), and managing classroom activities effectively (F79, M = 4.80) also received high ratings. These results suggest that the respondents particularly valued monitoring learner development, fostering autonomy, establishing clear instructional directions, activating prior knowledge, and maintaining effective classroom management.

Other indicators also received high mean ratings, including using assessment results to improve instruction (F74, M = 4.79), encouraging learners to ask questions and express ideas (F77, M = 4.79), and modifying teaching based on evidence of learner performance (F88, M = 4.79). These findings suggest that the teachers perceived themselves as responsive to learners' needs and willing to use assessment evidence to guide instructional decisions. Such practices are important components of effective teaching because they help teachers identify learning difficulties and adjust instruction accordingly. However, providing timely and constructive feedback to learners (F73, M = 4.62) obtained the lowest mean among the indicators. Although this rating remains relatively high, it may identify an area for further improvement. Appropriate use of technology to support learning (F84, M = 4.67), explaining concepts clearly and accurately (F68, M = 4.69), providing examples to clarify difficult concepts (F70,

M = 4.69), and addressing differences in learners' learning needs (F89, M = 4.68) also received comparatively lower ratings. These results suggest opportunities to strengthen feedback practices, technology integration, differentiated instruction, and strategies for explaining complex concepts.

Overall, the findings indicate that the respondents perceived their teaching effectiveness positively, particularly in monitoring learner progress, promoting independent learning, and managing classroom activities. Nevertheless, the comparatively lower ratings highlight areas where targeted professional development and reflective teaching practices may further enhance instructional quality.

3.4 Does Artificial Intelligence literacy significantly predict instructional innovation?

Table 8
Regression Analysis of Artificial Intelligence Literacy as a Predictor of Instructional Innovation

Dependent Variable	Predictor	B	SE B	β	t	p
Instructional Innovation	Constant	1.466	0.329	—	4.455	< .001
	AI Literacy	0.670	0.075	0.668	8.926	< .001

The regression analysis showed that AI literacy significantly predicts instructional innovation among public secondary school teachers (β = 0.668, $p < .001$). This means that teachers with higher levels of AI literacy tend to demonstrate higher levels of instructional innovation. The positive regression coefficient (B = 0.670) indicates that as AI literacy increases, instructional innovation also increases. This suggests that teachers who are knowledgeable, skilled, confident, and responsible in using AI are more likely to adopt innovative teaching strategies and practices. The model explained 44.6% of the variation in instructional innovation ($R^2 = 0.446$), indicating that AI literacy is an important factor influencing teachers' instructional innovation. However, the remaining 55.4% may be attributed to other factors such as teaching experience, professional development, access to technology, and institutional support. The ANOVA results further confirmed that the regression model was statistically significant, $F(1, 99) = 79.666$, $p < .001$, demonstrating that AI literacy is a meaningful predictor of instructional innovation. Overall, the findings indicate that AI literacy plays a significant role in promoting instructional innovation. Strengthening teachers' AI knowledge and skills through professional development and training may help enhance innovative teaching practices. Therefore, the null hypothesis stating that AI literacy does not significantly predict instructional innovation is rejected. However, the findings indicate a predictive relationship and should not be interpreted as proof of causation.

3.5 Does Artificial Intelligence literacy significantly predict teaching effectiveness?

Table 9
Regression Analysis of Artificial Intelligence Literacy as a Predictor of Teaching Effectiveness

Dependent Variable	Predictor	B	SE B	β	t	p
Instructional Innovation	Constant	1.466	0.329	—	4.455	< .001
	AI Literacy	0.670	0.075	0.668	8.926	< .001
Teaching Effectiveness	Constant	3.845	0.288	—	13.347	< .001
	AI Literacy	0.209	0.066	0.304	3.178	.002

Regression analysis showed that AI literacy significantly and positively predicts both instructional innovation and teaching effectiveness among public secondary school teachers. However, its influence is stronger on instructional innovation than on teaching effectiveness. For instructional innovation, AI literacy had a strong positive effect (β = 0.668, p < .001). This means that teachers with higher AI literacy are more likely to adopt innovative teaching practices, develop instructional materials, design learning activities, and integrate technology into their lessons. For teaching effectiveness, AI literacy also had a significant positive effect (β = 0.304, p = .002), although the relationship was weaker. This suggests that teachers with higher AI literacy may be better able to prepare resources, support learning, and provide feedback. However, teaching effectiveness also depends on other factors such as pedagogy, classroom management, assessment skills, and interpersonal relationships. Comparing the results, AI literacy was a stronger predictor of instructional innovation (β = 0.668) than teaching effectiveness (β = 0.304). This indicates that AI literacy is more directly connected to teachers' ability to implement new and

innovative instructional practices.

Overall, the findings highlight the importance of strengthening teachers' AI literacy through professional development, training, and school support programs. Improving AI literacy may enhance both instructional innovation and teaching effectiveness, particularly the adoption of innovative teaching strategies. Therefore, the null hypotheses were rejected, confirming that AI literacy significantly predicts instructional innovation and teaching effectiveness. However, the results indicate prediction, not causation.

4. Conclusion

Based on the findings of the study, the following conclusions were drawn.

- The public secondary school teachers in the study came from diverse demographic and professional backgrounds. While most had begun using AI for educational purposes, participation in formal AI-related training remained limited, suggesting a need for more structured professional development.
- Teachers demonstrated high levels of AI literacy, particularly in AI knowledge and ethical use. However, slightly lower ratings in practical application and AI integration confidence indicate opportunities to strengthen their skills through hands-on training and continuous learning.
- The respondents also reported a high level of instructional innovation, particularly in improving teaching practices, using learner feedback, and adapting instruction to learners' needs. However, they were less likely to experiment with new teaching approaches, highlighting the need for greater support for innovation and instructional experimentation.
- In terms of teaching effectiveness, teachers reported very high levels, especially in monitoring learner progress, promoting learner independence, and managing classroom instruction. Nonetheless, feedback practices, technology integration, and responsiveness to diverse learner needs remain areas for improvement.
- Institutional support for AI integration was generally perceived as high, particularly through collaborative and supportive school environments. However, teachers identified the need for more AI-related training, technical assistance, and safeguards addressing concerns about privacy, inaccurate AI-generated information, and learner dependence on AI.
- The study also found a significant positive relationship between AI literacy and both instructional innovation and teaching effectiveness. Teachers with higher AI literacy tended to be more innovative and more effective in their teaching. However, AI literacy showed a stronger association with instructional innovation than with teaching effectiveness.
- Regression analysis further confirmed that AI literacy significantly predicts instructional innovation and teaching effectiveness. Its contribution was stronger for instructional innovation (44.6% of the variance explained) than for teaching effectiveness (9.3% of the variance explained), suggesting that AI literacy is particularly important in fostering innovative instructional practices.

Overall, the findings suggest that an AI-ready teacher is not merely capable of using AI tools but also possesses the knowledge, skills, ethical awareness, and confidence needed to apply AI responsibly and effectively. While AI literacy significantly contributes to instructional innovation and teaching effectiveness, it should be viewed as a supportive resource that complements, rather than replaces, teachers' professional expertise and pedagogical judgment. Since the study used a cross-sectional design and self-reported data, the findings indicate significant relationships and predictive associations rather than direct causation.

Recommendation - In light of the findings and conclusions, the following recommendations were proposed.

For Public Secondary School Teachers - Teachers may continuously strengthen their AI literacy through self-learning, professional development, and collaboration with colleagues. Greater focus may be given to practical skills such as prompt writing, evaluating AI-generated information, curriculum alignment, and troubleshooting. AI may be used to support lesson planning, instructional materials, assessment, and differentiated instruction, provided that outputs are carefully reviewed and contextualized before classroom use. Teachers should also promote ethical and responsible AI use by protecting learner data, verifying AI-generated content, upholding academic integrity, and maintaining professional judgment. They may further help learners develop critical thinking by teaching them to evaluate and verify AI-generated information.

For School Heads and Administrators - School leaders may create a supportive environment for AI integration through workshops, Learning Action Cells (LACs), peer coaching, and collaborative lesson planning activities. Professional development initiatives should focus on prompt writing, curriculum alignment, ethical AI use, and troubleshooting. Schools may also establish clear guidelines on data privacy, academic integrity, responsible AI use, and teacher accountability, while ensuring access to adequate technology, internet connectivity, and technical support.

For Schools Division Offices and Education Authorities - Education authorities may develop sustained AI literacy programs that cover AI knowledge, practical applications, ethical use, and pedagogical integration. Training should emphasize how AI can meaningfully enhance teaching and learning rather than simply introducing new tools. Policies and guidance on data privacy, responsible AI use, and academic integrity should also be strengthened and consistently implemented across schools.

For Teacher Education Institutions and Professional Development Providers - AI literacy may be integrated into teacher preparation and continuing professional development programs. Training should emphasize the relationship between AI, pedagogy, curriculum, assessment, and learner needs, with opportunities for hands-on practice in evaluating and applying AI tools.

For Teachers and School-Based Research Teams - Teachers may conduct action research to examine the effectiveness of AI-supported strategies in lesson planning, assessment, feedback, and differentiated instruction. Findings can help identify AI practices that best support learner engagement and achievement.

For Future Researchers - Future studies may explore other factors influencing instructional innovation and teaching effectiveness, such as pedagogical competence, teaching experience, professional development, institutional support, and access to technology. Researchers may also use larger samples and mixed-method or longitudinal designs to gain a deeper understanding of how AI literacy influences classroom practice and learning outcomes.

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