Artificial Intelligence Integration and Teaching Effectiveness Based on RPMS-PPST Indicators: Basis for a Deped-Aligned AI Instructional Framework

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ABSTRACT

This study examined the relationship between Artificial Intelligence (AI) integration and teaching effectiveness as measured by the Philippine Professional Standards for Teachers (PPST) among public secondary school teachers. Guided by the Technology Acceptance Model (TAM) and DepEd Order No. 003, s. 2026 on the foundational guidelines for AI in basic education, a quantitative correlational design was employed involving 42 purposively selected teachers from Santa Fe National High School, Nueva Vizcaya, Philippines. Data were collected using a validated survey instrument aligned with Results-Based Performance Management System (RPMS- PPST) indicators and Department of Education (DepEd)- guided AI integration practices. The instrument demonstrated high internal consistency, with a Cronbach's alpha coefficient of 0.87. Descriptive analysis indicated high levels of AI integration (M= 3.77) and teaching effectiveness (M= 3.64). Pearson product–moment correlation analysis revealed a strong positive relationship between AI integration and teaching effectiveness (r= 0.89, p< .05), suggesting that AI-supported instructional practices are associated with enhanced teaching performance across PPST domains, including pedagogy, classroom management, assessment, and professional development. The findings highlight AI as a pedagogical support system that strengthens competency-based teaching performance rather than functioning as an independent determinant. The study contributes empirical evidence supporting policy-aligned digital transformation in Philippine basic education and informs the development of an AI-enhanced instructional framework anchored on PPST standards and DepEd policy direction.

Keywords: Artificial Intelligence integration, educational technology, Philippine Professional Standards for Teachers (PPST), public secondary education, teaching effectiveness

INTRODUCTION

The rapid advancement of Artificial Intelligence (AI) is reshaping educational systems by transforming instructional design, assessment practices, and teacher professional roles. Globally, AI is increasingly recognized as a tool that enhances teaching effectiveness through personalized learning, adaptive feedback, and improved instructional efficiency (Holmes et al., 2022; Zawacki-Richter et al., 2019). Despite its growing pedagogical potential, empirical evidence on how AI integration relates to standardized measures of teacher effectiveness remains limited, particularly in developing education systems. In the Philippine context, teacher quality is defined through the Philippine Professional Standards for Teachers (PPST), operationalized thru the Results-Based Performance Management System (RPMS) of the Department of Education (DepEd, 2017). The PPST establishes competency-based indicators of teaching effectiveness across pedagogy, curriculum implementation, assessment, learning environment management, and professional engagement. In response to rapid digital transformation in education, the Department of Education has institutionalized formal policy direction through DepEd Order No. 003, s. 2026, titled Foundational Guidelines on Artificial Intelligence in Basic Education. This policy establishes AI as a strategic educational tool guided by principles of human-centered learning, ethical use, data privacy protection, and pedagogical appropriateness. It further positions AI as a support mechanism for instruction, assessment, and educational management while maintaining that teachers remain central to instructional decision-making and learner development.

DepEd Order No. 003, s. 2026 also delineates three key dimensions of AI integration in basic education: AI in education, which supports teaching and learning processes; education on AI, which develops AI literacy among learners and educators; and AI for education systems, which enhances administrative and governance functions. These provisions signal a shift toward structured and policy-driven AI integration in Philippine schools, reinforcing the need to examine its actual impact on teacher performance within established professional standards. Despite this policy advancement, the implementation of AI in basic education remains emerging and uneven across schools. Studies involving Filipino teachers indicate generally positive perceptions of AI in terms of instructional support, efficiency, and learner engagement, although concerns persist regarding ethical risks, infrastructure readiness, and digital competence (EDCOM II, 2024; Estrellado & Miranda, 2023; Mallilin et al, 2025). These findings suggest that while AI adoption is gaining momentum, its pedagogical integration remains largely exploratory and under-evaluated in relation to formal teacher performance standards.

Moreover, existing research has primarily focused on teacher perceptions, readiness, and general technology adoption rather than empirically examining the relationship between AI integration and teaching effectiveness anchored on PPST-based RPMS indicators. This represents a critical gap in the literature, as there is limited evidence on how AI-supported instructional practices translate into measurable teaching performance within the Philippine public education system under a standardized competency framework. This study is further anchored on the Technology Acceptance Model (TAM) (Davis, 1989), which explains technology adoption behavior through perceived usefulness and perceived ease of use. In the context of education, TAM suggests that teachers are more likely to integrate AI tools into instructional practice when they perceive them as useful for improving teaching efficiency, instructional quality, and learner outcomes. This theoretical lens provides a foundation for understanding how AI integration may translate into improved teaching effectiveness within PPST-aligned performance indicators.

In response to this gap, this study examines the relationship between Artificial Intelligence integration and teaching effectiveness among public secondary school teachers using PPST-based RPMS indicators as the evaluative framework. It specifically determines the level of AI integration, the level of teaching effectiveness, and the relationship between these variables among teachers in Santa Fe National High School, Nueva Vizcaya, Philippines. In doing so, the study provides empirical evidence on the instructional implications of DepEd Order No. 003, s. 2026 and contributes to the development of an AI-enhanced instructional framework aligned with PPST domains to support ethical, effective, and standards-based integration of artificial intelligence in basic education.

RESEARCH DESIGN & METHODS

The study employed a quantitative correlational research design to examine the relationship between Artificial Intelligence (AI) integration and teaching effectiveness as measured by the Philippine Professional Standards for Teachers (PPST). This design was appropriate for determining the strength and direction of the relationship between variables without manipulating any study conditions. The participants consisted of 42 public secondary school teachers from Santa Fe National High School, Nueva Vizcaya, Philippines. A purposive sampling technique was used to select respondents who met the following inclusion criteria: full-time employment as teachers, prior exposure to AI-assisted instructional tools, and active engagement in classroom teaching during the data collection period. The sample size of 42 was considered appropriate for preliminary correlational analysis in educational technology research; however, findings were interpreted with caution due to limited generalizability beyond the study context.

Data were collected using a structured survey questionnaire composed of two sections: the AI Integration Scale and the Teaching Effectiveness Scale. The AI Integration Scale measured the extent of AI use in instructional planning, delivery, assessment, and professional tasks, while the Teaching Effectiveness Scale was anchored on Results-Based Performance Management System (RPMS) indicators aligned with the Philippine Professional Standards for Teachers (PPST) domains. The instrument was validated by experts in educational technology and teacher education. A pilot test conducted with a comparable group of teachers yielded a Cronbach's alpha coefficient of 0.87, indicating high internal consistency. The instrument was

further aligned with Department of Education (DepEd)-guided practices on the integration of emerging technologies in basic education.

Prior to data collection, approval was obtained from school authorities and relevant administrative offices. Participants were informed of the purpose of the study, and informed consent was secured. Data were gathered using a structured questionnaire administered either in person or online, depending on participant availability. Confidentiality, anonymity, and voluntary participation were strictly ensured throughout the process. Data were analyzed using descriptive statistics, including mean and standard deviation, to determine the levels of AI integration and teaching effectiveness. The relationship between the variables was examined using the Pearson product–moment correlation coefficient (r), with statistical significance set at $p < .05$. All analyses were conducted using appropriate statistical software such as SPSS.

The study adhered to ethical standards in educational research. Participation was voluntary, and respondents were assured of anonymity and confidentiality. No personally identifiable information was collected, and participants were informed of their right to withdraw at any stage without penalty. All data were used solely for academic and research purposes.

RESULTS

Level of Artificial Intelligence Integration And Teaching Effectiveness

Table 1 Level of Artificial Intelligence Integration Among Teachers

Indicators of AI Integration	**Mean (M)**	**Interpretation**
Instructional planning using AI tools	3.80	High
Instructional delivery with AI support	3.75	High
Assessment and feedback using AI tools	3.74	High
Professional tasks supported by AI	3.79	High
Overall AI Integration	**3.77**	**High**

Table 2 Level of Teaching Effectiveness Among Teachers Based on PPST Indicators

PPST-Based Teaching Effectiveness Indicators	**Mean (M)**	**Interpretation**
Content knowledge and pedagogy	3.66	High
Learning environment management	3.63	High
Assessment and reporting	3.61	High
Curriculum and planning	3.65	High
Professional engagement	3.65	High
Overall Teaching Effectiveness	**3.64**	**High**

Relationship Between Ai Integration And Teaching Effectiveness

Table 3 Correlation Between AI Integration and Teaching Effectiveness

Variables	**r-value**	**p-value**	**Interpretation**
AI Integration vs Teaching Effectiveness	0.89	<0.05	Significant, Strong Positive Relationship

DISCUSSION

Level of Artificial Intelligence Integration among Teachers

Table 1 shows that teachers demonstrate a high level of Artificial Intelligence (AI) integration in instructional and professional practices, with an overall mean of 3.77. The table shows that instructional planning using AI tools obtained the highest mean (M= 3.80), followed by professional tasks supported by AI (M= 3.79), instructional delivery with AI support (M= 3.75), and assessment and feedback using AI tools (M = 3.74). This

indicates that AI is most frequently used in lesson planning and professional workload management, while also being consistently applied in classroom instruction and assessment.

The table further suggests that AI adoption among teachers is primarily efficiency-driven, particularly in reducing administrative workload and supporting instructional preparation. This pattern is consistent with international studies indicating that teachers initially integrate AI and digital technologies for productivity-enhancing tasks before extending their use to deeper pedagogical applications (Holmes et al., 2022; Zawacki-Richter et al., 2019). These findings suggest that perceived usefulness plays a key role in sustaining AI integration in teaching practice. From a policy perspective, Table 1 also reflects emerging alignment with DepEd Order No. 003, s. 2026, which emphasizes ethical, human-centered, and pedagogically appropriate integration of artificial intelligence in basic education. The relatively high integration in instructional planning and professional tasks suggests that teachers are beginning to operationalize AI in ways that are consistent with national policy directions. The findings imply that professional development initiatives should prioritize the pedagogical use of AI, not only its technical application. Training programs aligned with PPST domains are necessary to ensure that AI integration enhances instructional quality across teaching, assessment, and curriculum implementation.

Level of Teaching Effectiveness among Teachers Based on PPST Indicators

Table 2 shows that teaching effectiveness among respondents is at a high level, with an overall mean of 3.64. The table shows that content knowledge and pedagogy obtained the highest mean (M= 3.66), followed by curriculum and planning (M= 3.65), professional engagement (M= 3.65), learning environment management (M= 3.63), and assessment and reporting (M= 3.61). These results indicate that teachers demonstrate consistent competency across all PPST domains.

The table suggests that teachers maintain strong instructional performance in both content delivery and professional responsibilities. This finding is consistent with the Results-Based Performance Management System (RPMS), which emphasizes continuous improvement and accountability in teacher performance (Department of Education, 2017). Prior studies in the Philippine context also report that teachers generally demonstrate high self-assessed performance when evaluated using PPST-based frameworks, particularly in curriculum implementation and classroom management (Madrigal, 2018). International research similarly indicates that structured professional standards contribute to stable and measurable teaching performance by providing clear benchmarks for instructional quality (Schmid et al., 2020). The consistently high teaching effectiveness suggests the need to sustain institutional support mechanisms such as mentoring programs and professional learning communities. Integrating AI-supported instructional strategies into RPMS-based professional development may further enhance teacher performance across PPST domains.

Correlation Between AI Integration and Teaching Effectiveness

Table 3 shows that there is a strong positive and statistically significant relationship between Artificial Intelligence (AI) integration and teaching effectiveness among public secondary school teachers ($r= 0.89$, $p < .05$). This indicates that higher levels of AI integration are associated with higher levels of teaching effectiveness as measured through Philippine Professional Standards for Teachers (PPST)-aligned indicators. The result suggests a close and systematic relationship between technology-supported instructional practices and competency-based teaching performance within the Philippine public education context. The strength of the relationship may be attributed to the functional alignment between AI integration and core PPST domains. AI tools such as automated feedback systems, adaptive learning platforms, and instructional planning applications directly support essential teaching functions, including pedagogy, curriculum implementation, assessment, and professional engagement. When AI tools are embedded in these instructional domains, they naturally reinforce the same performance indicators used to evaluate teaching effectiveness, thereby strengthening the observed statistical association.

The findings are consistent with the Technology Acceptance Model (TAM), which explains technology adoption through perceived usefulness and perceived ease of use (Davis, 1989). Teachers who perceive AI as

beneficial for improving instructional efficiency, learner engagement, and assessment quality are more likely to integrate it into classroom practice. This increased integration is reflected in enhanced performance across PPST-based teaching effectiveness indicators. Similar findings in educational technology research suggest that perceived usefulness is a strong predictor of sustained technology integration in instructional contexts (Venkatesh & Davis, 2000). From a policy perspective, the results align with DepEd Order No. 003, s. 2026, which provides foundational guidelines for the ethical and pedagogically appropriate integration of artificial intelligence in basic education. The policy emphasizes human-centered learning, data privacy protection, and the role of AI as a support mechanism for instruction and assessment while maintaining the central role of teachers in decision-making. The strong relationship observed in this study suggests that when AI is implemented within these policy parameters, it is closely associated with improved teaching effectiveness rather than functioning as an independent or disruptive factor.

However, the magnitude of the correlation ($r = 0.89$) should be interpreted with methodological caution. One possible explanation is common method variance, as both constructs were measured using self-reported survey instruments, which may inflate observed relationships due to shared measurement context and respondent consistency bias (Podsakoff et al., 2003). In addition, construct proximity may also contribute to the strength of the relationship, as several PPST-based teaching effectiveness indicators overlap conceptually and operationally with domains where AI tools are directly applied, such as instructional delivery, assessment, and professional tasks. Despite these limitations, the findings remain theoretically and practically significant. The strong association supports existing literature suggesting that meaningful integration of digital and AI technologies is closely linked with improved instructional performance when embedded within structured teaching systems (Holmes et al., 2022; Schmid et al., 2020). In developing education contexts such as the Philippines, where competency-based standards and digital transformation initiatives are simultaneously advancing, such convergence between technology use and performance frameworks is increasingly evident. The correlational design of this study does not allow causal inference. While AI integration is strongly associated with teaching effectiveness, it cannot be concluded that AI integration directly causes improved teaching performance. It is also plausible that teachers with higher professional competence are more capable of effectively integrating AI tools, suggesting a potentially reciprocal relationship between the variables. Thus, Table 3 suggests that AI integration is strongly embedded within instructional practice and closely aligned with PPST-based teaching effectiveness. Rather than functioning as an external innovation, AI appears to operate as a pedagogical support system that reinforces existing teaching competencies. This underscores the importance of structured, ethical, and standards-aligned implementation of AI in basic education to ensure that technological integration translates into meaningful instructional improvement.

CONCLUSION

The study revealed that public secondary school teachers demonstrate a high level of Artificial Intelligence (AI) integration, particularly in instructional planning, professional tasks, instructional delivery, and assessment and feedback practices. Teachers also exhibit a high level of teaching effectiveness across all Philippine Professional Standards for Teachers (PPST) domains, including content knowledge and pedagogy, curriculum and planning, learning environment management, assessment and reporting, and professional engagement. A strong positive and statistically significant relationship was found between AI integration and teaching effectiveness ($r = 0.89$, $p < .05$), indicating that higher levels of AI integration are associated with higher levels of teaching effectiveness. The findings suggest that AI functions as a supportive pedagogical tool that strengthens PPST-aligned instructional practices rather than serving as an independent determinant of performance. Consistent with the Technology Acceptance Model (TAM), perceived usefulness of AI appears to facilitate its integration in teaching practice, contributing to improved instructional performance. The results also support DepEd Order No. 003, s. 2026, highlighting that AI integration, when guided by ethical and pedagogical standards, is positively associated with teaching effectiveness. However, the correlational design and reliance on self-reported data suggest limitations related to causality and potential common method bias. Overall, the study concludes that AI integration is strongly embedded in instructional practice and is significantly associated with improved teaching effectiveness, underscoring the need for structured, ethical, and standards-aligned integration of AI in basic education under the PPST framework.

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