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Institutional Readiness in the Integration of Artificial Intelligence in Strengthening Technical Professional Education: Strategic Adoption Framework

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Abstract

This study examined institutional readiness, artificial intelligence (AI) integration, and implementation challenges in Technical-Professional Education in the Schools Division of Tacloban City during School Year 2026–2027 as a basis for developing a Strategic Development Framework. Anchored on the Technology–Organization–Environment Framework, Educational Change Theory, and Diffusion of Innovations Theory, the study employed a quantitative, descriptive-correlational design with a developmental component involving 55 teachers and 185 students purposively selected from eight public secondary schools. Data were collected using adapted structured questionnaires and analyzed through descriptive statistics and correlation analyses. Results revealed high institutional readiness among teachers (M = 3.93) and students (M = 3.59), alongside high AI integration (M = 4.09 and M = 3.76, respectively). Institutional readiness demonstrated significant positive correlations with AI integration among teachers (r = 0.825) and students (r = 0.809), both at $p < .001$. Organizational culture emerged as an institutional strength, while technological infrastructure remained a major concern. Teachers reported very serious implementation challenges, whereas students reported moderate challenges. The findings establish a strong association between institutional readiness and AI integration, supporting the development of a comprehensive Strategic Development Framework. The study recommends strengthening technological infrastructure, professional development, ethical governance, and institutional collaboration. However, purposive sampling, questionnaire-based assessments, and the non-experimental design limit generalizability and causal interpretation. The study supports Sustainable Development Goals 4 (Quality Education), 8 (Decent Work and Economic Growth), 9 (Industry, Innovation and Infrastructure), and 16 (Peace, Justice and Strong Institutions). Its sustainability contribution lies in promoting equitable technological access, responsible AI adoption, institutional capacity, and workforce preparedness.

Keywords: AI Integration; Artificial Intelligence; Ethical Governance; Institutional Readiness; Strategic Development Framework; Technical-Professional Education; Technological Infrastructure

1. Introduction

Artificial Intelligence (AI) has emerged as a transformative force in education, influencing instructional planning, teaching and learning, student assessment, research, and administrative functions. The Organisation for Economic Co-operation and Development (OECD, 2026) observes that generative AI is reshaping education through its accessibility, versatility, and expanding applications. This transformation is particularly relevant to Technical-Professional Education, which is closely associated with technological innovation, occupational competencies,

and evolving workplace demands. UNESCO (2026) emphasizes that AI integration in technical and vocational education requires an institution-wide approach encompassing governance, curriculum development, pedagogy, assessment, competency development, innovation, and monitoring. Consequently, effective AI integration requires institutional preparedness, coordinated educational management, and responsible implementation. Recent K–12 research also identifies teacher preparedness and practical implementation barriers as central considerations in generative AI adoption (Cheah et al., 2025; Alfarwan, 2025).

Institutional readiness is essential to effective, equitable, and sustainable AI integration. The OECD (2023) underscores that an effective digital education ecosystem combines technological resources, human capabilities, and appropriate governance mechanisms. Similarly, UNESCO's AI Competency Framework for Teachers emphasizes human-centered approaches, AI ethics, foundational knowledge, pedagogy, and professional learning (Miao & Cukurova, 2024). Institutional readiness therefore encompasses technological infrastructure, human resource capability, leadership support, accessibility of AI tools, technical assistance, ethical governance, and organizational openness to innovation. UNESCO (2023) further cautions that the rapid development of generative AI has outpaced institutional and regulatory responses, highlighting concerns regarding data privacy, intellectual property, academic integrity, algorithmic bias, misinformation, transparency, and accountability. These considerations reinforce the importance of developing institutional safeguards alongside technological adoption. Studies of teacher readiness and institutional capacity further identify AI literacy, perceived usefulness, professional competence, and institutional support as important adoption conditions (Al-Abdullatif, 2024; Granström & Oppi, 2025; Chiu et al., 2025).

In the Philippines, AI integration forms part of the broader digital transformation of basic education. The National Education Technology Plan (NETP) 2020–2025 provides background for technology integration, digital competencies, and enabling environments for education. More recent DepEd initiatives focus on responsible AI applications in education (Department of Education, 2025, 2026a, 2026b). The establishment of the Education Center for AI Research (E-CAIR) advances responsible AI applications in teaching, learning, and school administration (Department of Education, 2025). Furthermore, Project AGAP.AI (Accelerating Governance and Adaptive Pedagogy through Artificial Intelligence) promotes responsible AI integration through capacity building, curriculum development, governance mechanisms, ethical safeguards, and AI-supported educational practices (Department of Education, 2026). Within the Schools Division of Tacloban City, these national initiatives highlight the importance of assessing institutional readiness and actual AI integration in Technical-Professional Education. Philippine research on preservice teachers also highlights the need to strengthen AI literacy and contextually appropriate professional preparation (Lumanlan et al., 2025; Robledo et al., 2023).

The study is anchored on the Technology–Organization–Environment (TOE) Framework of Tornatzky and Fleischer (1990), Educational Change Theory associated with Fullan (2007), and Diffusion of Innovations Theory of Rogers (2003). The TOE Framework explains technological adoption through technological, organizational, and environmental conditions (Tornatzky & Fleischer, 1990), emphasizing that successful implementation depends on both internal and external organizational factors (Oliveira & Martins, 2011). Educational Change Theory highlights leadership, capacity building, professional learning, collaboration, and sustained organizational support as essential components of meaningful educational reform (Fullan, 2007). Meanwhile, Diffusion of Innovations Theory explains technology adoption through relative advantage, compatibility, complexity, trialability, and observability (Rogers, 2003). Collectively, these theoretical perspectives explain how institutional conditions, organizational change, and individual adoption influence the responsible and sustainable integration of AI across educational functions.

Despite advancing national policies and technological innovations, educational institutions may demonstrate varying levels of readiness and AI integration. Differences in technological accessibility, professional competencies, leadership support, institutional policies, and organizational culture may facilitate or constrain adoption. Challenges involving infrastructure, costs, AI literacy, information reliability, academic integrity, privacy, and resistance to change further emphasize the need for localized empirical evidence. Accordingly, this study assesses institutional readiness and AI integration in selected senior high schools within the Schools Division of Tacloban City during School Year 2026–2027. It examines respondent characteristics, institutional readiness, AI integration across academic and administrative functions, significant relationships among variables, and implementation challenges. The findings serve as the basis for developing a Strategic Development Framework for responsible and effective AI integration in Technical-Professional Education. Recent research on school-level AI readiness, including vocational education, underscores the need to align technological capacity with institutional policies and teacher development (Lara Nieto-Márquez et al., 2026; Petridou, 2024).

The study aligns with Sustainable Development Goal (SDG) 4 – Quality Education by promoting institutional capacity, educator competencies, equitable technological access, and responsible AI-supported learning. It supports SDG 8 – Decent Work and Economic Growth by strengthening Technical-Professional Education in response to evolving technological and workplace demands. It also contributes to SDG 9 – Industry, Innovation

and Infrastructure through its emphasis on technological infrastructure, digital innovation, and institutional readiness. Furthermore, it aligns with SDG 16 – Peace, Justice, and Strong Institutions by emphasizing ethical governance, transparency, accountability, data protection, and responsible institutional practices.

From a multidisciplinary sustainability perspective, the study contributes to educational, technological, institutional, and policy sustainability by promoting coordinated and responsible AI integration. Its proposed strategic development framework may guide educational leaders in strengthening technological resources, professional competencies, institutional governance, ethical safeguards, and organizational innovation. By addressing readiness gaps and implementation challenges, the study supports the development of adaptable, inclusive, and sustainable educational institutions capable of responding to emerging technological demands while maintaining educational quality, academic integrity, and human oversight.

2. Material and methods

2.1 Research Design

The study employed a quantitative, non-experimental, descriptive-correlational research design with a developmental component. The descriptive component assessed respondent characteristics, institutional readiness, AI integration, and implementation challenges. The correlational component examined significant relationships between respondent characteristics and AI integration and between institutional readiness and AI integration without manipulating the variables. The developmental component focused on formulating a strategic development framework based on the empirical findings. The study followed the Input–Process–Output (IPO) model. The input comprised respondent profiles, institutional readiness, AI integration, and implementation challenges. The process involved securing institutional permission, administering survey questionnaires, analyzing data using descriptive and correlational statistics, and interpreting the findings. The output was a Strategic Development Framework intended to strengthen responsible, effective, and sustainable AI integration in Technical-Professional Education.

2.2 Locale of the Study

The study was conducted in eight public secondary schools offering Senior High School Technical-Professional Education within the Schools Division of Tacloban City, Eastern Visayas, during School Year 2026–2027. The participating schools were geographically distributed across central, southern, northern, and peripheral communities, with distances ranging from approximately 1.0 to 15.2 kilometers from the Division Office. Their varying geographical and institutional conditions provided an appropriate setting for assessing technological infrastructure, human resource capability, institutional support, accessibility of AI tools, ethical governance, and organizational readiness for AI integration.

2.3 Respondents of the Study

The study involved 240 respondents, comprising 55 Senior High School teachers handling Technical-Professional Education subjects and 185 students enrolled in corresponding programs. Teacher characteristics included age, sex, highest educational attainment, teaching experience, specialization, AI-related training and seminars attended, and accessibility to technological resources. Student characteristics included age, sex, and accessibility to technological resources. Both groups provided assessments of institutional readiness, AI integration, and implementation challenges.

2.4 Sample and Sampling Procedure

Purposive sampling was employed to select respondents who satisfied the established inclusion criteria. Teachers were required to be actively teaching Technical-Professional Education subjects, familiar with their institutional conditions, and willing to participate. Students were required to be officially enrolled in Technical-Professional Education programs and voluntarily agree to participate, with parental consent and student assent obtained when applicable.

2.5 Research Instrument

An adapted structured survey questionnaire was used as the primary data-gathering instrument. Separate but parallel questionnaires were administered to teachers and students, comprising four parts: respondent profiles, institutional readiness, AI integration, and implementation challenges. Institutional readiness was assessed across six dimensions: technological infrastructure and resources, human resource capability and AI competence, leadership and institutional support, accessibility of AI tools and technical support, policy, governance and ethical readiness, and organizational culture and openness to innovation. The indicators were adapted from the OECD Digital Education Outlook 2023 (OECD, 2023), UNESCO's Guidance for Generative AI in Education and Research (Miao & Holmes, 2023), UNESCO's AI Competency Framework for Teachers (Miao & Cukurova, 2024), and UNESCO's Recommendation on the Ethics of Artificial Intelligence (UNESCO, 2021). AI integration was assessed across instructional planning and preparation, teaching and learning, student assessment, research and knowledge production, and administrative and management functions. The indicators were adapted and

contextualized primarily from Miao and Holmes (2023), Miao and Cukurova (2024), and the OECD Digital Education Outlook 2026 (OECD, 2026). Implementation challenges were assessed across six areas involving technological infrastructure and access, AI knowledge and professional development, pedagogical concerns, accuracy and reliability, ethical and academic integrity concerns, and institutional and organizational challenges. All three major variables were measured using five-point rating scales, with parallel indicators contextualized to teachers' professional responsibilities and students' learning experiences.

2.6 Data Gathering Procedure

The researcher secured permission from the Schools Division Superintendent and coordinated with participating school heads to identify qualified respondents and arrange questionnaire administration. Respondents were informed of the study's objectives, participation requirements, and confidentiality measures before informed consent was obtained. Questionnaires were administered independently at schedules that minimized disruption to regular educational activities. Completed questionnaires were checked for completeness, coded, organized, and subjected to appropriate statistical analyses. The findings provided the empirical basis for developing the proposed strategic development framework.

2.7 Data Analysis Techniques

Frequency counts and percentages were used to describe respondent characteristics and accessibility to technological resources. Weighted means and standard deviations were employed to assess institutional readiness, AI integration, and the seriousness of implementation challenges. Composite means were computed for each dimension and major variable using five-point interpretation scales. Eta (η) correlation was used to determine associations between nominal categorical profile variables and AI integration. Pearson product-moment correlation coefficient (r) examined relationships between quantitative profile variables and AI integration and between institutional readiness and AI integration when the required assumptions were satisfied. Spearman's rank-order correlation coefficient (ρ) was applied to ordinal variables and quantitative variables that did not satisfy Pearson correlation assumptions. All statistical tests were evaluated at the 0.05 significance level, and significant relationships were interpreted as associations rather than evidence of causation.

2.8 Ethical Considerations

The study adhered to established ethical research principles, including voluntary participation, informed consent, confidentiality, anonymity, and the right to withdraw without penalty. Parental or guardian consent and student assent were obtained when applicable. Data were securely stored, accessed only by authorized individuals, and used exclusively for academic purposes in accordance with the Data Privacy Act of 2012 (Republic Act No. 10173). Research integrity, objectivity, and proper acknowledgment of sources were maintained throughout data collection, analysis, interpretation, and reporting.

3. Results and Discussion

3.1 Profile of the Respondents

3.1.1 Socio-Demographic and Professional Profile of Teachers

Most teachers were aged 31–40 years (49.1%), with a mean age of 39.6 years. Female teachers comprised 65.5% of the respondents, while 41.8% had earned master's degree units. Most had 6–10 years of teaching experience (61.8%), with a mean of 7.8 years. Home Economics was the dominant specialization (60.0%). However, 67.3% had not attended AI-related training. The findings indicate a gap between teachers' professional experience and AI-specific competencies. Yue et al. (2024) identified substantial gaps in teachers' AI-related technological and content knowledge, while Tan et al. (2025) emphasized insufficient professional development opportunities despite increasing AI adoption. Similarly, Maghanay et al. (2026) reported limited formal AI training among Philippine secondary school teachers, reinforcing the need for targeted professional development.

3.1.2 Teachers' Accessibility to Technology Resources

All teachers reported access to laptops (100.0%), while school internet connectivity, mobile internet, and ICT facilities were accessible to 98.2%. Access to AI-powered chatbots was relatively high (74.5%), whereas AI-assisted writing and presentation tools were accessible to 52.7% each. AI-assisted assessment and feedback tools recorded the lowest accessibility at 49.1%. Although basic technological resources were widely available, access to specialized AI applications remained limited. Somabut et al. (2025) identified technological infrastructure, administrative support, and AI knowledge as important predictors of readiness. Similarly, Ayubian et al. (2026) emphasized that technological access must be complemented by institutional support, professional competence, and pedagogical preparedness.

3.1.3 Socio-Demographic Profile of Students

Most students were 17 years old (60.0%), with a mean age of 17 years. Male students accounted for 55.7%, while female students comprised 44.3%, indicating a relatively balanced sex distribution. The findings emphasize the importance of developmentally appropriate and equitable AI-supported learning. Klarin et al. (2024) highlighted

the relevance of adolescents' developmental characteristics to AI engagement, while Liu et al. (2026) identified associations between demographic characteristics and digital competencies. These findings support equitable opportunities for developing AI literacy and technical competencies.

3.1.4 Students' Accessibility to Technology Resources

Students reported relatively high access to school internet connectivity (87.0%) and smartphones (82.7%), while laptop and desktop accessibility remained lower at 48.1% and 38.4%, respectively. AI-powered chatbots were accessible to 71.9%, whereas specialized Technical-Professional AI applications and presentation tools were accessible to only 44.9% and 41.6%, respectively. The findings indicate that students primarily depend on mobile technologies and general-purpose AI applications, potentially limiting specialized technical learning opportunities. Zhang et al. (2026) emphasized the influence of socioeconomic circumstances on AI literacy, while Baek et al. (2024) identified demographic and institutional factors associated with AI utilization. These findings highlight the importance of equitable access to specialized AI resources.

3.2 Level of Institutional Readiness for AI Integration

3.2.1 Technological Infrastructure and Resources

Technological infrastructure and resources were assessed as Moderately Ready by teachers ($M = 3.36$, $SD = 1.03$) and students ($M = 3.26$, $SD = 0.81$). Teachers rated internet connectivity highest ($M = 3.73$), while network capacity received the lowest rating ($M = 3.05$). Students rated network capacity highest ($M = 3.41$), whereas the sufficiency of digital devices ranked lowest ($M = 2.96$). The findings indicate that existing technological resources remain insufficient for sustained AI integration. Miras et al. (2023) identified inadequate technological resources as a contributor to the digital divide, while Alnawati (2026) emphasized infrastructure readiness and teacher preparedness in AI-supported instruction. Furthermore, Miras et al. (2023) underscored the importance of equitable technological access to improve learning opportunities.

3.2.2 Human Resource Capability and AI Competence

Human resource capability and AI competence were assessed as Highly Ready by teachers ($M = 4.14$, $SD = 0.94$) and students ($M = 3.70$, $SD = 0.90$). Teachers rated their ability to use appropriate AI tools highest ($M = 4.25$), while evaluating AI-generated outputs received the lowest rating ($M = 4.04$). Students rated understanding AI concepts highest ($M = 4.02$), whereas selecting specialization-appropriate AI tools ranked lowest ($M = 3.40$). The findings demonstrate favorable AI competencies but indicate opportunities for improving critical evaluation and specialization-specific applications. Tan et al. (2025) emphasized that effective AI integration requires technical proficiency, pedagogical knowledge, professional development, and critical evaluation skills.

3.2.3 Leadership and Institutional Support

Leadership and institutional support were assessed as Highly Ready by teachers ($M = 4.03$, $SD = 0.99$) and students ($M = 3.75$, $SD = 0.97$). Teachers rated leadership encouragement of responsible AI exploration highest ($M = 4.11$), while institutional guidance received the lowest rating ($M = 3.89$). Students rated training and professional development opportunities highest ($M = 4.02$), whereas incorporating AI into school improvement plans ranked lowest ($M = 3.59$). The findings suggest that institutional encouragement is more evident than systematic guidance and formal planning. Tan et al. (2025) emphasized organizational support and structured professional learning as essential conditions for addressing technological, instructional, and ethical challenges associated with AI integration.

3.2.4 Accessibility of AI Tools and Technical Support

Teachers rated institutional guidance on appropriate and safe AI tools highest ($M = 3.98$), while affordability and subscription requirements received the lowest rating ($M = 3.62$). Students rated convenient access to educational AI tools highest ($M = 3.71$), whereas affordability ranked lowest ($M = 3.19$), interpreted as Moderately Ready. The findings indicate that financial constraints may limit access to advanced and specialized AI applications. Tan et al. (2025) emphasized that technological accessibility should be complemented by institutional assistance and professional development. Providing affordable AI applications and responsive technical support may strengthen equitable integration.

3.2.5 Policy, Governance, and Ethical Readiness

Policy, governance, and ethical readiness were assessed as Highly Ready by teachers ($M = 4.10$, $SD = 1.08$) and students ($M = 3.45$, $SD = 0.73$). Teachers rated responsible AI guidance and information verification highest ($M = 4.18$ each), while mechanisms for addressing ethical concerns ranked lowest ($M = 4.02$). Students rated responsible AI guidance highest ($M = 3.63$), whereas data privacy and protection received the lowest assessment ($M = 3.19$). The findings suggest that institutional ethical safeguards require further strengthening, particularly regarding student data protection and academic integrity. Tan et al. (2025) identified ethical challenges as important considerations in educational AI applications, reinforcing the need for operational policies, accountability mechanisms, and responsible AI practices.

3.2.6 Organizational Culture and Openness to Innovation

Organizational culture and openness to innovation were assessed as Highly Ready by teachers (M = 4.16, SD = 1.02) and students (M = 3.76, SD = 0.76). Teachers rated receptiveness to learning AI applications highest (M = 4.26), while opportunities for responsible experimentation ranked lowest (M = 4.07). Students rated responsible experimentation highest (M = 3.88), whereas collaborative exploration received the lowest rating (M = 3.60). The findings demonstrate favorable institutional attitudes toward innovation but indicate opportunities for strengthening collaboration and experimentation. Tan et al. (2025) highlighted continuous professional learning and pedagogical adaptation as essential to sustainable AI integration.

3.2.7 Overall Institutional Readiness

Overall institutional readiness was assessed as Highly Ready by teachers (M = 3.93, SD = 0.95) and students (M = 3.59, SD = 0.60). Organizational culture and openness to innovation obtained the highest ratings from teachers (M = 4.16) and students (M = 3.76), while technological infrastructure and resources received the lowest ratings (M = 3.36 and M = 3.26, respectively). The findings indicate that favorable human and organizational conditions are not fully supported by adequate technological infrastructure. Tan et al. (2025) emphasized that effective AI integration requires coordinated technological, pedagogical, professional development, and ethical support. Institutional strategies should therefore prioritize infrastructure improvement while sustaining existing organizational strengths.

3.3 Level of AI Integration in Technical-Professional Education

3.3.1 Instructional Planning and Preparation

AI integration in instructional planning and preparation was assessed as Very Highly Integrated by teachers (M = 4.25, SD = 0.72) and Highly Integrated by students (M = 3.82, SD = 0.96). Reviewing and modifying AI-generated materials received the highest ratings from teachers (M = 4.47) and students (M = 3.93). The findings emphasize the importance of professional judgment and content verification in AI-assisted instructional preparation. Powell and Courchesne (2024) demonstrated that AI can efficiently generate curriculum-aligned lesson plans but may produce inaccurate or fabricated content. Similarly, Calamlam (2026) identified inaccuracies and impractical outputs in AI-generated instructional activities, reinforcing the importance of human oversight and curriculum alignment.

3.3.2 Teaching and Learning

AI integration in teaching and learning was assessed as Very Highly Integrated by teachers (M = 4.26, SD = 0.77) and Highly Integrated by students (M = 3.77, SD = 0.96). Teachers rated AI-supported explanations, demonstrations, independent learning, and problem-solving highest (M = 4.29). Students rated AI use as a complement to hands-on learning and teacher guidance highest (M = 3.89). The findings suggest that AI supports instructional delivery but should not replace authentic practical learning experiences. A systematic review by researchers examining generative AI in pedagogical practices (2025) identified benefits involving personalized learning, feedback, engagement, and problem-solving alongside risks of inaccuracies and overreliance. Levy-Nadav et al. (2026) similarly observed increasing AI utilization for instructional redesign and personalized materials, emphasizing the importance of purposeful pedagogical integration.

3.3.3 Student Assessment

Student assessment was assessed as Highly Integrated by teachers (M = 3.94, SD = 0.70) and students (M = 3.75, SD = 0.96). Teachers rated AI-generated assessment questions and performance tasks highest (M = 4.18), whereas reviewing AI-generated assessment materials received the lowest rating (M = 3.29). Students rated AI-assisted development and understanding of scoring rubrics highest (M = 3.85). The findings indicate opportunities to strengthen quality assurance in AI-assisted assessment. Xia et al. (2024) identified the potential of AI to transform assessment while raising concerns regarding validity, reliability, and academic integrity. Similarly, Zhao et al. (2024) emphasized the opportunities and challenges associated with AI-supported assessment, reinforcing the importance of human verification and authentic performance-based evaluation.

3.3.4 Research and Knowledge Production

AI integration in research and knowledge production was assessed as Highly Integrated by teachers (M = 3.92, SD = 1.07) and students (M = 3.75, SD = 0.89). Teachers rated AI-assisted research idea generation highest (M = 4.07), while identifying keywords and research sources ranked lowest (M = 3.82). Students rated idea generation, source identification, and information verification highest (M = 3.79). The findings demonstrate the usefulness of AI in research initiation while emphasizing the need for information verification and research literacy. Giray et al. (2026) identified fabricated citations, factual distortions, and inconsistent AI-generated outputs as significant threats to research integrity, reinforcing the importance of credible source verification and independent inquiry.

3.3.5 Administrative and Management Functions

Administrative and management functions were assessed as Highly Integrated by teachers (M = 4.10, SD = 0.74) and students (M = 3.68, SD = 0.95). Verification of AI-generated documents received the highest ratings from

teachers (M = 4.25) and students (M = 3.89), while organizing information for administrative and academic requirements received the lowest ratings (M = 3.95 and M = 3.59, respectively). The findings indicate that AI supports administrative efficiency while maintaining the importance of information verification. Levy-Nadav et al. (2026) identified benefits involving workload reduction and professional efficiency alongside continuing concerns regarding content quality and bias. These findings reinforce the need for responsible information management, confidentiality, and human accountability.

3.3.6 Overall Level of AI Integration

Overall AI integration was assessed as Highly Integrated by teachers (M = 4.09, SD = 0.79) and students (M = 3.76, SD = 0.88). Teachers rated teaching and learning highest (M = 4.26), while research and knowledge production ranked lowest (M = 3.92). Students rated instructional planning and preparation highest (M = 3.82), whereas administrative and management functions received the lowest rating (M = 3.68). The findings indicate that AI integration is more evident in instructional activities than in research and administrative functions. The systematic review published in Cogent Education (2025) identified instructional efficiency, personalized learning, feedback, and idea generation as important AI applications. Similarly, a systematic review published in the British Journal of Educational Technology (2026) emphasized human control and interaction in determining educational effectiveness. These findings support balanced AI integration through professional development, institutional support, and ethical safeguards.

3.4 Relationship Between Respondent Profiles and AI Integration

Among teachers, highest educational attainment ($r = 0.318$, $p = 0.018$) and accessibility to technology resources ($r = 0.396$, $p = 0.003$) demonstrated significant positive relationships with AI integration. Age, sex, teaching experience, specialization, and AI-related training showed no significant relationships. Among students, age demonstrated a significant negative relationship ($r = -0.162$, $p = 0.027$), while technological accessibility exhibited a significant positive relationship ($r = 0.279$, $p < 0.001$). Sex was not significantly associated with AI integration. The findings emphasize technological accessibility as an important factor associated with AI integration among both respondent groups. Celik (2023) established that technological knowledge should be complemented by pedagogical and ethical competencies. Similarly, Zhang et al. (2026) identified associations between socioeconomic circumstances, AI literacy, and AI engagement. The nonsignificant relationship involving teachers' AI-related training highlights the importance of examining training quality, relevance, and practical application rather than attendance alone.

3.5 Relationship Between Institutional Readiness and AI Integration

All six institutional readiness dimensions demonstrated significant positive relationships with AI integration among teachers and students ($p < 0.001$). Overall institutional readiness exhibited strong positive correlations with AI integration among teachers ($r = 0.825$, $p < 0.001$) and students ($r = 0.809$, $p < 0.001$). Among teachers, organizational culture and openness to innovation demonstrated the strongest correlation ($r = 0.891$), followed by leadership and institutional support ($r = 0.853$) and policy, governance, and ethical readiness ($r = 0.851$). Technological infrastructure demonstrated the weakest correlation ($r = 0.559$). Among students, leadership and institutional support recorded the strongest correlation ($r = 0.795$), followed by human resource capability and AI competence ($r = 0.793$), while accessibility of AI tools and technical support recorded the weakest correlation ($r = 0.464$). The findings indicate that higher perceived institutional readiness is associated with greater AI integration. Celik (2023) emphasized the interconnected roles of technological, pedagogical, and ethical competencies in effective AI utilization. Similarly, Zhang et al. (2026) identified the importance of AI literacy and technological accessibility in academic AI engagement. These findings support a comprehensive institutional approach encompassing leadership, capacity building, technological resources, ethical governance, and organizational innovation.

3.6 Issues and Challenges Encountered in AI Integration

3.6.1 Technical Infrastructure and Access Challenges

Technical infrastructure and access were assessed as a Very Serious Challenge by teachers (M = 4.25, SD = 0.59) and a Serious Challenge by students (M = 3.63, SD = 0.89). Teachers identified subscription fees and advanced AI application costs as their greatest concern (M = 4.36), while students identified unstable internet connectivity as their primary challenge (M = 3.89). The findings indicate that affordability and connectivity remain important barriers to AI integration. Improving technological infrastructure, providing affordable AI applications, and ensuring equitable access to digital resources may address these limitations.

3.6.2 AI Knowledge, Skills, and Professional Development Challenges

AI knowledge, skills, and professional development were assessed as a Serious Challenge by teachers (M = 4.19, SD = 0.78) and a Moderate Challenge by students (M = 3.32, SD = 0.78). Teachers identified insufficient training opportunities as their greatest concern (M = 4.44), while students identified limited AI knowledge and difficulty developing effective prompts (M = 3.44 each). The findings emphasize the need for sustained professional development and AI literacy initiatives. Tan et al. (2025) identified a gap between increasing AI applications and

available professional development opportunities. Similarly, Celik (2023) emphasized the importance of combining technological, pedagogical, and ethical competencies to achieve effective AI integration.

3.6.3 Pedagogical and Technical-Professional Education Challenges

Pedagogical and Technical-Professional Education challenges were assessed as a Serious Challenge by teachers (M = 4.03, SD = 0.70) and a Moderate Challenge by students (M = 3.34, SD = 0.82). Teachers identified difficulty integrating AI without reducing authentic hands-on learning opportunities as their greatest concern (M = 4.24). Students identified misalignment between AI-generated content and prescribed curriculum competencies as their primary challenge (M = 3.51). The findings emphasize the importance of preserving practical learning and independent technical performance. Celik (2023) highlighted the need to align AI applications with pedagogical objectives and subject-specific requirements, while Celik (2026) emphasized instructional strategies that prevent excessive AI dependence and preserve learners' cognitive effort and independent performance.

3.6.4 Accuracy, Reliability, and Quality Challenges

Accuracy, reliability, and quality were assessed as a Very Serious Challenge by teachers (M = 4.24, SD = 0.70) and a Moderate Challenge by students (M = 3.31, SD = 0.79). Teachers identified fabricated or unverifiable information and references as their greatest concern (M = 4.33), while students identified inaccurate or misleading information as their primary challenge (M = 3.50). The findings highlight the importance of verifying AI-generated information before educational application. Wang et al. (2024) identified response errors, biases, overdependence, and privacy concerns as major challenges. Similarly, Kaşarcı (2026) documented risks involving AI hallucinations, fabricated citations, misinformation, and assessment validity, reinforcing the importance of critical evaluation and human verification.

3.6.5 Ethical, Privacy, and Academic Integrity Challenges

Ethical, privacy, and academic integrity concerns were assessed as a Very Serious Challenge by teachers (M = 4.32, SD = 0.58) and a Moderate Challenge by students (M = 3.38, SD = 0.77). Teachers identified information privacy, security, and excessive AI dependence as their greatest concerns (M = 4.42 each), while students identified privacy and security as their primary challenge (M = 3.52). The findings emphasize the need for institutional guidelines addressing data protection, academic honesty, responsible AI assistance, and transparency. Wang et al. (2024) identified privacy risks, academic integrity concerns, and excessive dependence as major challenges. Similarly, Ocak and Caskurlu (2026) highlighted transparency, fairness, accountability, and inclusiveness as essential considerations in establishing trust in educational AI applications.

3.6.6 Institutional and Organizational Challenges

Institutional and organizational challenges were assessed as a Very Serious Challenge by teachers (M = 4.33, SD = 0.72) and a Moderate Challenge by students (M = 3.32, SD = 0.69). Teachers identified limited collaboration and sharing of effective AI practices as their greatest concern (M = 4.53), while students identified differences in willingness, confidence, and ability to use AI (M = 3.44). The findings indicate the importance of institutional collaboration, mentoring, and coordinated professional learning. Tan et al. (2025) emphasized sustained professional development to address expanding AI applications, while Celik (2023) highlighted the interconnected technological, pedagogical, and ethical competencies necessary for effective integration.

3.6.7 Overall Issues and Challenges in AI Integration

Overall implementation challenges were assessed as a Very Serious Challenge by teachers (M = 4.22, SD = 0.60) and a Moderate Challenge by students (M = 3.38, SD = 0.63). Institutional and organizational challenges ranked highest among teachers (M = 4.33), while technical infrastructure and access challenges ranked highest among students (M = 3.63). Pedagogical challenges received the lowest teacher rating (M = 4.03), whereas accuracy, reliability, and quality challenges received the lowest student rating (M = 3.31). The findings demonstrate the need for differentiated institutional interventions addressing teachers' organizational concerns and students' technological accessibility. Tan et al. (2025) emphasized sustained professional development and institutional support, while Wang et al. (2024) identified technological inequalities, inaccuracies, privacy concerns, and overdependence as barriers to responsible AI utilization. Furthermore, Ocak and Caskurlu (2026) emphasized ethical understanding and accountability in establishing trust. Collectively, these findings support the development of an integrated strategic framework addressing technological accessibility, institutional capacity, professional competence, and ethical governance to strengthen sustainable AI integration in Technical-Professional Education.

4. Conclusion & Recommendations

The study concludes that selected senior high schools offering Technical-Professional Education in the Schools Division of Tacloban City demonstrate favorable institutional readiness and substantial AI integration, as perceived by 240 respondents comprising 55 teachers and 185 students. Organizational culture and openness to innovation emerged as institutional strengths, while technological infrastructure and resources required further improvement. AI integration was more prominent in instructional planning and teaching and learning than in

research, assessment, and administrative functions. Technological accessibility was significantly associated with AI integration among both respondent groups, while all institutional readiness dimensions demonstrated significant positive relationships with AI integration. Despite favorable readiness, teachers encountered substantial organizational, ethical, and professional development challenges, whereas students primarily experienced technological accessibility concerns. These findings support the formulation of a comprehensive Strategic Development Framework integrating technological enhancement, professional capacity building, instructional leadership, ethical governance, and collaborative innovation to promote responsible, equitable, and sustainable AI integration while preserving authentic competency-based learning.

The Schools Division Office and school administrators should strengthen institutional readiness through coordinated technical assistance, reliable internet connectivity, adequate digital devices, accessible AI applications, and functional technical support systems. Sustained professional development programs should prioritize AI literacy, prompt development, instructional applications, information verification, data privacy, and ethical utilization. Teachers should integrate AI into educational activities while maintaining curriculum alignment, authentic hands-on learning, and performance-based assessment. School administrators should establish institutional guidelines addressing academic integrity, intellectual property, transparency, and responsible AI utilization. Collaborative professional learning through Learning Action Cells, mentoring, peer demonstrations, and school-based AI integration teams should be strengthened. Teachers and students should verify AI-generated information against credible sources and relevant technical standards. Furthermore, the proposed Strategic Development Framework should undergo phased implementation, subject to institutional approval and available resources, accompanied by baseline assessments, performance indicators, periodic monitoring, and evaluation to determine its effectiveness and sustainability.

The study was limited to 240 purposively selected teachers and students from selected senior high schools offering Technical-Professional Education in the Schools Division of Tacloban City during School Year 2026–2027, restricting the generalizability of its findings. Its quantitative descriptive-correlational design and reliance on questionnaire-based perceptions limited the assessment of actual AI-supported instructional practices and prevented the establishment of causal relationships. Furthermore, the effectiveness of the proposed Strategic Development Framework remains subject to implementation and evaluation. Future studies may involve broader geographical settings, additional Technical-Professional specializations, and longitudinal, mixed-methods, or intervention-based approaches to examine instructional quality, learner performance, and technical competency development.

5. Compliance with ethical standards

The author affirm that no conflicts of interest exist in relation to this study. The study observed established ethical principles involving 240 respondents, comprising 55 teachers and 185 students from selected senior high schools offering Technical-Professional Education in the Schools Division of Tacloban City. Participation was voluntary, informed consent was obtained, and parental or guardian consent and student assent were secured when applicable. Respondents were informed of their right to decline or withdraw without penalty, while confidentiality and anonymity were maintained by avoiding the collection of unnecessary personally identifying information and reporting findings exclusively in aggregate form.

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