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Technological Pedagogical Content Knowledge (TPACK) and Performance Management Outcomes Among Secondary School Teachers: Basis for a Training Design

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Abstract

This study determined the levels of Technological Pedagogical Content Knowledge (TPACK) and Performance Management and Evaluation System (PMES) outcomes among public secondary school teachers. It examined the relationship between these variables to inform a proposed training design. A descriptive–correlational research design was employed at Salvacion National High School and Marcelina National High School in the South District of the Bayugan City Division. Seventy Teacher I to Teacher III respondents were included through complete enumeration. Data were gathered using a researcher-developed, expert-validated, and reliability-tested survey questionnaire and analyzed using weighted mean and Spearman's rank-order correlation. Findings revealed very satisfactory levels of technological knowledge (M=4.07), technological pedagogical knowledge (M=4.11), technological content knowledge (M=4.16), and overall TPACK (M=4.12). PMES outcomes were likewise very satisfactory in content knowledge and pedagogy (M=4.40), learning environment and diversity of learners (M=4.47), curriculum and planning (M=4.47), assessment and reporting (M=4.46), and factor (M=4.44). Overall, TPACK was significantly and positively associated with all PMES domains, with the strongest association observed in content knowledge and pedagogy ($\rho = .534$, $p < .001$). The findings supported the development of a TPACK-based training design to strengthen teachers' technological, pedagogical, and content competencies and to support professional performance.

Keywords: PMES, Professional Development, Teacher Performance, Technology Integration, TPACK

Introduction

The rapid advancement of digital technologies has significantly transformed educational systems worldwide, reshaping how teaching and learning are designed, delivered, and evaluated. In the 21st century, schools are increasingly expected to integrate digital instructional tools such as learning management systems, multimedia resources, online assessments, and data-driven platforms to enhance instructional effectiveness and improve learner outcomes. Digital instructional integration is no longer viewed merely as a

supplementary practice but as a core component of quality education, supporting differentiated instruction, learner engagement, timely feedback, and evidence-based decision-making (Luo et al., 2024).

In this context, effective integration of technology in teaching is best understood through the Technological Pedagogical Content Knowledge (TPACK) framework, which emphasizes the dynamic interplay among content, pedagogy, and technology in delivering meaningful instruction. As educational institutions adapt to these global trends, teachers play a central role in ensuring that digital tools are meaningfully aligned with curriculum goals, pedagogical approaches, and performance standards. This alignment highlights the importance of teachers' competencies in integrating technology in a pedagogically sound and content-relevant manner.

In the Philippine context, the integration of digital instruction has been strongly emphasized as part of ongoing education reforms. The Department of Education (DepEd) recognizes digital technology as a strategic enabler for improving teaching quality, school efficiency, and learner achievement, particularly in response to globalization and technological change. The Basic Education Development Plan (BEDP) 2030 highlights the importance of digital transformation in strengthening instructional delivery and teacher competence (Department of Education, 2022).

Through various initiatives, such as blended learning modalities, online professional development, and digital assessment tools, DepEd aims to equip teachers with competencies aligned with TPACK. These initiatives ensure that teachers are capable of integrating technology effectively with pedagogy and content. As a result, teachers are better prepared to meet evolving educational demands and deliver high-quality instruction.

Alongside instructional reforms, teacher accountability and performance have been institutionalized through structured evaluation systems. In public secondary schools, the Performance Management and Evaluation System (PMES), operationalized through the Results-Based Performance Management System (RPMS), serves as a key mechanism for assessing teacher effectiveness, professional growth, and alignment with organizational goals. Consequently, PMES outcomes inform promotion, professional development planning, and recognition, making them a critical component of teacher motivation and school improvement (Department of Education, 2018).

However, as instructional practices become increasingly digital, there is a growing need to examine how teachers' TPACK-based instructional practices influence their performance indicators under PMES. This connection is essential in understanding whether technology integration contributes to measurable improvements in teaching performance. It also emphasizes the need to align instructional innovation with evaluation standards.

From a policy and legal standpoint, several mandates provide a strong foundation for integrating digital instruction into Philippine basic education. Republic Act No. 10533, also known as the Enhanced Basic Education Act of 2013, encourages the use of innovative teaching strategies and learning resources, including information and communication technologies (ICT), to improve learning outcomes. Republic Act No. 10929, which established free internet access in public places, further supports the use of digital platforms in schools.

In addition, DepEd Orders such as DepEd Order No. 35, s. 2016 (Learning Action Cells) and DepEd Order No. 42, s. 2017 (National Adoption and Implementation of the RPMS) underscore the integration of technology in teaching practices and performance evaluation. These legal and policy frameworks collectively mandate schools and teachers to adopt digital innovations while ensuring accountability, performance quality, and continuous professional development aligned with frameworks such as TPACK.

In the South District of the Bayugan City Division, particularly in Salvacion National High School and Marcelina National High School, teachers had been encouraged to integrate digital instructional strategies into classroom teaching and assessment. Despite these initiatives, informal observations and school-level reports

suggested that teachers experienced varying degrees of difficulty in aligning their technological, pedagogical, and content knowledge with PMES performance indicators.

Challenges such as limited access to reliable digital resources, varying levels of digital competence, increased documentation demands, and uncertainties in translating digital innovations into measurable performance outcomes had been noted. These concerns highlighted a gap between policy expectations and actual classroom practice, particularly regarding whether and how TPACK-informed digital instructional integration contributed to improved PMES outcomes among teachers.

Given these conditions, there was a clear need for an empirical investigation into the relationship between teachers' TPACK-based digital instructional integration and their performance outcomes. Thus, the study examined the extent to which digital instructional practices grounded in the TPACK framework were implemented by teachers of Marcelina National High School and how these practices were associated with their PMES outcomes.

Specifically, the study generated evidence that informed the development of a training design to enhance teachers' technological, pedagogical, and content competencies. The proposed training design was intended to strengthen instructional effectiveness, support professional growth, and enhance overall teacher performance. In light of this, the study was conceived.

Review of Related Studies

This section presents a comprehensive review of the literature and studies relevant to the variables of the present research. It synthesizes theoretical foundations, empirical findings, and scholarly discussions that provide context and support for examining the efficacy of digital instructional integration in relation to teachers' Performance Management and Evaluation System (PMES) outcomes.

Technological Pedagogical Content Knowledge (TPACK) plays a crucial role in enhancing learner engagement and instructional delivery by enabling teachers to combine content, pedagogy, and technology effectively. In a study conducted across secondary schools in Metro Manila, Philippines, the integration of technology within teaching practices among junior and senior high school teachers was examined to improve lesson delivery and learner participation. The findings revealed that the appropriate use of technological resources, when aligned with pedagogy and content, significantly improved instructional efficiency and learners' understanding. These results indicate that structured application of TPACK supports interactive and meaningful learning experiences (Sumbilon et al., 2024).

Another study examined the application of TPACK among teachers in public secondary schools in Central Luzon across different subject areas. The findings showed that integrating technology with appropriate pedagogical strategies enhanced learners' engagement and supported the development of critical thinking skills. It was also found that aligning instructional approaches with content and technology improved lesson planning and classroom interaction. This highlights that effective application of TPACK enhances both teaching practices and learner outcomes (Kilaton et al., 2024).

In Northern Mindanao, a study explored teachers' experiences in applying TPACK in classroom instruction and its impact on teaching practices. The results revealed that integrating technology with pedagogy and content facilitated timely feedback, efficient assessment, and adaptive learning approaches that benefited learners. The study also emphasized improved teacher efficiency and accountability as outcomes of effectively applying TPACK. These findings support the idea that TPACK-informed instruction strengthens both teaching and learning processes (Estillore & Namoco, 2024).

Another investigation assessed the application of TPACK across urban and rural secondary schools involving teachers from various disciplines. The findings showed that stronger integration of technological, pedagogical, and content knowledge improved instructional management, content delivery, and learner

engagement. It also highlighted that teachers' competence in these knowledge domains influenced both instructional effectiveness and learners' academic participation. These results emphasize the importance of strengthening teachers' TPACK through continuous professional development (Amemasor et al., 2025).

In the Caraga Region, a study analyzed the challenges and best practices in applying TPACK among secondary school teachers. The findings identified barriers such as limited access to resources, insufficient training, and unstable support systems, which affected instructional quality and learner engagement. Despite these challenges, teachers who effectively integrated technology, pedagogy, and content improved lesson delivery and learner outcomes. The study emphasized that institutional support and professional development are essential in strengthening TPACK and sustaining effective teaching practices (Del Mundo, 2022).

Technological Pedagogical Content Knowledge (TPACK) provides a strong foundation for enhancing learner engagement and instructional delivery by effectively integrating technology, pedagogy, and content. In selected public secondary schools, a study examined how teachers applied technological tools within their instructional approaches. The findings revealed that integrating appropriate technological resources with sound pedagogical strategies increased learners' participation and engagement in classroom activities. These results highlight that well-structured application of TPACK supports meaningful learning experiences (Prestoza, 2024).

Another study explored how teachers applied TPACK in classroom instruction across various subject areas. The findings showed that combining technological tools with pedagogical strategies and content knowledge improved learners' comprehension and critical thinking skills. It was further emphasized that aligning instructional objectives with appropriate teaching approaches strengthens the connection among the three knowledge domains. This suggests that effective use of TPACK enhances both teaching effectiveness and learner outcomes (Javier, 2021).

A related investigation examined how teachers utilized TPACK to improve teaching performance and classroom practices. The results indicated that integrating technology with pedagogy and content enhanced lesson delivery and supported more efficient monitoring of learners' progress. These practices enabled teachers to make informed instructional decisions that contribute to learners' academic development. The findings underscore that effective application of TPACK strengthens both instructional management and learner engagement (Gomez et al., 2025).

Another study assessed patterns in the application of TPACK among teachers across different disciplines. The findings revealed that combining multiple forms of technological, pedagogical, and content knowledge increased learner engagement, improved feedback mechanisms, and promoted interactive learning environments. It also highlighted that teachers' competence in these knowledge domains is essential for effective instructional implementation. These results emphasize the importance of continuous professional development in strengthening TPACK competencies (Nwafor et al., 2023).

An additional study examined best practices and challenges in applying TPACK among public secondary school teachers. The findings revealed that effective implementation involved structured planning, alignment of instruction with learning objectives, and continuous monitoring of learners' progress. Despite existing challenges, teachers who demonstrated strong integration of technology, pedagogy, and content improved teaching performance and learner outcomes. The study emphasized that clear pedagogical frameworks and institutional support are essential in optimizing TPACK-based instructional practices (Caratıquıt & Caratıquıt, 2022).

The effectiveness of Technological Pedagogical Content Knowledge (TPACK) is significant in improving teaching performance and learner engagement through the meaningful integration of technology, pedagogy, and content. A study examined how secondary school teachers applied these knowledge domains in classroom instruction using various technological resources. The findings revealed that consistent and well-

aligned application of TPACK improved lesson delivery and increased learners' participation and comprehension. These results indicate that purposeful integration of the three knowledge areas enhances both teaching efficiency and learning quality (Natividad & Jhon, 2024).

Another study investigated how applying TPACK influenced teaching effectiveness in public secondary schools. The findings showed that integrating technology with appropriate pedagogical strategies supported differentiated instruction, provided timely feedback, and promoted interactive learning among learners. It was also emphasized that aligning technology with instructional objectives improved classroom performance and learner achievement. This highlights that TPACK-guided instruction strengthens both teaching practices and learner outcomes (Caoile et al., 2025).

A related study explored the relationship between TPACK application and teacher performance outcomes among secondary school teachers. The results indicated that effective integration of technology, pedagogy, and content improved lesson planning, classroom management, and assessment practices. These improvements benefited learners through more structured and responsive instruction while also supporting teacher accountability and data-driven decision-making. The findings suggest that strong TPACK competencies enhance both teaching quality and performance monitoring (Caberos & Dioso, 2025).

Another investigation assessed the effectiveness of TPACK across different teaching contexts involving teachers from various disciplines. The study found that higher levels of integration among technological, pedagogical, and content knowledge improved lesson flow, interactive instruction, and learner participation. It also highlighted that teachers' confidence and proficiency in these domains influenced the success of instructional delivery. These results underscore the importance of continuous professional development in strengthening TPACK competencies (Zhang, 2025).

An additional study analyzed the determinants of effective TPACK application among public secondary school teachers. The findings revealed that institutional support, resource availability, and clear implementation guidelines significantly influenced teachers' ability to integrate the three knowledge domains effectively. It also showed that addressing training and resource limitations improved instructional quality and learner engagement. The study emphasized that coordinated strategies at both the teacher and institutional levels are essential for sustaining effective TPACK implementation (Daradar & Pinca-Atutubo, 2023).

The Performance Management and Evaluation System (PMES) plays a critical role in enhancing teachers' instructional practices and professional growth when aligned with the Technological Pedagogical Content Knowledge (TPACK) framework. A study examined how PMES implementation influenced instructional performance among junior and senior high school teachers in public secondary schools. The findings revealed that structured feedback and goal-setting improved lesson planning, classroom management, and learner engagement. These results indicate that PMES supports continuous improvement in teaching practices and learner outcomes (Ormilla, 2021).

Another investigation explored the relationship between PMES outcomes and instructional practices across various subject areas in selected secondary schools. The study found that teachers who actively engaged in PMES processes were more likely to adopt innovative strategies that enhance teaching effectiveness. It further showed that positive performance results were associated with improved instructional delivery and higher learner achievement. These findings highlight that PMES functions not only as an evaluation tool but also as a driver of instructional innovation (Cagongon & Osorno, 2022).

A related study examined how PMES contributes to teacher professional development and classroom performance among secondary school teachers. The findings indicated that regular monitoring and feedback enabled teachers to refine instructional strategies and improve learner outcomes. It also emphasized that clear guidance and support strengthen the effectiveness of performance evaluation systems. These results suggest

that PMES reinforces TPACK by encouraging reflective and evidence-based teaching practices (Bangcasan, 2023).

Another investigation analyzed the influence of PMES on instructional quality and teaching efficiency among teachers from diverse disciplines. The study revealed that consistent evaluation improved lesson organization, classroom engagement, and alignment with curriculum standards. It also highlighted the importance of institutional support in sustaining teacher accountability and performance. These findings emphasize that PMES enhances both instructional effectiveness and learner-centered practices (Rafique et al., 2024).

An additional study examined the relationship between PMES outcomes and teachers' ability to apply innovative instructional approaches. The results showed that teachers with higher performance ratings demonstrated greater competence in integrating effective teaching strategies that support learner engagement. It also revealed that performance evaluation influences teachers' readiness to adopt improved instructional practices. These findings suggest that aligning PMES with professional development strengthens TPACK and supports continuous improvement in teaching and learning (Siega, 2025).

Technological Pedagogical Content Knowledge (TPACK) has been shown to directly influence teacher performance and learner outcomes through the effective integration of technology, pedagogy, and content. A study examined how teachers applied these knowledge domains in improving instructional efficiency and classroom management in public secondary schools. The findings revealed that consistent and appropriate integration of technological resources enhanced lesson delivery and learner engagement. These results indicate that strong TPACK competencies contribute to measurable improvements in teaching performance (Jarabata et al., 2024).

Another study investigated how applying TPACK influenced teacher performance across subject areas in secondary schools. The findings showed that teachers who effectively combined technological, pedagogical, and content knowledge demonstrated improved instructional planning, assessment accuracy, and feedback mechanisms. It also highlighted that such integration strengthens professional accountability and teaching efficiency. These results emphasize that TPACK-based practices enhance both instructional quality and learner outcomes (Luwang et al., 2025).

A related study examined the impact of TPACK on the effectiveness of secondary school teachers and classroom performance. The results indicated that integrating the three knowledge domains improved instructional quality, supported data-driven decision-making, and enhanced learner achievement. It also demonstrated that effective application of TPACK contributes to improved performance indicators. These findings reinforce the importance of TPACK in strengthening both teaching performance and learner engagement (De Guzman, 2024).

Another investigation assessed the relationship between TPACK and teacher performance across various teaching contexts involving teachers from different disciplines. The study revealed that higher levels of integration among technological, pedagogical, and content knowledge resulted in improved classroom management, lesson organization, and learner participation. It also emphasized that teachers' competence in these domains is crucial to effective instruction. These findings highlight the need for continuous professional development to strengthen TPACK competencies (Demissie et al., 2022).

An additional study examined how applying TPACK influences teacher performance in public secondary schools. The findings showed that teachers who effectively integrated technology with pedagogy and content achieved higher performance ratings and demonstrated improved instructional efficiency and learner engagement. It also emphasized that the structured application of these knowledge domains contributes to better assessment practices and classroom interaction. These results suggest that strengthening TPACK-based strategies enhances both teacher performance and learner outcomes (Maroto, 2024).

Technological Pedagogical Content Knowledge (TPACK) is influenced by technological and institutional factors that shape how teachers integrate knowledge domains in instruction. A study examined how access to devices, internet connectivity, and school policies affected secondary school teachers' ability to use technology in teaching. The findings revealed that reliable infrastructure and administrative support significantly improved the quality and consistency of instructional practices, which enhanced learner engagement. These results indicate that strong technological and institutional readiness supports effective development of TPACK (Alieto et al., 2024).

Another investigation focused on teacher-related factors influencing the development and application of TPACK in classroom instruction. The study found that teachers' digital literacy, pedagogical competence, and prior exposure to technology played a critical role in how effectively they combined technological, pedagogical, and content knowledge. It also showed that higher levels of teacher competence led to more varied and effective instructional approaches that benefited learners. These findings emphasize that professional development is essential in strengthening teachers' TPACK and improving instructional outcomes (Martinez, 2025).

A related study explored environmental and contextual factors affecting teachers' application of TPACK in instructional settings. The results indicated that classroom size, learners' access to resources, and subject complexity influenced how teachers selected and applied appropriate instructional strategies. It further revealed that adapting teaching approaches to contextual conditions improved learner engagement and understanding. These findings highlight that flexible and context-responsive use of TPACK is essential for effective teaching (Daleon & Namoco, 2023).

Another investigation examined systemic and organizational factors influencing teachers' ability to apply TPACK across different teaching contexts. The study found that leadership support, access to technical assistance, and clear instructional guidelines significantly enhanced teachers' capacity to integrate knowledge domains effectively. It also emphasized that strong institutional alignment supports the delivery of learner-centered and meaningful instruction. These results underscore the importance of supportive school systems in sustaining TPACK-based practices (Mustafa et al., 2024).

An additional study analyzed the combined effects of technological, teacher-related, and organizational factors on the development of TPACK among secondary school teachers. The findings revealed that barriers such as limited resources, insufficient training, and resistance to change affected instructional practices and learner engagement. However, teachers with strong self-efficacy and institutional support were able to apply TPACK effectively and improve instructional outcomes. The study emphasized that a holistic approach that addresses multiple factors is essential for strengthening TPACK and enhancing both teacher performance and learner achievement (Magante et al., 2023).

The reviewed literature provides a strong foundation for understanding how teachers' Technological Pedagogical Content Knowledge (TPACK) influences instructional effectiveness and performance outcomes. It highlights how integrating technology with pedagogy and content enhances lesson delivery, learner engagement, assessment accuracy, and overall instructional efficiency. The studies also emphasize that teachers' competence, readiness, and access to resources play a crucial role in effectively applying TPACK in classroom settings. These insights establish that strengthening teachers' knowledge domains is essential in improving both teaching practices and learner outcomes.

Furthermore, the literature identifies several factors that affect the development and application of TPACK, including institutional support, professional development, and contextual classroom conditions. It also points out barriers such as limited resources, insufficient training, and resistance to change that hinder teachers' ability to integrate technology effectively with pedagogy and content. These findings underscore the need for continuous capacity-building and systemic support to ensure that teachers can maximize their

instructional competencies. As a result, the literature provides a comprehensive understanding of both enabling and limiting factors that influence teacher performance.

In this study, these insights helped identify TPACK as the core independent variable and PMES outcomes as the dependent variable. They guided the development of the research framework, the formulation of measurable indicators, and the design of the survey instrument aligned with teachers' competencies and performance standards. Moreover, the literature supported the examination of the relationship between TPACK and PMES outcomes by providing empirical evidence that instructional knowledge was associated with teacher performance. Consequently, this body of literature situated the study within a broader evidence-based perspective and supported the development of a training design to enhance teachers' competencies and overall performance.

Theoretical/Conceptual Framework

This study was anchored in the Unified Theory of Acceptance and Use of Technology (UTAUT), developed by Venkatesh et al. (2003). The theory explains how individuals adopt and use technology through key determinants such as performance expectancy, effort expectancy, social influence, and facilitating conditions. These factors influence users' behavioral intention and actual use of technology, particularly in professional settings where technology is integrated into daily tasks. In the context of this study, these determinants shape teachers' ability and willingness to develop their TPACK level, specifically technological knowledge, technological pedagogical knowledge, and technological content knowledge.

The theory is relevant to this study as it explains the factors influencing teachers' development and application of TPACK, which serves as the independent variable in the conceptual framework. Teachers are more likely to strengthen their TPACK competencies when they perceive digital tools as useful for improving teaching performance, easy to use, supported by school leadership, and adequately resourced and trained. These conditions directly affect how teachers integrate technology with pedagogy and content in delivering instruction, assessing learners, and managing classroom activities. Thus, UTAUT provides a strong basis for understanding variations in teachers' TPACK levels and their ability to implement effective digital instructional practices.

Furthermore, the effective application of TPACK, as influenced by UTAUT constructs, is expected to impact teachers' Performance Management and Evaluation System (PMES) outcomes, which serve as the dependent variable in the framework. When teachers successfully integrate technology with pedagogy and content, improvements are observed in instructional delivery, assessment practices, classroom management, and professional engagement. These enhanced performance outcomes inform the development of the proposed training design, which serves as the study's output. Hence, UTAUT explains how technology acceptance leads to stronger TPACK competencies, which in turn result in improved PMES outcomes and inform targeted interventions for teacher development.

The framework highlights a directional relationship where teachers' competencies in integrating technology, pedagogy, and content affect their instructional performance. This paradigm provides a structured representation of how teacher knowledge translates into measurable outcomes and informs evidence-based interventions. Figure 1 presents the research paradigm showing the interplay among the variables of the study, specifically how the independent variable, TPACK level, influences the dependent variable, Performance Management and Evaluation System (PMES) outcomes, and leads to the development of a proposed training design for secondary school teachers.

This study is anchored in the Technological Pedagogical Content Knowledge (TPACK) model developed by Mishra and Koehler (2006), which conceptualizes effective technology integration as the dynamic interaction among content knowledge, pedagogical knowledge, and technological knowledge.

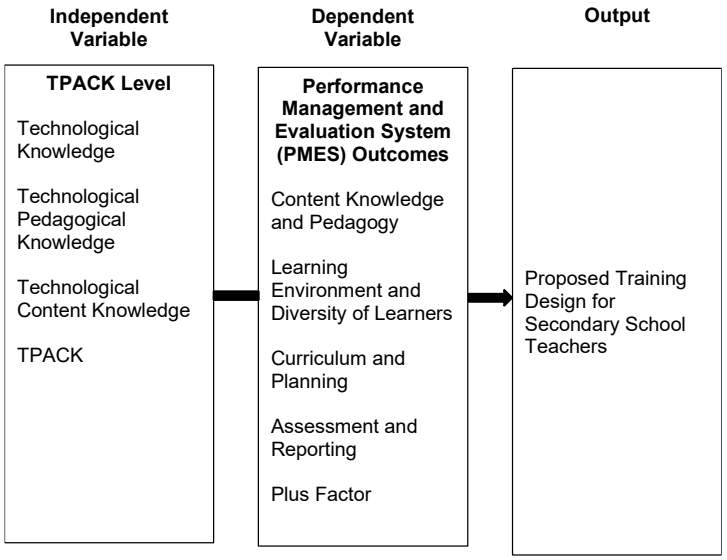
Rather than treating technology as an add-on, TPACK emphasizes that meaningful integration occurs when teachers effectively combine what they teach, how they teach, and the technologies they use. This integration enables teachers to design instruction that is pedagogically sound, content-accurate, and technologically appropriate, leading to improved learner engagement and instructional effectiveness.

In this study, TPACK level is treated as the independent variable and is reflected through indicators such as technological knowledge, technological pedagogical knowledge, and technological content knowledge. These components represent how teachers operationalize their knowledge in integrating digital tools into classroom instruction. The dependent variable, PMES outcomes, includes domains such as content knowledge and pedagogy, learning environment and diversity of learners, curriculum and planning, assessment and reporting, and the plus factor, which collectively measure teachers' performance and professional competence.

The framework assumes that teachers with higher levels of TPACK are more capable of integrating technology effectively, which leads to improved instructional delivery, better assessment practices, enhanced classroom management, and stronger learner engagement. These improvements are reflected in higher PMES ratings and overall teaching performance. The output of the framework, which is the proposed training design, is derived from the identified gaps in teachers' TPACK competencies and performance outcomes.

In this context, TPACK served as the foundational basis for understanding how teachers' knowledge domains influenced their instructional practices and performance outcomes. It guided the identification of key variables, informed the selection of indicators at the TPACK level, and explained how the effective integration of technology, pedagogy, and content was associated with improved PMES outcomes. Ultimately, the theory provided the conceptual lens through which the relationships among the variables were analyzed and supported the development of a targeted training design to enhance teacher performance.

Figure 1. *Research Paradigm Showing the Interplay Between Variables of the Study*



Objectives of the Study

This study aimed to determine TPACK in relation to the Performance Management and Evaluation System (PMES) outcomes among secondary school teachers at Salvacion National High School and Marcelina National High School. Specifically, it sought to: (1) determine the level of TPACK among teachers in terms of

technological knowledge, technological pedagogical knowledge, technological content knowledge, and integrated TPACK; (2) determine the level of teachers' PMES outcomes in terms of content knowledge and pedagogy, learning environment and diversity of learners, curriculum and planning, assessment and reporting, and plus factor; (3) determine whether a significant relationship exists between the level of TPACK and PMES outcomes among teachers; and (4) develop a training design based on the findings of the study.

Methodology

This study employed a descriptive-correlational research design and was conducted at Salvacion National High School and Marcelina National High School in the South District of the Bayugan City Division. Complete enumeration was used, and data were gathered through a researcher-developed two-part Likert-scale questionnaire measuring TPACK and PMES outcomes; the instrument was content-validated by two master teachers and one school principal and obtained a Cronbach's alpha reliability coefficient of .90. After institutional permissions and informed consent were secured, responses were collected, coded, and analyzed using weighted mean and Spearman's rank-order correlation, with confidentiality, voluntary participation, and secure data handling observed throughout the study.

Results and Discussion

Problem 1. What is the level of TPACK among teachers in terms of technological knowledge, technological pedagogical knowledge, technological content knowledge, and TPACK?

Table 1. Level *of Teachers' Technological Pedagogical Content Knowledge (TPACK)*

TPACK Dimension	Mean	SD	Interpretation
Technological Knowledge	4.07	0.60	Very Satisfactory
Technological Pedagogical Knowledge	4.11	0.59	Very Satisfactory
Technological Content Knowledge	4.16	0.63	Very Satisfactory
Integrated TPACK	4.12	0.62	Very Satisfactory
Overall Mean	**4.12**		**Very Satisfactory**

Table 1 shows that all four TPACK dimensions were rated Very Satisfactory, with means ranging from 4.07 to 4.16. Technological content knowledge obtained the highest mean (M = 4.16, SD = 0.63), indicating a particularly strong capacity to connect technological resources with subject content, while technological knowledge obtained the lowest mean (M = 4.07, SD = 0.60). The pattern suggests that teachers were generally competent across the TPACK domains, although foundational technical skills remained a comparatively greater area for improvement.

At the indicator level, the manuscript identified the use of technology to explain subject matter effectively as a major strength in technological content knowledge (M = 4.28, SD = 0.75), whereas troubleshooting basic technical problems was the lowest technological knowledge indicator (M = 3.66, SD = 0.89). Within technological pedagogical knowledge, supporting collaborative learning was highest (M = 4.21, SD = 0.68), while designing technology-supported learning activities was lowest (M = 3.88, SD = 0.74). These results indicate that teachers were more confident in applying available technologies for instruction than in resolving technical problems or designing technology-rich learning tasks from the ground up.

The findings are consistent with the literature presented in the manuscript, which emphasizes that digital literacy, prior technology exposure, infrastructure, and institutional support influence teachers' ability to develop and apply TPACK (Alieto et al., 2024; Martinez, 2025). Prestoza (2024) likewise reported that well-structured integration of technological resources with pedagogical strategies supports meaningful learner engagement, while Natividad and Jhon (2024) linked purposeful technology-content alignment with improved lesson delivery and comprehension. Thus, professional development may build on teachers' existing strengths while prioritizing technical troubleshooting, instructional design, and reflective evaluation of technology-supported teaching.

Problem 2. What is the level of teachers' Performance Management and Evaluation System (PMES) Outcomes in terms of content knowledge and pedagogy, learning environment and diversity of learners, curriculum and planning, assessment and reporting, and plus factor?

Table 2. Level *of Teachers' Performance Management and Evaluation System (PMES) Outcomes*

PMES Domain	Mean	Interpretation
Content Knowledge and Pedagogy	4.40	Very Satisfactory
Learning Environment and Diversity of Learners	4.47	Very Satisfactory
Curriculum and Planning	4.47	Very Satisfactory
Assessment and Reporting	4.46	Very Satisfactory
Plus Factor	4.44	Very Satisfactory
Overall Mean	**4.45**	**Very Satisfactory**

Table 2 indicates Very Satisfactory performance across all five PMES domains. Learning environment and diversity of learners and curriculum and planning jointly obtained the highest mean (M = 4.47), closely followed by assessment and reporting (M = 4.46), plus factor (M = 4.44), and content knowledge and pedagogy (M = 4.40). The narrow range of means shows consistently favorable performance while also identifying content knowledge and pedagogy as the comparatively lowest domain.

The results suggest that teachers demonstrated strong capacity to establish responsive learning environments, address learner diversity, align instruction with curricular requirements, and carry out assessment and reporting responsibilities. The plus factor was also rated favorably, although the manuscript noted comparatively lower ratings for demonstrating initiative in professional tasks and contributing to school projects and committees. Consequently, the findings point to the value of sustaining established PMES practices while providing opportunities for teachers to strengthen initiative, leadership, and technology-supported instructional performance.

These findings align with the literature reviewed in the study. Ormilla (2021) described performance management as a mechanism that can support instructional improvement through structured feedback and goal setting, while Bangcasan (2023) emphasized monitoring, guidance, and reflective practice in professional growth. The favorable PMES results therefore provide a strong performance base from which targeted TPACK development may be linked to teachers' continuing instructional and professional improvement.

Problem 3. Is there a significant relationship between the level of TPACK and the Performance Management and Evaluation System (PMES) Outcomes among teachers?

Table 3. *Spearman Correlations Between Overall TPACK and PMES Outcomes*

PMES Outcome	ρ	p	Decision
Content Knowledge and Pedagogy	.534	< .001	Significant
Learning Environment and Diversity of Learners	.430	< .001	Significant
Curriculum and Planning	.354	.003	Significant
Assessment and Reporting	.333	.005	Significant
Plus Factor	.276	.023	Significant

Table 3 shows that overall TPACK was significantly and positively associated with every PMES domain. The strongest relationship was with content knowledge and pedagogy ($\rho = .534$, $p < .001$), followed by learning environment and diversity of learners ($\rho = .430$, $p < .001$), curriculum and planning ($\rho = .354$, $p = .003$), assessment and reporting ($\rho = .333$, $p = .005$), and plus factor ($\rho = .276$, $p = .023$). These findings indicate that higher reported TPACK tended to occur alongside stronger professional performance outcomes, although the correlational design does not establish causation.

The pattern is particularly meaningful because the strongest association involved content knowledge and pedagogy, the PMES domain most directly connected with the integrated use of content, teaching strategies, and technology. The weaker but still significant association with plus factor suggests that TPACK is related not only to classroom-centered performance but also, to a lesser extent, to broader professional contributions. Accordingly, TPACK development may be most directly relevant to instructional performance while still contributing to wider dimensions of professional practice.

This result supports the manuscript's cited literature indicating that effective integration of technology, pedagogy, and content is associated with improvements in lesson planning, classroom management, assessment, learner engagement, and teacher performance (Caberos & Dioso, 2025; Demissie et al., 2022). It also reinforces the rationale for using the correlation findings as a basis for professional development rather than interpreting them as evidence that TPACK alone causes higher PMES outcomes. Training should therefore focus on competencies that are both comparatively weaker and closely connected to teachers' instructional responsibilities.

Problem 4. Based on the findings of the study, what training design may be proposed?

Table 4. *Proposed TPACK-Based Teacher Competency Enhancement Training Design*

Priority Area	Proposed Focus	Intended Output
Technical capability	Basic troubleshooting and effective use of digital tools	Improved ability to address routine technical problems
Technology-supported pedagogy	Design of technology-supported and learner-centered activities	Contextualized technology-enhanced learning activities
Technology-content integration	Selection and use of tools for content representation and delivery	Technology-supported instructional materials/lesson outputs
Integrated TPACK practice	Application of technology, pedagogy, and content in actual instruction	Demonstrated TPACK integration in classroom practice
Professional growth	Individual TPACK-PMES development planning, coaching, and monitoring	Individual professional development action plan

Table 4 summarizes the training design derived from the study's findings. The proposed program prioritizes basic technical troubleshooting, technology-supported instructional design, content-appropriate technology use, integrated TPACK classroom practice, and individualized professional development planning. These areas directly address the comparatively weaker competencies identified in the results while retaining a developmental focus on teachers' existing strengths.

The training design is appropriately aligned with the evidence because technical troubleshooting and the design of technology-supported learning activities emerged as areas requiring greater attention, while the significant TPACK-PMES relationships support strengthening integrated instructional competencies. The inclusion of classroom application, coaching, and monitoring also moves the intervention beyond one-time training toward sustained professional learning. Such an approach is consistent with the manuscript's emphasis on Learning Action Cells, technical assistance, and school-based professional development as mechanisms for continuing improvement.

Conclusions

Based on the findings of the study, the following conclusions are drawn:

1. The teachers demonstrated a very satisfactory level of Technological Pedagogical Content Knowledge, indicating that they were generally capable of integrating technological knowledge with pedagogical approaches and content knowledge in their instructional practices. However, the results also indicated that certain technological and technology-supported instructional competencies could still be strengthened to enhance their capacity for effective technology integration.
2. The teachers demonstrated very satisfactory performance across the different PMES domains, reflecting their competence in content knowledge and pedagogy, learning environment and diversity of learners, curriculum and planning, assessment and reporting, and the plus factor. Despite these favorable outcomes, the results suggested that there remained opportunities to strengthen further particular aspects of teachers' instructional and professional performance.
3. Teachers' TPACK was significantly and positively associated with their PMES outcomes, indicating that teachers with higher levels of technological, pedagogical, and content knowledge tended to demonstrate better performance across the PMES domains. Thus, strengthening teachers' TPACK competencies may be considered relevant to supporting their instructional and professional performance, although the correlational findings did not establish a causal relationship.
4. The findings provided an empirical basis for developing a TPACK-Based Teacher Competency Enhancement Training Design responsive to the identified strengths and areas for improvement among teachers. The proposed training design could focus on strengthening comparatively weaker TPACK competencies while sustaining established practices associated with favorable PMES outcomes, thereby supporting teachers' continuing professional development and instructional performance.

Recommendations

Based on the findings and conclusions of this study, the following recommendations are forwarded.

Teachers. They may strengthen their Technological Pedagogical Content Knowledge (TPACK) by participating in relevant professional development activities focused on technology integration, technology-supported

instructional strategies, digital content delivery, and the effective application of technology in classroom instruction.

School Heads and Instructional Leaders. They shall provide sustained instructional leadership by developing targeted training programs, coaching activities, technical assistance, and school-based professional development initiatives that address teachers' identified TPACK competency needs and support improved PMES outcomes.

Learners. They can actively participate in technology-supported learning activities provided by their teachers to maximize opportunities for engagement, collaboration, understanding, and meaningful learning.

Parents and the Community. They may support school initiatives that promote technology-enhanced instruction by encouraging learners' responsible use of digital resources and participating in school programs intended to strengthen the quality of teaching and learning.

Future Researchers. They can conduct further studies on TPACK and teacher performance by including additional schools, larger populations, additional variables, or alternative research designs to validate and extend the present study's findings.

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