2026 Volume: 02 Issue: 05 www.ijrpa.com ISSN 2456-9995 Research Article

International Journal Research Publication Analysis

Page: 01-09

TECHNOLOGY INTEGRATION IN TEACHING AND ITS EFFECT ON TEACHERS' CLASSROOM PERFORMANCE IN PUBLIC ELEMENTARY SCHOOLS: A QUANTITATIVE INVESTIGATION

[*1]Meriam D. Naga, [2]Yusof A. Aliudin, EdD

[1]DepEd-Cotabato Division-Marbel Elementary School.

[2]Cotabato Foundation College of Science and Technology.

Article Received: 25 March 2026
Article Revised: 15 April 2026
Published on: 05 May 2026

***Corresponding Author: Meriam D. Naga**
DepEd-Cotabato Division-Marbel Elementary School.

DOI: https://doi-doi.org/101555/ijrpa.8267

ABSTRACT

This study examined the extent of technology integration in teaching and its effect on teachers' classroom performance in selected public elementary schools under the Schools Division Office (SDO) of Cotabato for School Year 2025–2026. Using a quantitative descriptive-correlational and regression design, data were collected from public elementary school teachers through a researcher-developed survey questionnaire. The instrument assessed technology integration across four dimensions—lesson planning, instructional delivery, assessment and feedback, and learning activities—while classroom performance was evaluated in terms of establishing rules and routines, managing students' behavior, and sustaining learner engagement. Results revealed that teachers highly practiced technology integration across all domains (WM = 4.39 to 4.60) and exhibited high classroom performance overall (WM = 4.63). Spearman rho correlation analyses revealed significant positive relationships between technology integration and classroom performance, with instructional delivery strongly correlated to establishing rules and routines ($r = 0.543$, $p < 0.001$), and learning activities demonstrating the strongest link to sustaining learner engagement ($r = 0.771$, $p < 0.001$). Multiple regression analysis further confirmed that technology integration significantly predicted classroom performance, explaining 37.2% to 62.9% of the variance. These findings underscore the critical role of digital tools in enhancing instructional effectiveness and highlight the need for sustained ICT professional development and infrastructure support.

KEYWORDS: technology integration, classroom performance, instructional delivery, learner engagement, ICT, public elementary schools, Philippines.

INTRODUCTION

The integration of technology in education has emerged as one of the most transformative forces shaping modern classroom instruction. In an era defined by rapid digital advancement, teachers are increasingly expected to leverage technology not merely as a supplementary tool but as an integral component of their pedagogical practice. This expectation has gained even greater urgency in developing countries such as the Philippines, where the Department of Education (DepEd) has pursued a series of ICT-based reforms designed to modernize the educational landscape and improve learning outcomes across all levels of basic education.

Technology integration in teaching encompasses the purposeful incorporation of digital resources and platforms into lesson planning, instructional delivery, student assessment, and the design of learning activities. When implemented effectively, such integration has the potential to enrich teachers' instructional repertoire, facilitate more dynamic classroom interactions, and sustain higher levels of learner engagement. However, the relationship between technology integration and actual classroom performance—as manifested in teachers' capacity to establish clear rules and routines, manage learner behavior, and maintain meaningful student engagement—remains an area that warrants deeper empirical investigation, particularly within the Philippine public school context.

Studies have consistently demonstrated that effective instructional technology use is associated with improved pedagogical outcomes (Ertmer & Ottenbreit-Leftwich, 2013; Mishra & Koehler, 2006). Yet, few studies have examined the specific quantitative relationships between the domains of technology integration and the distinct dimensions of classroom performance among elementary school teachers in rural and semi-urban settings in the Philippines. This gap is especially significant given the diverse socioeconomic conditions that characterize public schools in regions such as Cotabato, where digital infrastructure challenges frequently coexist with policy expectations for ICT-enhanced instruction.

The present study was undertaken to address this gap by examining how the extent of technology integration in four key instructional dimensions predicts and correlates with teacher classroom performance. By employing a rigorous descriptive-correlational and regression design, this research contributes both to the empirical base on educational

technology and to practical policy discourse on teacher professional development in the Philippines.

Statement of the Problem

This study sought to answer the following research questions:

1. What is the extent of technology integration in teaching in terms of lesson planning, instructional delivery, assessment and feedback, and learning activities?
2. What is the level of teachers' classroom performance in terms of establishing rules and routines, managing students' behavior, and sustaining learner engagement?
3. Is there a significant relationship between the extent of technology integration and the level of classroom performance?
4. Does technology integration significantly predict teachers' classroom performance?

REVIEW OF RELATED LITERATURE

Technology integration in teaching is widely recognized as a multidimensional construct that extends beyond the mere presence of digital devices in the classroom. Mishra and Koehler (2006) introduced the Technological Pedagogical Content Knowledge (TPACK) framework, which underscores the importance of teachers possessing integrated knowledge of technology, pedagogy, and content. This framework has since become a cornerstone in understanding how teachers can leverage digital tools to enhance instructional quality across subject areas and grade levels.

In the domain of lesson planning, digital tools have been found to support teachers in organizing instruction more systematically and communicating expectations more clearly to learners (Alqahtani, 2017). Lesson presentation software, online instructional repositories, and planning applications enable teachers to design coherent lesson sequences, anticipate transitions, and integrate multimedia content that enriches student comprehension. Brookhart (2017) further argued that effective lesson planning supported by technology allows teachers to align instructional goals with learner needs more precisely, thereby enhancing overall classroom management.

For instructional delivery, research has consistently highlighted the transformative potential of digital tools. Bernardo (2024) observed that technology-enhanced instructional delivery enables teachers to manage classroom processes more efficiently, maintain structured learning environments, and reduce instructional downtime. Similarly, Marzano (2017)

emphasized that clear and engaging instructional delivery directly contributes to establishing and maintaining classroom routines and behavioral expectations.

The relationship between technology-enhanced assessment and feedback and classroom behavior management has also attracted scholarly interest. Zepeda (2017) noted that technology-assisted practices, including digital quizzes, online performance monitoring, and automated feedback mechanisms, contribute to improved teacher performance in both instructional and behavioral dimensions. Timely and specific feedback provided through digital platforms has been linked to higher learner motivation and reduced disruptive behavior (Hattie & Timperley, 2007).

With respect to learner engagement, Fredricks, Blumenfeld, and Paris (2004) established that student engagement is a multidimensional construct encompassing behavioral, emotional, and cognitive components. Digital learning activities that promote collaboration, interaction, and active participation have been shown to significantly enhance all three dimensions of engagement. Sage (2017) further demonstrated that digital technologies improve learner engagement by fostering active participation and meaningful interaction during classroom tasks.

METHODOLOGY

Research Design

This study employed a quantitative descriptive-correlational and regression research design. The descriptive component characterized the extent of technology integration and the level of classroom performance among teachers. The correlational component assessed the relationships between technology integration variables and classroom performance dimensions, while the regression component determined the predictive influence of technology integration on teachers' classroom performance.

Respondents

The study was conducted in selected public elementary schools located in Kabacan, Matalam, and Mlang, all within the Schools Division Office (SDO) of Cotabato, Philippines, during School Year 2025–2026. Participants included teachers from these schools who were identified through total enumeration sampling, given the manageable population size. The sample comprised regular public school teachers who had been using technology in their classroom instruction for at least one school year.

Instrument

Data were gathered through a researcher-developed and validated survey questionnaire composed of two major sections. The first section measured technology integration across four dimensions: (1) lesson planning, (2) instructional delivery, (3) assessment and feedback, and (4) learning activities. The second section assessed classroom performance across three dimensions: (1) establishing rules and routines, (2) managing students' behavior, and (3) sustaining learner engagement. Items were rated using a five-point Likert scale with descriptors ranging from 1 (Least Practiced) to 5 (Highly Practiced). The instrument underwent content validation by subject matter experts and reliability testing using Cronbach's alpha.

Data Analysis

Descriptive statistics, including weighted means and verbal descriptions, were used to characterize the extent of technology integration and the level of classroom performance. Spearman rho correlation was employed to determine the relationships between technology integration variables and classroom performance dimensions, given the ordinal nature of the data. Multiple regression analysis was applied to assess the predictive value of technology integration on classroom performance. All statistical analyses were conducted at a 0.05 level of significance.

RESULTS AND DISCUSSION

Extent of Technology Integration in Teaching

As shown in Table 1, teachers demonstrated high levels of technology integration across all four dimensions. Assessment and feedback obtained the highest weighted mean (WM = 4.60, Highly Practiced), followed by lesson planning (WM = 4.51), instructional delivery (WM = 4.50), and learning activities (WM = 4.39). These findings indicate that teachers in the selected schools have incorporated digital tools across the major phases of the instructional cycle, from pre-instructional planning to in-class execution and post-instructional assessment. The high rating for assessment and feedback suggests that teachers are actively using digital platforms, online quizzes, and automated feedback mechanisms to monitor learner performance and provide timely responses. This finding aligns with Hattie and Timperley's (2007) observation that technology-mediated feedback enhances teacher responsiveness and learner awareness of progress. The slightly lower score for learning activities may reflect the

greater preparation demands associated with designing interactive, technology-enhanced tasks compared to other instructional functions.

Table 1. Extent of Technology Integration in Teaching.

Dimension	Weighted Mean	Verbal Description
Lesson Planning	4.51	Highly Practiced
Instructional Delivery	4.50	Highly Practiced
Assessment and Feedback	4.60	Highly Practiced
Learning Activities	4.39	Highly Practiced

Level of Teachers' Classroom Performance

Table 2 presents the teachers' classroom performance results. All three dimensions were rated as Highly Practiced. Learning environment (managing students' behavior) obtained the highest mean (WM = 4.99), followed by establishing rules and routines (WM = 4.63) and sustaining learner engagement (WM = 4.82). The overall classroom performance mean of 4.63 reflects a consistently high standard of instructional management among the teacher-participants.

The near-perfect score for managing students' behavior (WM = 4.99) indicates that teachers have developed strong behavioral management competencies. This may be attributable in part to the structured classroom routines facilitated by technology tools, which minimize instructional downtime and reduce opportunities for disruptive behavior. The high scores across all dimensions are consistent with Marzano, Marzano, and Pickering's (2023) assertion that effective classroom management is both a prerequisite and a product of high-quality instructional design.

Table 2. Level of Teachers' Classroom Performance.

Dimension	Weighted Mean	Verbal Description
Establishing Rules and Routines	4.63	Highly Practiced
Managing Students' Behavior (Learning Environment)	4.99	Highly Practiced
Sustaining Learner Engagement	4.82	Highly Practiced
Overall	4.63	Highly Practiced

Relationship Between Technology Integration and Classroom Performance

Spearman rho correlation analysis revealed several significant relationships between technology integration dimensions and classroom performance variables (Table 3). Instructional delivery demonstrated a moderate positive and significant correlation with establishing rules and routines ($r = 0.543$, $p < 0.001$), indicating that teachers who effectively use digital tools in delivering instruction are better able to maintain structured and orderly classroom environments. Lesson planning also showed a positive and significant relationship with establishing rules and routines ($r = 0.337$, $p < 0.001$), suggesting that technology-supported planning contributes to clearer classroom procedures and behavioral expectations.

Assessment and feedback were significantly correlated with both managing students' behavior ($r = 0.132$, $p = 0.037$) and sustaining learner engagement ($r = 0.618$, $p < 0.001$). While the former relationship was weak, the latter was moderate and practically meaningful, reflecting the role of timely digital feedback in maintaining student interest and participation. Learning activities demonstrated the strongest correlation in the study, exhibiting a strong positive and significant relationship with sustaining learner engagement ($r = 0.771$, $p < 0.001$). This finding underscores the potency of interactive, technology-enhanced tasks in capturing and sustaining learners' attention and motivation.

Table 3. Correlation Matrix: Technology Integration and Classroom Performance.

Technology Integration	Rules & Routines	Student Behavior	Learner Engagement
Lesson Planning	0.337**	0.050	0.004
Instructional Delivery	0.543**	0.092	-0.029
Assessment & Feedback	0.005	0.132*	0.618**
Learning Activities	-0.047	-0.004	0.771**

*$p < 0.05$; **$p < 0.01$

Predictive Influence of Technology Integration on Classroom Performance

Multiple regression analysis revealed that technology integration significantly predicted all three dimensions of classroom performance (Table 4). For establishing rules and routines, the model accounted for 37.2% of the variance ($R^2 = 0.372$, $F = 36.473$, $p < 0.001$), with instructional delivery emerging as the strongest predictor ($\beta = 0.589$, $t = 9.945$, $p < 0.001$). For managing students' behavior, the model explained a modest but statistically significant 4.1% of variance ($R^2 = 0.041$, $F = 2.645$, $p = 0.034$), with assessment and feedback as the significant predictor ($\beta = 0.049$, $t = 2.408$, $p = 0.017$). The most robust model was found for

sustaining learner engagement, where technology integration explained 62.9% of the variance ($R^2 = 0.629$, $F = 104.127$, $p < 0.001$), with learning activities identified as the dominant predictor ($\beta = 0.626$, $t = 11.304$, $p < 0.001$).

These findings carry substantial practical implications. The strong predictive power of learning activities on learner engagement confirms that well-designed, technology-enhanced tasks are among the most effective means of sustaining student participation and motivation in the elementary classroom. The relatively modest predictive value of technology integration for behavior management suggests that behavioral outcomes are influenced by a broader constellation of factors beyond digital tools alone, including classroom climate, teacher-student relationships, and school-wide behavioral support systems.

Table 4. Regression Analysis: Technology Integration as Predictor of Classroom Performance.

Outcome Variable	R^2	F-value	Strongest Predictor
Establishing Rules & Routines	0.372**	36.473	Instructional Delivery
Managing Students' Behavior	0.041*	2.645	Assessment & Feedback
Sustaining Learner Engagement	0.629**	104.127	Learning Activities

*p < 0.05; **p < 0.01

CONCLUSION AND RECOMMENDATIONS

This study demonstrated that technology integration in public elementary schools within SDO Cotabato is extensive and positively associated with strong classroom performance outcomes. Teachers who incorporate digital tools into their lesson planning, instructional delivery, assessment, and learning activities are better positioned to establish structured classroom environments, manage student behavior effectively, and maintain high levels of learner engagement. The regression findings, particularly the strong predictive power of learning activities on engagement ($R^2 = 0.629$), affirm that the design of interactive, technology-enhanced tasks is among the most impactful levers available to classroom teachers.

Based on these findings, the following recommendations are advanced. School administrators should invest in sustained, structured ICT professional development programs that equip teachers with practical competencies for integrating digital tools across all instructional phases. Policy makers and DepEd officials should prioritize budget allocations for ICT

infrastructure, including reliable internet connectivity, updated hardware, and access to licensed digital learning platforms. Teachers are encouraged to explore collaborative approaches to lesson planning and to engage in peer mentoring focused on technology integration best practices. Future researchers may build on these findings by employing longitudinal designs that capture changes in technology use and classroom performance over time, and by examining additional variables—such as school leadership support, teacher self-efficacy, and learner characteristics—that may moderate or mediate the observed relationships.

REFERENCES

1. Alqahtani, A. (2017). The role of the school leader in supervising teachers to improve teaching quality. International Education Studies, 10(6), 155–162. https://doi.org/10.5539/ies.v10n6p155
2. Bernardo, A. B. I. (2024). Digital learning tools and classroom management. Asian Studies Review, 28(3), 327–344. https://doi.org/10.1080/10357820408713350
3. Brookhart, S. M. (2017). How to give effective feedback to your students (2nd ed.). ASCD.
4. Ertmer, P. A., & Ottenbreit-Leftwich, A. T. (2013). Teacher technology change: How knowledge, confidence, beliefs, and culture intersect. Journal of Research on Technology in Education, 45(3), 255–284. https://doi.org/10.1080/15391523.2013.10782634
5. Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement. Review of Educational Research, 74(1), 59–109. https://doi.org/10.3102/00346543074001059
6. Hattie, J., & Timperley, H. (2007). The power of feedback. Review of Educational Research, 77(1), 81–112. https://doi.org/10.3102/003465430298487
7. Marzano, R. J. (2017). The new art and science of teaching. Solution Tree Press.
8. Marzano, R. J., Marzano, J. S., & Pickering, D. J. (2023). Classroom management that works. ASCD.
9. Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge. Teachers College Record, 108(6), 1017–1054. https://doi.org/10.1111/j.1467-9620.2006.00684.x
10. Sage, V. (2017). Digital technologies and learner engagement. The Journal of Positive Psychology, 12(3), 297–298.
11. Zepeda, S. J. (2017). Instructional supervision (4th ed.). Routledge. https://doi.org/10.4324/9781315461094