

# Principals' Technology Leadership and Its Relationship to Teachers' Technology Self-Efficacy in Elementary Schools

Precious Gay Cotamora Bautista  
Cebu Technological University, Main Campus  
[preciousgay.cotamora@deped.gov.ph](mailto:preciousgay.cotamora@deped.gov.ph)

Date Submitted:  
**March 21, 2026**

Date Accepted:  
**April 30, 2026**

Date Published:  
**May 12, 2026**

DOI:  
**10.5281/zenodo.20140759**

## ABSTRACT

This study examined the relationship between principals' technology leadership and teachers' technology self-efficacy in selected public elementary schools in the Inabanga North District, Bohol, during School Year 2025–2026. Anchored on the International Society for Technology in Education (ISTE) Technology Leadership Framework and Bandura's Self-Efficacy Theory, the research assessed the extent of principals' technology leadership, the level of teachers' technology self-efficacy, and the statistical relationship between these constructs. A quantitative descriptive–correlational research design was employed using total enumeration, involving sixty-five (65) teacher respondents. Data were gathered through adapted survey instruments measuring principals' technology leadership across four

domains: Visionary Leadership, Digital-Age Learning Culture, Excellence in Professional Practice, and Systemic Improvement. Teachers' technology self-efficacy was assessed across four dimensions: Confidence in Using Technology, Instructional Integration, Collaboration and Assessment, and Professional Growth. Descriptive statistics and the Pearson Product-Moment Correlation Coefficient were used in data analysis. Findings revealed that principals demonstrated technology leadership to a great extent (grand mean = 4.29) and teachers reported high levels of technology self-efficacy (grand mean = 3.92). However, no statistically significant relationship was found between the two variables ( $r = 0.086$ ,  $p = 0.497$ ), suggesting that teachers' technological confidence is shaped more by individual experience, training, and professional development than by leadership practices alone. A Digital Leadership Enhancement Plan is proposed to strengthen school-level technology integration.

**Keywords:** *Technology Leadership, Teacher Self-Efficacy, Instructional Technology Use, Educational Leadership, Elementary Education*

## INTRODUCTION

The integration of digital technology in education has become essential in preparing learners to meet the demands of the 21st century. Schools are increasingly expected to utilize digital tools, online resources, and innovative instructional strategies to enhance teaching and learning outcomes. In this context, school leaders play a crucial role in guiding and sustaining effective technology integration. Beyond their administrative responsibilities, principals are now expected to lead digital initiatives that strategically support instructional improvement and organizational development (Zhao et al., 2020; ISTE, 2022).

Although school leaders are responsible for promoting technology use in classrooms, the effectiveness of digital integration largely depends on teachers' confidence in their ability to use technology for instructional purposes. Teachers with high levels of technology self-efficacy are more likely to experiment with digital tools, integrate technology into lesson delivery, and create engaging learning experiences for students. Research indicates that teachers' self-efficacy significantly influences technology adoption and classroom innovation (Tondeur et al., 2021; Scherer & Teo, 2019).

Despite increasing efforts to promote digital learning, many schools—particularly those in rural areas—continue to encounter persistent challenges in technology integration. In districts such as Inabanga North District in Bohol, limitations related to internet connectivity, insufficient digital equipment, and inadequate technical support remain prevalent. Infrastructure deficiencies and limited leadership capacity hinder sustainable digital transformation in rural schools (Howard et al., 2020; Zhang et al., 2022). These conditions highlight the need for strong and responsive technology leadership to optimize available resources and address infrastructure gaps.

Although the Department of Education has implemented programs to promote ICT integration and digital transformation, many initiatives primarily emphasize infrastructure provision and training workshops. Leadership focused specifically on developing technology leadership competencies remains inconsistent across schools. Scholars argue that policy implementation alone is insufficient without strong leadership capacity at the school level to translate digital policies into sustainable practices (Voogt et al., 2019; Dexter & Richardson, 2022).

This study is grounded in three theoretical frameworks. Technology Leadership Theory (ISTE, 2009) highlights the critical role of school leaders in promoting effective technology integration by establishing a clear vision, providing support, and ensuring access to necessary resources. Self-Efficacy Theory (Bandura, 1986) explains individuals' beliefs about their capacity to successfully perform specific tasks; in the educational context, teachers with high technology self-efficacy are more confident in integrating digital tools into instruction. Transformational Leadership Theory (Burns, 1978; Bass, 1985) further emphasizes leaders' ability to inspire and empower followers, helping teachers overcome uncertainties related to technology use and reinforcing their confidence.

These frameworks collectively suggest that principals' leadership practices play a crucial role in shaping teachers' confidence and competence in using technology. The study is further grounded in national legal mandates, including Republic Act No. 10533 (Enhanced Basic Education Act of 2013), DepEd Order No. 42, s. 2017 (Philippine Professional Standards for Teachers), DepEd Order No. 24, s. 2020 (NEAP Professional Development Framework), and the DepEd Computerization Program, which underscore the Philippine government's commitment to enhancing technology integration in basic education.

This study assessed the relationship between principals' technology leadership and teachers' technology self-efficacy in Inabanga North District elementary schools during School Year 2025–2026, as a basis for proposing a Digital Leadership Enhancement Plan. It sought to: (1) describe the demographic profile of respondents; (2) assess the level of principals' technology leadership; (3) determine the level of teachers' technology self-efficacy; (4) test the significant relationship between the two variables; and (5) propose a Digital Leadership Enhancement Plan based on findings.

## METHODS

### Research Design

This study employed a quantitative descriptive–correlational research design. Descriptive statistics were used to characterize the levels of principals’ technology leadership and teachers’ technology self-efficacy, while correlational analysis was used to examine the statistical relationship between the two primary variables. This design is appropriate for studies that aim to describe phenomena and establish the degree of association between variables without manipulating them (Creswell, 2014).

### Research Locale

The study was conducted in public elementary schools in the Inabanga North District, Division of Bohol, during School Year 2025–2026. The district is situated in the northern part of Inabanga, Bohol—a municipality in the Central Visayas region of the Philippines. The schools in this district face common rural challenges including limited internet connectivity, shared digital devices, and constrained professional development opportunities, making the context particularly relevant for studying technology leadership and teacher self-efficacy.

### Sampling Technique

Total enumeration sampling was used, as the population of public elementary school teachers in the Inabanga North District was small and manageable. A total of sixty-five (65) teachers served as respondents, ensuring complete population coverage. The use of total enumeration maximized data completeness and representativeness.

Table 1. *Respondents by School*

School	Total Teachers	Respondents
Inabanga Central Elementary School	18	18
Other District Schools	47	47
TOTAL	65	65

### Research Instruments

Two adapted survey instruments were used. The first was the Principals’ Technology Leadership Assessment (PTLA), adapted from Domeny (2017) and based on the ISTE NETS•A (2009) standards. It consisted of 17 items across four dimensions: Visionary Leadership (3 items), Digital-Age Learning Culture (5 items), Excellence in Professional Practice (4 items), and Systemic Improvement (5 items), rated on a 5-point scale from 1 (Not at all) to 5 (To a very great extent). The second was the Teachers’ Technology Self-Efficacy Survey (ETS-TS), comprising 31 items across four dimensions: Confidence in Using Technology (10 items), Instructional Integration (8 items), Collaboration and Assessment (7 items), and Professional Growth (6 items), rated on a 5-point Likert scale from 1 (Strongly Disagree) to 5 (Strongly Agree). Both instruments were validated by content experts and subjected to reliability testing.

### Data Analysis

Descriptive statistics, including frequency counts, percentages, weighted means, and standard deviations, were used to profile the respondents and describe variable levels. The Pearson Product-Moment

Correlation Coefficient ( $r$ ) was applied to determine the relationship between principals' technology leadership and teachers' technology self-efficacy. The significance level was set at  $p < 0.05$ . The null hypothesis posited that there is no significant relationship between principals' technology leadership and teachers' technology self-efficacy in elementary schools. Scoring scale for technology leadership: 4.20–5.00 = To a very great extent; 3.40–4.19 = To a great extent; 2.60–3.39 = To a moderate extent; 1.80–2.59 = To a small extent; 1.00–1.79 = Not at all. For teacher self-efficacy: 4.20–5.00 = Strongly Agree; 3.40–4.19 = Agree; 2.60–3.39 = Neutral; 1.80–2.59 = Disagree; 1.00–1.79 = Strongly Disagree.

## RESULTS AND DISCUSSION

### Level of Principals' Technology Leadership

Findings revealed that principals demonstrated technology leadership to a great extent across all four dimensions. Visionary Leadership obtained the highest mean score ( $M = 4.38$ ,  $SD = 0.57$ ), indicating that principals were highly effective in articulating a clear vision for technology integration, developing technology-integrated strategic plans, and advocating for funding and program support. Digital-Age Learning Culture ( $M = 4.32$ ,  $SD = 0.61$ ) showed that principals consistently promoted a learning environment supporting innovation and effective technology use to address diverse learner needs. Excellence in Professional Practice ( $M = 4.22$ ,  $SD = 0.64$ ) reflected principals' efforts to allocate resources for teachers' professional growth and stay current with educational technology research. Systemic Improvement ( $M = 4.20$ ,  $SD = 0.69$ ) indicated that principals led purposeful change, established strategic partnerships, and maintained technology infrastructure to support teaching and learning.

Table 2. *Level of Principals' Technology Leadership*

Dimension	Mean	SD	Interpretation
Visionary Leadership	4.38	0.57	To a great extent
Digital-Age Learning Culture	4.32	0.61	To a great extent
Excellence in Professional Practice	4.22	0.64	To a great extent
Systemic Improvement	4.20	0.69	To a great extent
Grand Mean	4.29	0.63	To a great extent

*Scale: 4.20–5.00 = To a very great extent; 3.40–4.19 = To a great extent; 2.60–3.39 = To a moderate extent; 1.80–2.59 = To a small extent; 1.00–1.79 = Not at all*

These findings are consistent with Al-Marouf (2024) and Li and Tsai (2022), who reported that school principals in developing countries are increasingly adopting proactive approaches to digital leadership, particularly in vision-setting and resource allocation. The results also align with the ISTE (2009) NETS•A framework, which emphasizes that effective technology leaders must go beyond technical competence to inspire a shared vision and model digital citizenship.

### Level of Teachers' Technology Self-Efficacy

Teachers reported overall high levels of technology self-efficacy (grand mean = 3.92, Agree). Among the four dimensions, Confidence in Using Technology yielded the highest mean ( $M = 4.06$ ,  $SD = 0.72$ ), reflecting that teachers felt confident using digital tools, collecting and analyzing data, and designing technology-enhanced learning experiences. Instructional Integration obtained a mean of 3.97 ( $SD = 0.75$ ),

indicating that teachers regularly incorporated digital tools into lesson delivery and fostered student creativity and exploration. Collaboration and Assessment recorded a mean of 3.88 (SD = 0.81), showing that teachers engaged in data-driven assessment and collaborative practices, although modeling collaborative learning for students remained a challenge. Professional Growth received the lowest mean of 3.72 (SD = 0.89), with concerns noted around limited technology skills and infrequent peer discussions about educational technology.

Table 3. *Level of Teachers' Technology Self-Efficacy*

Dimension	Mean	SD	Interpretation
Confidence in Using Technology	4.06	0.72	Agree
Instructional Integration	3.97	0.75	Agree
Collaboration and Assessment	3.88	0.81	Agree
Professional Growth	3.72	0.89	Agree
Grand Mean	3.92	0.79	Agree

*Scale: 4.20–5.00 = Strongly Agree; 3.40–4.19 = Agree; 2.60–3.39 = Neutral; 1.80–2.59 = Disagree; 1.00–1.79 = Strongly Disagree*

These results are consistent with Ertmer and Ottenbreit-Leftwich (2010), who found that teachers' technology confidence is closely linked to prior experience, pedagogical beliefs, and frequency of technology use. The findings also reflect Bandura's (1997) assertion that mastery experiences are the strongest source of self-efficacy development, as teachers who regularly use digital tools tend to develop greater confidence over time.

### **Relationship Between Principals' Technology Leadership and Teachers' Technology Self-Efficacy**

The Pearson correlation analysis revealed no statistically significant relationship between principals' technology leadership and teachers' technology self-efficacy ( $r = 0.086$ ,  $p = 0.497$ ). Since the  $p$ -value of 0.497 exceeded the 0.05 significance level, the null hypothesis was not rejected. Although a negligible positive correlation was observed, it was too weak to indicate any meaningful association between the two variables.

Table 4. *Significant Relationship Between Principals' Technology Leadership and Teachers' Technology Self-Efficacy*

Variables	r-value	p-value	Degree of Relationship	Remarks	Decision
Principals' Technology Leadership & Teachers' Technology Self-Efficacy	0.086	0.497	Negligible positive	Not Significant	Do not Reject $H_0$

*\*Significant at  $p < 0.05$*

The absence of a significant relationship may be explained by Bandura's (1997) self-efficacy theory, which identifies mastery experiences—direct, repeated hands-on practice—as the strongest source of efficacy development. Principals' technology leadership often operates at the structural and organizational level (vision-setting, resource allocation), which does not automatically translate into the direct instructional experiences that shape teachers' self-efficacy beliefs. Ertmer and Ottenbreit-Leftwich

(2010) similarly found that teachers' technology integration beliefs are shaped more by internal factors such as prior experience, pedagogical beliefs, and classroom practice than by external leadership influence. Inan and Lowther (2010) further noted that teacher-level variables—including access to technology and frequency of use—were stronger predictors of effective technology integration than administrative leadership. Tondeur et al. (2017) emphasized that leadership contributes more effectively to technology use when combined with sustained professional development, peer collaboration, and opportunities for hands-on practice.

## CONCLUSION

This study investigated the relationship between principals' technology leadership and teachers' technology self-efficacy in Inabanga North District public elementary schools. Principals demonstrated technology leadership to a great extent (grand mean = 4.29), consistently articulating a clear vision for technology integration, fostering a digital-age learning culture, and providing support for professional practice. Teachers likewise reported high levels of technology self-efficacy (grand mean = 3.92), actively integrating digital tools into lesson planning, instruction, collaboration, and assessment.

However, the correlational analysis revealed no statistically significant relationship between the two variables ( $r = 0.086$ ,  $p = 0.497$ ), indicating that principals' technology leadership, while important in creating enabling school conditions, does not directly predict teachers' technology self-efficacy. Teachers' confidence in using technology appears to develop primarily through direct, practice-based experiences, peer learning, and individual professional development rather than through top-down leadership initiatives alone.

These findings highlight the need to complement leadership initiatives with sustained, classroom-grounded teacher learning structures. Schools are encouraged to implement peer demonstration teaching, collaborative lesson planning, learning walkthroughs, and buddy systems for technology integration. Professional development should be restructured as ongoing peer coaching cycles rather than one-time seminars, with time intentionally allocated for collaborative planning. A Digital Leadership Enhancement Plan is proposed to address identified gaps through targeted ICT training, tech help desks, digital teaching support, home-school technology engagement, and a progress monitoring and recognition system, implemented over one academic semester with involvement from principals, teachers, parents, and learners. Future research may expand the scope to larger and more diverse samples, employ qualitative or mixed-methods designs, and examine mediating factors such as infrastructure, peer collaboration, and professional development on the relationship between technology leadership and teacher self-efficacy.

## References

- Al-Marouf, R. S. (2024). A validated model of principals' digital leadership and teacher technology adoption in K–12 schools. *Educational Management Administration & Leadership*, 52(1), 155–178.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Prentice Hall.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. W. H. Freeman.
- Dexter, S. (2011). School technology leadership: Articulating a model for technology leadership in schools. *Computers & Education*, 57(1), 142–150. <https://doi.org/10.1016/j.compedu.2010.04.010>

- Ertmer, P. A., & Ottenbreit-Leftwich, A. T. (2010). Teacher technology change: How knowledge, confidence, beliefs, and culture intersect. *Journal of Research on Technology in Education*, 42(3), 255–284. <https://doi.org/10.1080/15391523.2010.10782551>
- Inan, F. A., & Lowther, D. L. (2010). Factors affecting technology integration in K–12 classrooms: A path model. *Educational Technology Research and Development*, 58(2), 137–154. <https://doi.org/10.1007/s11423-009-9132-y>
- International Society for Technology in Education. (2009). *National educational technology standards for administrators (NETS-A)*. ISTE.
- Li, Y., & Tsai, C.-C. (2022). Integrating leadership and digital competence: Exploring the impact of educational leadership on teacher technology practices. *Educational Technology Research and Development*, 70, 345–369.
- Tondeur, J., van Braak, J., Ertmer, P. A., & Ottenbreit-Leftwich, A. (2017). Understanding the relationship between teachers' pedagogical beliefs and technology use in education: A systematic review. *Educational Technology Research and Development*, 65(3), 555–575. <https://doi.org/10.1007/s11423-016-9481-2>
- Zhao, Y., Lei, J., & Frank, K. (2020). Redesigning schools for the digital age: Beyond technology integration. *Educational Technology Research and Development*, 68, 1649–1670. <https://doi.org/10.1007/s11423-020-09823-4>