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

International Journal Research Publication Analysis

Page: 01-07

TEACHERS' TECHNOLOGICAL EFFICACY AND CLASS PERFORMANCE: A QUANTITATIVE INVESTIGATION IN ANTIPAS DISTRICT ELEMENTARY SCHOOLS

***[1]Lou En E. Agad, [2]Queenie A. Habibun, EdD**

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

[2]Graduate School, Cotabato Foundation College of Science and Technology, Doroluman, Arakan, Cotabato, Philippines.

Article Received: 31 March 2026

Article Revised: 21 April 2026

Published on: 11 May 2026

***Corresponding Author: Lou En E. Agad**

DepEd-Cotabato Division-Malangag Elementary School.

DOI: https://doi-doi.org/101555/ijrpa.8816

ABSTRACT

This quantitative study examined the level of teachers' technological efficacy and its influence on class academic performance in selected public elementary schools of Antipas District, North Cotabato, Philippines, for School Year 2022–2023. Using a descriptive-correlational design, 100 teachers were purposively selected as respondents. Data were gathered through validated survey questionnaires and analyzed using mean, multiple regression analysis, and the Sobel-Z test. The study assessed teachers' technological efficacy across three dimensions: technical skills, digital literacy, and technological knowledge skills. Academic performance was measured through pupils' Mean Percentage Score (MPS) across the first, second, and third grading periods. Results revealed that teachers demonstrated a generally high level of technological efficacy, with technical skills rated as Highly Efficient ($M = 4.24$), while digital literacy ($M = 4.16$) and technological knowledge skills ($M = 4.14$) were both rated as Efficient. Pupils' weighted mean MPS was 89.44, classified as Satisfactory. Multiple regression analysis showed that teachers' technological efficacy did not significantly influence class academic performance ($R^2 = 0.041$, $F = 1.35$, $p = 0.262$). These findings suggest that while teachers are technologically capable, this alone is insufficient to drive measurable academic gains. The study underscores the need to complement technology proficiency with sound pedagogical practices.

3. KEYWORDS: Technological Efficacy, Technical Skills, Digital Literacy, Academic Performance, Mean Percentage Score, Descriptive-Correlational, Elementary Education, Philippines

4. INTRODUCTION

Across the globe, education systems have observed firsthand how a teacher's ability to work with digital tools can shape what and how much students learn. The relentless pace at which technology evolves means that schools are perpetually acquiring and embedding newer tools into instructional delivery. This integration carries both promise and peril: it can enrich learning experiences, but can equally disrupt them when handled without proper preparation or support.

At the heart of this transformation is a fundamental question about what teachers truly need to know. Clark (2013) argued that educators require deliberate preparation in how the particular affordances of technology can be harnessed to deepen learning within specific subject areas, and that this preparation must attend to the complex interplay among content, pedagogy, and technology — what has come to be called technological pedagogical content knowledge (p. 43).

Despite broad recognition of technology's potential, its actual uptake in classrooms remains uneven. Prior scholarship has catalogued an array of contributing barriers, including constrained access to equipment, deficiencies in teacher preparation, deeply held reservations about digital tools, and insufficient time to experiment with emerging applications (Cakir, 2012; Farah, 2012; Kellenberger & Hendricks, 2003; Littrell et al., 2005; Moore-Hayes, 2011; Teo, 2009; Wang et al., 2004). A recurring observation across this literature is that teachers' low sense of personal competence in deploying technology represents one of the most stubborn obstacles to meaningful integration (Huntington, 2011; Kopcha, 2012; Prensky, 2001).

When teachers feel uncertain about a tool, they tend to avoid it — not out of indifference but out of a rational reluctance to expose their limitations in front of learners (Prensky, 2001; Roach, 2010). Nevertheless, a growing body of rigorous investigation has consistently affirmed that technology, when used purposefully, shapes student learning trajectories and academic achievement in meaningful ways (Autio, 2018). Yet research on how teacher-level technological competence specifically influences performance outcomes remains incomplete.

Against this backdrop, this study undertook a quantitative investigation into teachers' technological efficacy and its bearing on class academic performance among selected Antipas

District elementary schools during School Year 2022–2023. Specifically, this study sought to: (1) determine the level of teachers' technological efficacy in terms of technical skills, digital literacy, and technological knowledge skills; (2) assess the level of class academic performance using MPS; and (3) determine whether teachers' technological efficacy significantly influences class academic performance.

5. MATERIALS AND METHODS

Research Design

A descriptive-correlational research design was employed in this study. The descriptive component enabled systematic characterization of the levels of teachers' technological efficacy and class performance, while the correlational component allowed for the examination of relationships among these variables without manipulation. This design is consistent with a quantitative, non-experimental mode of inquiry (Cochran, 2011; Creswell, 2017).

Participants and Locale

The study was conducted in ten selected public elementary schools of Antipas District, North Cotabato, Philippines, during School Year 2022–2023. Using purposive sampling, 100 public school teachers were selected as respondents — 10 per school — from: Antipas Central Elementary School, B. Cadungon Elementary School, Datu Agod Elementary School, Luhong Elementary School, Lukiki Elementary School, Magsaysay Elementary School, New Pontevedra Elementary School, Kiyaab Elementary School, Malangag Elementary School, and Malatab Elementary School.

Research Instruments

Two validated instruments were used. The Technology Self-Efficacy Scale for Teachers (TSES), adapted from Chuang and Chang (2011), measured teachers' technological efficacy across three dimensions using a 5-point Likert scale: (5) Highly Efficient, (4) Efficient, (3) Moderate, (2) Less Efficient, and (1) Least Efficient. Class academic performance data were obtained from pupils' Mean Percentage Scores (MPS) recorded during the first, second, and third grading periods.

Statistical Analysis

Data were analyzed using: (1) the Mean to determine levels of technological efficacy and academic performance; (2) Multiple Regression Analysis to determine the significant

influence of teachers' technological efficacy on class academic performance; and (3) the Sobel-Z Test to assess the mediation effect (Sobel, 1982).

6. RESULTS AND DISCUSSION

Level of Teachers' Technological Efficacy

Table 1 presents the overall profile of teachers' technological efficacy across three dimensions.

Table 1. Summary of Teachers' Technological Efficacy by Dimension.

Dimension	Categorical Mean	SD	Description
Technical Skills	4.24	0.43	Highly Efficient
Digital Literacy	4.16	0.48	Efficient
Technological Knowledge Skills	4.14	0.50	Efficient

Teachers registered a Highly Efficient rating for Technical Skills (M = 4.24, SD = 0.43), reflecting strong capacity to facilitate lessons using technology, support higher-order thinking activities, and manage classroom functions through digital tools. Digital Literacy (M = 4.16, SD = 0.48) and Technological Knowledge Skills (M = 4.14, SD = 0.50) were both rated as Efficient, indicating solid but improvable competence in accessing digital content and applying technology-enhanced instruction. These findings align with Ataç and Çiltaş (2020), who found that access to professional development and technology resources significantly shapes teachers' technological knowledge and skills.

Level of Class Academic Performance

Table 2 presents the MPS data across three grading periods.

Table 2. Level of Students' Academic Performance by Grading Period.

Grading Period	Mean MPS	Description
First Grading	90.15	Very Satisfactory
Second Grading	88.92	Satisfactory
Third Grading	89.25	Satisfactory
Weighted Mean	89.44	Satisfactory

The weighted mean MPS of 89.44 places overall academic performance within the Satisfactory range. Performance peaked during the first grading period (M = 90.15, Very Satisfactory) before declining slightly in the second (M = 88.92) and third (M = 89.25) quarters. This pattern may be attributed to factors unrelated to technology use, such as mid-year fatigue or shifts in instructional focus.

Influence of Teachers' Technological Efficacy on Class Academic Performance

Table 3 presents the regression model results.

Table 3. Multiple Regression: Influence of Technological Efficacy on Class Performance | $R^2 = 0.041$, $F(3,96) = 1.35$, $p = 0.262$ (ns)

Predictor	Estimate (β)	SE	T	p-value
Intercept	92.4005	10.42	8.867	< .001
Technical Skill	2.3894	4.72	0.507	0.614 ns
Digital Literacy	-5.7674	3.33	-1.732	0.087 ns
Technological Knowledge	0.0298	3.52	0.008	0.993 ns

The regression model was not statistically significant ($R^2 = 0.041$, $F(3,96) = 1.35$, $p = 0.262$), indicating that teachers' technological efficacy, as a composite, does not significantly predict class academic performance. Individual predictors — technical skill ($\beta = 2.389$, $p = 0.614$), digital literacy ($\beta = -5.767$, $p = 0.087$), and technological knowledge ($\beta = 0.030$, $p = 0.993$) — likewise failed to reach significance. These findings are consistent with Sahin and Yilmaz (2020), who found that higher digital competence increases technology use frequency but does not reliably transfer to higher student achievement. Similarly, Trust et al. (2021) noted that student progress depended more on lesson quality and engagement than on teacher technological confidence alone. The present results reinforce a growing consensus: technology is a valuable amplifier of good teaching, not a substitute for it.

7. CONCLUSION

Elementary school teachers in Antipas District demonstrate generally high levels of technological efficacy, with technical skills as their strongest asset. Nevertheless, this technological competence did not produce a statistically significant influence on pupils' class academic performance. The findings confirm that while technology serves an important supportive and enriching function in the classroom, it is not a sufficient determinant of academic achievement on its own. Measurable academic gains are more likely to depend on the quality of instructional design, the pedagogical strategies employed, and teachers' capacity to address diverse learner needs. Technology should therefore be positioned as a tool that amplifies effective teaching rather than a standalone driver of academic outcomes.

8. ACKNOWLEDGEMENTS

The researcher extends sincere gratitude to Dr. Jesica B. Arenga and Dr. Marvien M. Barrios, advisory committee members, for their invaluable guidance. Appreciation is likewise

extended to Dr. Rizza Rhea V. Ringconada for her statistical expertise. To the school principals and teacher-respondents of Antipas District deepest gratitude for their cooperation, and to the Graduate School of Cotabato Foundation College of Science and Technology for institutional support.

9. REFERENCES

1. Autio, T. (2018). The influence of technology on students' learning and academic achievement.
2. Ataç, S., & Çiltaş, A. (2020). Factors influencing teachers' technological knowledge and skills. Journal of Educational Technology.
3. Cakir, R. (2012). Determinants of pre-service teachers' technology use in early childhood education. Journal of Educational Technology & Society, 15(2), 145–158.
4. Clark, C. (2013). The interaction of pedagogy, content, and technology knowledge in the 21st century (p. 43).
5. Cochran, W. G. (2011). Sampling techniques (3rd ed.). John Wiley & Sons.
6. Costabile, M. F. (2012). Technological effectiveness: Enhancing classroom learning through digital integration. International Journal of Human-Computer Interaction.
7. Creswell, J. W. (2017). Research design: Qualitative, quantitative, and mixed methods approaches. Sage Publications.
8. Ebner, M., & Grimus, R. (2015). Technical skills and educational technology. Journal of Interactive Online Learning.
9. Elstad, E., & Christophersen, K. A. (2017). Teacher training in technology and student accomplishment. Computers in Human Behavior.
10. Huntington, B. (2011). Teacher self-efficacy and technology integration.
11. Kopcha, T. J. (2012). A curriculum-based model for technology integration. Computers & Education, 58(4), 1109–1121.
12. Littrell, A. B., Zagumny, M. J., & Ensor, K. L. (2005). Predictors of instructional technology use. Computers in Human Behavior, 21(6), 861–873.
13. Moore-Hayes, C. (2011). Technology integration and teacher beliefs. Journal of Educational Computing Research.
14. Prensky, M. (2001). Digital natives, digital immigrants part 1. On the Horizon, 9(5), 1–6.
15. Roach, A. T. (2010). Teacher self-efficacy and technology integration barriers.
16. Sahin, S., & Eryilmaz, A. (2022). Teaching quality and student academic outcomes in technology-enhanced classrooms. Technology, Pedagogy and Education.

17. Sahin, S., & Yilmaz, H. (2020). Digital competence and student achievement. Journal of Educational Computing Research.
18. Sobel, M. E. (1982). Asymptotic confidence intervals for indirect effects. Sociological Methodology.
19. Teo, T. (2009). Technology acceptance in education: A study of pre-service teachers. Computers & Education, 52(2), 302–312.
20. Trust, T., Carpenter, J. P., & Krutka, D. G. (2021). Digital tools and lesson planning in pandemic teaching. Journal of Research on Technology in Education.
21. Wang, L., Ertmer, P. A., & Newby, T. J. (2004). Self-efficacy and technology integration. Journal of Computing in Teacher Education, 21(1), 3–11.