

# THE RELATIONSHIP BETWEEN TECHNOLOGY INTEGRATION AND INSTRUCTIONAL PRACTICES OF EARLY CHILDHOOD EDUCATION TEACHERS

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## Abstract

Across various educational environments, there has been a growing concern in recent years about the continued presence of ineffective instructional practices. This study aimed to determine the relationship between technology integration and instructional practices of early childhood education (ECE) teachers, with the hypothesis that no significant difference exists between the two. Employing a descriptive quantitative research design with a correlational approach, utilized a total enumeration sampling on the licensed and practicing ECE teachers of Tagum City. The findings indicate a substantial correlation between ECE teachers' technology integration and their instructional practices. This is consistent with Vygotsky's Activity Theory, which highlights that the integration of technology transforms instructional practices. The study concluded that there is a strong positive relationship between technology integration and the instructional planning of Early Childhood Education (ECE) teachers, showing that those who are more confident and engaged with technology demonstrate better instructional planning practices.

*Keywords: technology integration; instructional practices; Philippines*

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## Introduction

Ongoing challenges concerning the persistence of substandard pedagogical approaches have become increasingly apparent across a range of educational contexts in recent years. These instructional deficiencies, evident in both domestic and international spheres, underscore persistent shortcomings in the actualization of classroom instruction (World Bank, 2023). Many educators in developing economies and emerging nations contend with a shortage in effective instructional practices for successful teaching (Popova, Anna & Evans, David & Breeding, Mary & Arancibia, Violeta. 2021). A considerable body of research indicates that a substantial number of teaching methodologies often fail to consistently align with recognized benchmarks of effective instruction (Fabito et al., 2021).

The widespread nature of subpar instructional practices is not confined to a singular geographical area or educational framework. Rather, analogous patterns have been observed globally, underscoring that ineffective instruction represents a significant concern across both economically developed and developing nations. In the Australian context, for instance, classroom pedagogy has drawn criticism for its purported lack of academic rigor, as overly generalized methodologies have arguably diluted core subject content (The Australian, 2023). In the United States, ongoing disparities in reading instruction remain a source of apprehension, as numerous classrooms have yet to implement pedagogical approaches grounded in empirical evidence (Ripley, 2022).

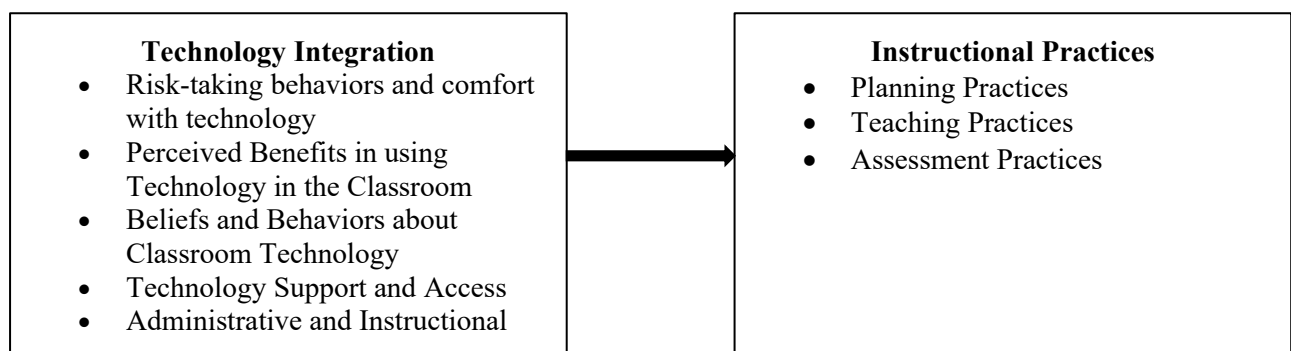
In the educational landscape of the Philippines, specifically within Albay, observations indicated that although educators utilized a range of teaching tactics, a notable disparity existed between these methods and anticipated student learning achievements, pointing to discrepancies and areas ripe for enhancement (Bibon, M. B. 2022). Furthermore, the OECD (2023) posits that current instructional approaches are inadequate for cultivating students' desired learning outcomes. Concurrently, during the pandemic, senior high school science teachers in Cebu City encountered pedagogical hurdles, as documented by Geverola, Mutya, Siason, and Bonotan (2025). These difficulties encompassed a lack of adequate digital proficiency, a tendency toward unvarying and less stimulating teaching strategies, a scarcity of appropriate educational materials, and suboptimal methods for assessing student comprehension.

Unaddressed, subpar instructional practices inevitably contribute to the perpetuation of learning deficits, a decline in student engagement, and diminished academic achievement (World Bank, 2022; UNESCO, 2023). Over time, deficient classroom instruction compromises students' capacity to master foundational skills and undermines their preparedness for subsequent academic pursuits and career demands (OECD, 2020; Schleicher, 2022). In the Philippine context, this issue is starkly evidenced by consistently low scores on both national and international assessments (PBE, 2021; Manalang & Dela Cruz, 2023). Should such practices remain unchecked, they risk systemic entrenchment, thereby exacerbating educational inequities and impairing long-term learning outcomes (UNICEF, 2021).

This study aimed to determine the relationship between technology integration and the instructional practices of early childhood education (ECE) teachers. Specifically, it sought to examine the level of technology integration in terms of risk-taking behaviors and comfort with technology, perceived benefits of using technology in the classroom, beliefs and behaviors about classroom technology, technology support and access, administrative and instructional uses, and communication uses. Additionally, the study explored instructional practices in terms of planning, teaching, and assessment practices. Ultimately, the research aimed to determine the significance of the relationship between technology integration and the instructional practices of ECE teachers.

In this study, there is no significant relationship between technology integration and the instructional planning practices of early childhood education (ECE) teachers.

This study is guided by Vygotsky's Activity Theory, which explains that learning occurs through goal-directed actions shaped by social context and mediated by tools. In this framework, early childhood education teachers are seen as active participants whose teaching practices evolve as they interact with both their environment and the tools they use. Technology such as digital apps, online resources, and devices acts as a mediating instrument that can transform how teachers plan, deliver, and reflect on instruction. According to Vygotsky (1978), such tools influence not only the outcomes of an activity but also the way individuals think and engage with their tasks. As teachers integrate technology into their practice, their instructional methods are reshaped by both the affordances of the tools and the social and institutional settings in which they work.



*Figure 1. Conceptual Framework of Study*

## Method

This employed a descriptive quantitative research design utilizing correlational approach to explore the relationship of technology integration on the instructional planning practices of early childhood education (ECE) teachers. According to Creswell (2014) and McMillan & Schumacher (2010), this approach is appropriate for gathering quantitative data that may be used to identify trends, patterns, and possible connections between educators' use of technology and their planning practices. It enables the researcher to find relationships between variables without changing the study environment by methodically gathering and analyzing data.

The study was conducted in Tagum City Division DepEd Central District, Davao del Norte which has a diverse range of public early childhood education institutions, making it a suitable setting to investigate the integration of technology in instructional planning among ECE teachers.

The target respondents of the study were licensed and practicing early childhood education teachers in Tagum City Division DepEd Central District, Davao del Norte who are currently teaching in early childhood settings. This study employed a total enumeration sampling, wherein all members of the target population were included as participants. The sample size was 111 teachers, Gay, Mills, and Airasian (2012) In their book *Educational Research: Competencies for Analysis and Applications*, they suggest that a minimum of 100 participants is recommended for descriptive studies to ensure a valid and reliable estimate of the population.

Data was gathered using adapted questionnaires from Banister, S., and Vannatta, R. (2009) *Validating a Measure of Teacher Technology Integration*. It is designed to assess the six main components of technology integration, including: (1) Risk-taking Behaviors and Comfort with Technology, (2) Perceived Benefits in using Technology in the Classroom, (3) Beliefs and Behaviors about Classroom Technology, (4) Technology Support and Access, (5) Administrative and Instructional Uses, and (6) Communication Uses. In addition, questionnaires for instructional practices was adapted from Francisco, C. D. C., & Celon, L. C. (2020) which composes (1) Instructional Practices in terms of Planning Practices, (2) Instructional Practices in terms of Teaching Practices, and (3) Instructional Practices in terms of Assessment Practices.

Before the start of data collection, the researcher asked permission from relevant school administrators and educational authorities. Upon approval, questionnaires were distributed either online or in printed form, depending on the accessibility and preference of the participants. Each respondent was provided with an informed consent form ensuring voluntary participation, anonymity, and confidentiality.

The collected data was organized, encoded, and analyzed using statistical software such as SPSS or Microsoft Excel. Descriptive statistics (e.g., mean, frequency, percentage, and standard deviation) was used to present respondents' demographic profiles and the extent of technology use. To explore the relationship between technology integration and instructional planning, inferential statistics such as Pearson's correlation were applied to test for significant relationships between variables (Cohen, Manion, & Morrison, 2018).

## Result

Presented on the table below is the mean scores, standard deviations, and verbal descriptions of each variable and its corresponding indicators. The findings reveal that both technology integration and instructional practices are rated mostly as very high by respondents.

**Table 1: Descriptive Level on Technology Integration and Instructional Practices**

Variables and Their Indicators	Standard Deviation	Mean	Verbal Description
<b>Technology Integration</b>	<b>Sd</b>	<b>4.40</b>	<b>Very High</b>
Risk-taking behaviors and comfort with technology	0.87	3.72	High
Perceived benefits using technology in the classroom	0.57	4.75	Very High
Beliefs and Behaviors about classroom technology	0.90	4.56	Very High
Technology support and access	0.95	4.37	Very High
Administrative and Instructional Uses	0.74	4.60	Very High
Communication Uses	0.93	4.42	Very High
<b>Instructional Practices</b>	<b>Sd</b>	<b>4.71</b>	<b>Very High</b>
Planning Practices	0.60	4.70	Very High
Teaching Practices	0.64	4.69	Very High
Assessment Practices	0.57	4.75	Very High

Presented in Table 1 are the descriptive statistics on the levels of technology integration and instructional practices among the respondents, based on mean scores and standard deviations. The findings show that the overall level of Technology Integration was rated as Very High, with a mean score of 4.40, indicating that respondents frequently and effectively integrate technology into their teaching environments.

Among the indicators of technology integration, the perceived benefits of using technology in the classroom had the highest mean score of 4.75 and a standard deviation of 0.57. This suggests that teachers highly recognize the positive impact of technology on student engagement and learning outcomes. This was closely followed by administrative and instructional uses, with a mean of 4.60 and a standard deviation of 0.74, and beliefs and behaviors about classroom technology, with a mean of 4.56 and a standard deviation of 0.90. Both of these were also rated Very High, implying a strong alignment between teachers' pedagogical beliefs and their technology-use behaviors.

Moreover, communication uses had a mean score of 4.42 and a standard deviation of 0.93, while technology support and access had a mean of 4.37 and a standard deviation of 0.95. Both were rated Very High, highlighting the availability of technology and its application in facilitating communication. However, risk-taking behaviors and comfort with technology scored comparatively lower, with a mean of 3.72 and a standard deviation of 0.87, receiving only a high rating. This suggests that while teachers are generally comfortable with using technology, there may still be some hesitance or lack of confidence in adopting new tools or approaches that involve a higher degree of technological experimentation.

In terms of Instructional Practices, the overall mean score was 4.71, which corresponds to a Very High rating, indicating robust and effective teaching practices aligned with modern pedagogical standards. All three indicators, planning practices, teaching practices, and assessment practices were rated Very High, with mean scores of 4.70, 4.69, and 4.75 respectively. The corresponding standard deviations were 0.60 for planning practices, 0.64 for teaching practices, and 0.57 for assessment practices. These findings suggest that educators not only incorporate technology but also uphold strong pedagogical strategies across all stages of instruction, from planning to delivery to assessment. The relatively low standard deviations across most indicators further indicate consistency in responses, suggesting a shared perception and common experience among the educators surveyed.

Table 2 presents the results of the Pearson correlation analysis conducted to determine the relationship between technology integration and instructional practices among educators.

**Table 2: Test of Relationship Between Technology Integration and Instructional Practices**

	Instructional Practices			
	R-value	p-value	Decision on Ho	Interpretation
Technology Integration	.65	.001	Reject	Significant

The findings in Table 2 revealed a statistically significant positive correlation between technology integration and instructional practices, with a Pearson  $r$ -value of .65 and a  $p$ -value of  $< .001$ . According to the interpretation scale for correlation strength, an  $r$  of .65 represents a moderate to strong relationship between the two variables.

The null hypothesis stating that there is no significant relationship between technology integration and instructional practices is rejected. This suggests that educators who report higher levels of technology integration also tend to demonstrate stronger and more effective instructional practices.

This result reinforces the idea that the effective use of technology in the classroom may enhance teaching strategies, improve planning and assessment practices, and support student learning. The significance level of  $p < .001$  indicates that this relationship is highly unlikely to be due to chance, and thus can be considered both statistically and practically meaningful.

## Discussion

This finding suggests that educators who actively incorporate technology into their classroom routines are more likely to engage in effective instructional practices, including lesson planning, teaching delivery, and assessment. According to Blackwell et al. (2021), when teachers perceive technology as beneficial and receive adequate support, their likelihood of integrating it meaningfully into instructional practices increases. The high scores in areas such as beliefs about classroom technology and communication uses reflect a shift in early education toward more dynamic and interactive learning environments, as seen in studies highlighting the positive impact of technology on young learners' engagement and development (Karsenti & Fievez, 2020). Furthermore, the elevated mean scores across planning, teaching, and assessment practices suggest that ECE educators are not only embracing technology but also aligning it with pedagogically sound approaches indicating a maturation in the field's adoption of EdTech tools.

Moreover, the result reflects the growing importance of digital competence in modern education. The integration of technology not only facilitates access to information and resources but also promotes innovative teaching strategies such as differentiated instruction, formative assessment using digital tools, and interactive learning environments. This aligns with contemporary findings in the field, which suggest that the intentional integration of digital tools enhances instructional quality and supports differentiated learning strategies. For example, Donohue and Schomburg (2020) emphasize that professional development and systemic support for technology use are critical in fostering instructional innovation and reflective practice. The strong correlation also affirms that when teachers are technologically confident and supported, they are more likely to implement diverse, student-centered teaching approaches (Neumann et al., 2021). These results underline the importance of sustaining institutional investments in training and infrastructure to maximize the pedagogical benefits of educational technology in early learning contexts.

The results confirm a meaningful and statistically significant connection between technology integration and instructional practices. This emphasizes the value of investing in both technological infrastructure and teacher training to ensure that technology use translates into pedagogical improvement. Ultimately, the study supports the argument that effective technology use is not a separate educational goal but a critical component of high-quality instruction.

The findings of this study reveal a strong and positive relationship between technology integration and instructional practices among Early Childhood Education (ECE) teachers. Teachers exhibit high levels of competence and confidence in using technology for planning, teaching, assessment, and communication. These findings align with research showing that perceived benefits and adequate support encourage the adoption of learner-centered practices. Vygotsky's (1978) Activity Theory supports this by explaining that tools like technology mediate human activity, transforming both teaching methods and learning experiences. Thus, technology serves as a powerful mediating tool that enhances instructional quality and fosters innovation in early learning environments.

Given the significant findings, future research should explore the qualitative dimensions of how technology influences teaching strategies, student engagement, and learning outcomes in early childhood settings. Longitudinal studies may also provide insights into how sustained technology use impacts instructional practices over time. Additionally, it is recommended that future studies examine contextual factors such as regional disparities, socioeconomic status of learners, and the availability of professional development programs, which may mediate the relationship between technology integration and instructional success. Finally, further research could investigate how emerging technologies such as AI-based learning tools and interactive media specifically shape early childhood pedagogy and assessment practices.

## References

- Banister, S., & Vannatta, R. (2009). Validating a measure of teacher technology integration. [https://www.researchgate.net/publication/277807155\\_Validating\\_a\\_Measure\\_of\\_Teacher\\_Technology\\_Integration](https://www.researchgate.net/publication/277807155_Validating_a_Measure_of_Teacher_Technology_Integration)
- Bibon, M. B. (2022). Teachers' instructional practices and learners' academic achievement in science. *Contemporary Mathematics and Science Education*, 3(1), ep22007. <https://doi.org/10.30935/conmaths/11816>
- Blackwell, C. K., Lauricella, A. R., Wartella, E. A., Robb, M., & Schomburg, R. (2021). Adoption and use of technology in early education: The interplay of extrinsic barriers and teacher attitudes. <https://www.sciencedirect.com/science/article/abs/pii/S0360131513001917>
- Cohen, L., Manion, L., & Morrison, K. (2018). *Research methods in education* (8th ed.). Routledge. <https://doi.org/10.4324/9780203224342>
- Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). SAGE Publications.
- Donohue, C., & Schomburg, R. (2020). *Education and Digital Learning*. <https://doi.org/10.1051/shsconf/202214901018>
- Fabito, B. S., Buama, C. A. C., & Guarte, J. B. (2021). Teachers' instructional practices and learners' academic achievement in science. ResearchGate. <https://www.researchgate.net/publication/353768484>
- Francisco, C. D. C., & Celon, L. C. (2020). Teachers' Instructional Practices and Its Effects on Students' Academic Performance. <https://eric.ed.gov/?id=ED607985>
- Fraenkel, J. R., Wallen, N. E., & Hyun, H. H. (2012). *How to design and evaluate research in education* (8th ed.). McGraw-Hill Education.
- Geverola, I. J. R., Mutya, R. C., Siason, L. M. B., & Bonotan, A. (2022). Challenges and struggles of public senior high school science teachers during the new normal. *Journal of Research, Policy & Practice of Teachers and Teacher Education*, 12(1), 49–68. <https://doi.org/10.37134/jrptte.vol12.1.4.2022>
- Gay, L. R., Mills, G. E., & Airasian, P. W. (2012). *Educational research: Competencies for analysis and applications*.
- McMillan, J. H., & Schumacher, S. (2010). *Research in education: Evidence-based inquiry* (7th ed.). Pearson Education.
- Neumann, M. M., Finger, G., & Neumann, D. L. (2021). A Conceptual Framework for Emergent Digital Literacy. <https://eric.ed.gov/?id=EJ1141143>
- OECD. (2023). *OECD economic outlook, interim report September 2023: Confronting inflation and low growth*. OECD Publishing. <https://doi.org/10.1787/1f628002-en>
- Popova, A., Evans, D., Breeding, M., & Arancibia, V. (2021). Teacher professional development around the world: The gap between evidence and practice. *The World Bank Research Observer*, 37. <https://doi.org/10.1093/wbro/lkab006>
- Ripley, A. (2022, August 9). Inside the effort to return phonics to the classroom. *Time Magazine*. <https://time.com/6205084/phonics-science-of-reading-teachers/>
- The Australian. (2023, March 18). Fact is, the national curriculum has done nothing but dumb down education in Australia. *The Australian*. <https://www.theaustralian.com.au/inquirer/fact-is-the-national-curriculum-has-done-nothing-but-dumb-down-education-in-australia>
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes* (M. Cole, V. John-Steiner, S. Scribner, & E. Souberman, Eds.). Harvard University Press.

World Bank. (2023). Improving teacher quality to address learning poverty in the Philippines. The Philippine Star. <https://www.philstar.com/headlines/2023/09/22/2298233/learning-poverty-philippines-linked-poor-teaching-quality-world-bank-study>