

# Classroom Technology Utilization and Integration Strategies of Digital Native and Digital Migrant Teachers

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Received September 12, 2025; Revised October 14, 2025; Accepted October 21, 2025

**Abstract** This study examined the classroom technology utilization and integration strategies of digital native and digital migrant teachers to determine differences and relationships between their profiles and digital practices. Using a quantitative–correlational design, data were gathered from 150 teachers through a structured survey focusing on instructional delivery, assessment, classroom management, and collaboration. Results revealed that both digital native and digital migrant teachers demonstrate a high level of technology utilization and frequent integration strategies, with no significant difference between the two groups. Correlational analysis further indicated that academic position and educational attainment significantly influence effective technology integration, while teaching experience and ICT-related trainings have minimal impact. The findings suggest that generational classification does not strongly affect technology use, as both groups exhibit comparable digital competence. The study underscores the importance of continuous professional development and institutional support to sustain effective and inclusive technology integration in classrooms.

**Keywords:** *Classroom Technology Utilization, Technology Integration Strategies, Digital Native Teachers, Digital Migrant Teachers*

**Cite This Article:** Von P. Gabayan Jr, and Celso C. Dumalig, “Classroom Technology Utilization and Integration Strategies of Digital Native and Digital Migrant Teachers.” *American Journal of Educational Research*, vol. 13, no. 10 (2025): 459-465. doi: 10.12691/education-13-10-3.

## 1. Introduction

The rapid advancement of digital technologies has transformed education across the globe, reshaping classrooms from traditional chalk-and-board settings into technology-enhanced learning environments. Teachers now have access to a wide range of digital tools and platforms designed to improve instructional delivery, assessment, classroom management, and collaboration. As education systems continue to adapt to technological innovations, the effective use of these tools has become a vital component of pedagogy [1,2,3]. Technology integration is no longer a supplementary option but a necessary practice in ensuring relevant and meaningful learning for 21st-century learners [4,5].

Despite this growing emphasis on technology integration, challenges persist. Studies reveal tensions between ICT in education policies and the actual practices of teachers, leading to inconsistencies in the expected outcomes of technology use [6]. Teachers’ knowledge, beliefs, and confidence significantly affect their willingness and ability to integrate digital tools [7,8]. Furthermore, generational differences highlight another gap: digital native teachers—those who grew up in a technology-rich environment—tend to display higher

confidence and adaptability, while digital migrant teachers—those who were introduced to technology later in their careers—may encounter greater difficulties in maximizing its potential [9,10,11]. These disparities call for a deeper investigation of how teachers across generations utilize and integrate classroom technologies.

To address these concerns, this study seeks to determine the level of classroom technology utilization and the integration strategies employed by digital native and digital migrant teachers. Specifically, it aims to assess how both groups make use of technology in instructional delivery, assessment of learning, classroom management, and collaboration. Additionally, it examines the strategies teachers commonly adopt in these domains, while exploring whether significant differences and relationships exist between their demographic profiles, levels of utilization, and chosen strategies [12,13,14].

In line with this purpose, the study specifically investigates: (1) the profile of teachers in terms of age, sex, teaching experience, academic rank, educational attainment, and ICT-related trainings; (2) their level of classroom technology utilization; (3) the integration strategies employed by both digital native and digital migrant teachers; (4) the differences in utilization and integration strategies between these two groups; and (5) the relationship between teachers’ profiles, their technology utilization, and their integration strategies.

Through this alignment, the study not only captures the current state of classroom technology practices but also identifies factors influencing effective technology adoption [4,15,16].

Finally, this study aligns with the United Nations' Sustainable Development Goals (SDGs), particularly SDG 4 (Quality Education), which promotes inclusive and equitable access to education, and SDG 9 (Industry, Innovation, and Infrastructure), which emphasizes innovation in teaching and learning practices. By investigating how different generations of teachers utilize and integrate technology in classrooms, the study contributes to building sustainable, innovative, and future-ready educational systems [17,18,19].

## 2. Literature Review

### Classroom Technology Utilization of Teachers

Technology utilization in education has emerged as a cornerstone of contemporary pedagogy, transforming how teachers design, deliver, and assess learning. Numerous studies underscore that technology enhances instructional efficiency, learner engagement, and accessibility across educational levels [1,3]. Teachers increasingly rely on digital tools—such as Google Classroom, learning management systems, and interactive multimedia platforms—to manage classroom tasks and enrich pedagogical interactions [20,14]. These technologies have redefined learning environments by fostering collaboration, immediate feedback, and differentiated instruction. However, despite the widespread availability of digital resources, disparities persist in the depth and sophistication of technology use across teacher cohorts. Research suggests that digital native teachers—those who have grown up immersed in technology—tend to adapt and experiment more readily with new tools compared to digital migrant teachers, who often adopt technology more cautiously and within traditional pedagogical boundaries [9,10].

The level of technology utilization among teachers is also shaped by their technological competence, pedagogical beliefs, and self-efficacy. In the Philippine setting, studies have found that teachers' proficiency in educational technology directly influences instructional effectiveness, particularly in science and higher education contexts [12,21,14]. Morales et al. [21] emphasized that faculty in higher STEAM education who possess stronger digital competencies are more capable of facilitating inquiry-based and interactive learning environments. Similarly, Cahapay and Anoba [7] observed that teachers' technological pedagogical knowledge (TPK) self-efficacy significantly predicts their intention to continue using digital platforms even after the pandemic shift to remote education. These findings are supported by Mayantao and Tantiado [8], who found that confidence and frequency of digital tool usage are mutually reinforcing—teachers who frequently use technology become more confident, which in turn promotes more sustained utilization. Thus, utilization extends beyond mere access; it involves a complex interplay between confidence, competence, and professional experience.

From a theoretical standpoint, these findings resonate with the Unified Theory of Acceptance and Use of

Technology (UTAUT) and the Will–Skill–Tool (WST) model, both of which emphasize that teachers' willingness, ability, and access to resources jointly determine technology use [13,22]. For instance, Kim and Lee [13] found that Filipino teachers' behavioral intentions toward ICT adoption are influenced by performance expectancy, effort expectancy, and facilitating conditions. Meanwhile, Sasota et al. [22] argue that without the necessary tools and institutional support, even skilled and motivated teachers may underutilize technology. This theoretical triangulation underscores that utilization is both an individual and systemic process, shaped by personal readiness and contextual enablers.

Another critical dimension influencing utilization is the persistent policy–practice gap. Bedi [6] highlighted the tension between top-down ICT-in-education policies and classroom realities, noting that while governments and institutions advocate for digital transformation, teachers often struggle with insufficient training, time constraints, or infrastructural limitations. Similarly, Du et al. [17] demonstrated that teachers' continuous usage of advanced tools such as virtual reality (VR) depends heavily on motivational and institutional factors—teachers are more likely to maintain digital practices when the tools are easy to integrate, supported by school leadership, and aligned with existing curricula. Goles et al. [10] further reported that in Philippine higher education, teachers continue to face systemic barriers such as inadequate connectivity, lack of incentives, and minimal technical support. Collectively, these studies highlight that classroom technology utilization is not merely a function of teacher willingness but also of organizational culture, resource availability, and sustained professional development.

### Classroom Technology Integration Strategies of Teachers

While utilization refers to the extent of technology use, integration strategies focus on how teachers embed digital tools into pedagogy. In this regard, Akram et al. [1] noted that effective integration requires alignment between pedagogy, content, and technology. Similarly, Santos and Castro [23], drawing from the TPACK framework, stressed that technology integration becomes meaningful when teachers combine technological knowledge with pedagogical and content expertise. In addition, Sasota et al. [22] proposed the Will–Skill–Tool (WST) model, which underscores that teachers must have the willingness, skills, and appropriate tools to integrate technology effectively.

Moreover, teachers employ diverse integration strategies depending on their generational backgrounds. For example, digital natives often incorporate interactive platforms, gamification, and multimedia content in instructional delivery, while digital migrants may rely more on blended approaches and structured digital presentations [9,15]. In the Philippine context, Goles et al. [10] highlighted how higher education institutions have shifted from emergency remote teaching to more intentional digital integration, with teachers adapting varied strategies to sustain engagement. Thus, integration is not uniform but is influenced by generational differences and institutional contexts.

Finally, integration strategies are closely tied to student engagement and classroom outcomes. Bui [24] reported that English teachers who adopted digital tools for

assessment and collaboration achieved higher levels of student participation. In addition, Tortola [16] found that technology-based classroom management strategies enhanced organization and discipline, particularly in elementary education. Furthermore, Teng et al. [19] highlighted how emerging technologies such as large language model-based assistants improve collaboration and flipped classroom outcomes, demonstrating that integration strategies continue to evolve alongside technological innovations. Consequently, examining the strategies of digital natives and migrants provides insights into how best practices may be shared and improved across teacher generations.

### 3. Methodology

This study employed a quantitative–correlational research design to examine the relationship between the profile of digital native and digital migrant teachers, their level of classroom technology utilization, and their integration strategies. Conducted in the Province of Isabela, Region II, the study involved 150 teachers selected through convenience sampling. A structured survey questionnaire served as the primary tool, consisting of sections on respondents' profile, level of technology utilization, and integration strategies in instructional delivery, assessment of learning, classroom management, and collaboration and engagement.

The data collection procedure followed proper protocols, beginning with permission from the District Superintendent, then the school principals, and finally, administration to respondents. Ethical considerations such as informed consent, voluntary participation, confidentiality, and data security were strictly observed. Data were analyzed using statistical tools: frequency and percentage for profile, mean and standard deviation for utilization, weighted mean for integration strategies, t-test for differences between digital natives and migrants, and Pearson *r* for relationships. A 5-point Likert scale was used to interpret responses, ranging from “Very High Utilization/Always” to “Very Low Utilization/Never.”

### 4. Results and Discussion

The following are the results of the study.

#### A. Profile of the Respondents

Table 1 presents the demographic profile of the 150 teacher-respondents classified as either digital native or digital migrant teachers. As shown, the majority of the respondents (77.3%) are digital native teachers, while only 22.7% are digital migrant teachers. This indicates that most participants belong to the younger generation of educators who were exposed to technology at an early age.

In terms of sex, the teaching profession remains female-dominated, with 77.3% of the respondents being female and only 22.7% male. This aligns with the national trend in the education sector, where female teachers outnumber males across levels.

For length of teaching experience, the largest group of respondents (40.7%) have been teaching for 6–10 years, followed by 23.3% with 1–5 years of experience. This

suggests that a considerable number of teachers are in the early to mid-stage of their careers, indicating a mix of both youthful enthusiasm and developing professional experience.

**Table 1. Profile of the Respondents**

	Profile Variables	Frequency	Percentage
Age	Digital Native Teachers	116	77.3 %
	Digital Migrant Teachers	34	22.7 %
Sex	Male	34	22.7 %
	Female	116	77.3 %
Length of Teaching Experience	1-5 years	35	23.3 %
	6-10 years	61	40.7 %
	11-15 years	24	16.0 %
	16-20 years	10	6.7 %
	21 years and above	20	13.3 %
Academic Rank/ Position	Teacher	125	83.3 %
	Master Teacher/ Subject Area Coordinator	10	6.7 %
	Head Teacher	7	4.7 %
	Principal/ Administrator	8	5.3 %
Highest Educational Attainment	Bachelor's Degree	62	41.3 %
	Master's Degree (Units)	62	41.3 %
	Master's Degree (Completed)	8	5.3 %
	Doctoral Degree (Units)	14	9.3 %
	Doctoral Degree (Completed)	4	2.7 %
ICT/IT/ Technology Related Training Attended	None	44	29.3 %
	1-2 Trainings	80	53.3 %
	3-4 Trainings	8	5.3 %
	5 Trainings and Above	18	12.0 %
TOTAL		150	100 %

Regarding academic rank or position, a vast majority (83.3%) are classroom teachers, while only a small portion occupy administrative or supervisory roles such as master teachers (6.7%), head teachers (4.7%), and principals or administrators (5.3%). This shows that most respondents are directly involved in classroom instruction rather than in managerial or supervisory capacities.

As to highest educational attainment, 41.3% of the respondents hold a bachelor's degree, while another 41.3% have earned units in a master's program. Only a few have completed a master's degree (5.3%) or pursued doctoral studies (12.0% combined). This reflects a teaching workforce that is gradually pursuing higher studies for professional advancement.

Finally, in terms of ICT or technology-related trainings, more than half of the respondents (53.3%) have attended 1–2 trainings, while 29.3% have no training at all. Only a few have undergone 3 or more trainings (17.3% total). This suggests that although a number of teachers have some exposure to ICT training, there remains a need for continuous professional development programs to strengthen teachers' digital competencies and promote effective classroom technology integration.

#### B. Level of Classroom Technology Utilization

Table 2 presents the level of classroom technology utilization among digital native and digital migrant teachers across instructional delivery, assessment, classroom management, and collaboration. Both groups demonstrated a high level of utilization, with digital natives obtaining a slightly higher overall mean ( $M = 3.89$ ) than digital migrants ( $M = 3.82$ ). The highest indicator for both groups was instructional delivery, suggesting that teachers consistently employ multimedia tools, online

platforms, and interactive applications to enhance teaching and learning. This aligns with Boonmoh et al. (2021) and Bui (2022), who reported that younger teachers actively integrate digital resources for engagement, while Goles et al. (2024) and Morales et al. (2021) noted that even older, digital migrant teachers have effectively adapted to blended and online modalities through institutional support and post-pandemic digital transitions.

**Table 2. Mean and Descriptive Interpretation on the Level of Classroom Technology Utilization among Digital Native Teachers and Digital Migrant Teachers**

Indicator	Digital Native Teachers		Digital Migrant Teachers	
	Mean	D.I.	Mean	D.I.
Instructional Delivery	4.01	High	3.96	High
Assessment of Learning	3.80	High	3.69	High
Classroom Management	3.83	High	3.81	High
Collaboration and Engagement	3.91	High	3.82	High
Average Mean	3.89	High	3.82	High

The small difference in mean scores indicates that generational background has minimal effect on technology utilization, consistent with findings by Akram et al. (2022) and Kim and Lee (2022) that teachers' adoption of ICT depends more on self-efficacy, institutional support, and perceived usefulness than on age. Both digital natives and migrants appear to possess the will, skill, and tools described in the WST model by Sasota et al. (2021), reflecting high confidence and competence in using technology for instruction, assessment, and engagement. Overall, the results affirm that teachers, regardless of generation, demonstrate a strong commitment to technology integration, underscoring the importance of continued professional development and organizational support to sustain this high level of utilization.

### C. Classroom Technology Integration Strategies

**Table 3. Mean and Descriptive Interpretation on the Classroom Technology Integration Strategies commonly used by Digital Native Teachers and Digital Migrant Teachers**

Indicator	Digital Native Teachers		Digital Migrant Teachers	
	Mean	D.I.	Mean	D.I.
Instructional Delivery	4.13	Often	4.16	Often
Assessment of Learning	3.75	Often	3.76	Often
Classroom Management	3.75	Often	4.01	Often
Collaboration and Engagement	3.65	Often	3.79	Often
Average Mean	3.82	Often	3.93	Often

Table 3 presents the classroom technology integration strategies of digital native and digital migrant teachers, revealing that both groups "often" integrate technology in their instructional practices. Digital natives obtained an overall mean of 3.82, while digital migrants slightly surpassed them with 3.93. The highest indicator for both was instructional delivery, emphasizing frequent use of multimedia, online resources, and interactive tools to enhance lessons. This aligns with Akram et al. (2022) and Santos and Castro (2023), who highlighted that effective

integration depends on aligning pedagogy, content, and technology—core principles of the TPACK framework. Despite generational differences, both groups exhibit strong capacity to use ICT in diverse instructional contexts, echoing findings by Goles et al. (2024) that higher education teachers have transitioned from emergency digital adaptation to intentional integration practices.

The minimal difference in mean scores suggests that generation has limited influence on integration strategies, supporting Sasota et al. (2023) and the Will–Skill–Tool (WST) model, which emphasize that willingness, competence, and access—rather than age—drive meaningful technology use. Moreover, the results reflect broader trends identified by Bui (2022) and Teng et al. (2024), who observed that digital tools enhance classroom engagement, management, and collaboration when teachers receive adequate institutional support. Overall, both digital native and migrant teachers demonstrate comparable proficiency and commitment to leveraging ICT for effective teaching and learning, underscoring the need for continuous digital training and pedagogical innovation to sustain this high level of integration.

### D. Mean Difference and Correlational Analysis

**Table 4. Difference in the Level of Classroom Technology Utilization between Digital Native and Digital Migrant Teachers**

Indicators	Mean Difference	P-value	Decision	Interpretation
Instructional Delivery	0.0570	0.701	Accept $H_0$	No significant difference
Assessment of Learning	0.1105	0.552	Accept $H_0$	No significant difference
Classroom Management	0.0231	0.894	Accept $H_0$	No significant difference
Collaboration & Engagement	0.0860	0.612	Accept $H_0$	No significant difference
p-value < 0.05 Reject $H_0$ ; p-value > 0.05 Accept $H_0$				

Table 4 presents the difference in the level of classroom technology utilization between digital native and digital migrant teachers. Results show that all computed p-values for instructional delivery ( $p = 0.701$ ), assessment of learning ( $p = 0.552$ ), classroom management ( $p = 0.894$ ), and collaboration and engagement ( $p = 0.612$ ) are greater than the 0.05 level of significance. This indicates no significant difference between the two groups, suggesting that both generations display comparable proficiency and consistency in utilizing technology across various classroom functions. These findings align with Kim and Lee (2022) and Akram et al. (2022), who reported that technology use among teachers is influenced more by self-efficacy and institutional support than by age or generational identity.

The results further affirm that professional development and institutional initiatives have bridged generational gaps in technology adoption. Studies such as Goles et al. (2024) and Sasota et al. (2023) highlight that continuous ICT training and exposure foster digital competence among teachers of all ages. Thus, the absence of a significant difference underscores a shared commitment among educators to integrate digital tools for instruction, assessment, and classroom management. Overall, both digital native and digital migrant teachers demonstrate a high and uniform level of technological engagement,

reflecting an evolving educational culture that values inclusivity and adaptability in technology-driven teaching.

**Table 5. Difference in the Classroom Technology Integration Strategies between Digital Native and Digital Migrant Teachers**

Indicators	Mean Difference	P-value	Decision	Interpretation
Instructional Delivery	-0.0281	0.853	Accept H <sub>0</sub>	No significant difference
Assessment of Learning	-0.0104	0.952	Accept H <sub>0</sub>	No significant difference
Classroom Management	-0.2604	0.173	Accept H <sub>0</sub>	No significant difference
Collaboration & Engagement	-0.1433	0.469	Accept H <sub>0</sub>	No significant difference

p-value < 0.05 Reject H<sub>0</sub>; p-value > 0.05 Accept H<sub>0</sub>

Table 5 presents the difference in classroom technology integration strategies between digital native and digital migrant teachers. The analysis shows that all computed p-values for instructional delivery (p = 0.853), assessment of learning (p = 0.952), classroom management (p = 0.173), and collaboration and engagement (p = 0.469) exceed the 0.05 level of significance, indicating no significant difference between the two groups. This means that both generations employ technology integration strategies with similar frequency and purpose. These results support the findings of Akram et al. (2022) and Santos and Castro (2023), who emphasized that effective integration depends more on pedagogical alignment and contextual factors than on generational distinctions.

The absence of significant differences suggests that institutional support, training programs, and shared digital exposure have equalized teachers' integration practices, as observed in Goles et al. (2024) and Sasota et al. (2023). Both digital natives and migrants appear to possess the necessary will, skill, and tools, consistent with the WST model, enabling them to effectively embed technology into teaching, assessment, and classroom management.

Overall, the findings affirm that generational background plays a minimal role in shaping technology integration, with teachers across age groups demonstrating comparable competence, adaptability, and commitment to technology-enhanced learning.

Table 6 presents the correlation analysis between teachers' profile variables and their levels of classroom technology utilization and integration strategies. Results show that most p-values are greater than 0.05, indicating no significant relationship between most demographic factors and teachers' use of technology. However, Highest Educational Attainment (HEA) was significantly correlated with Instructional Delivery (p = 0.007) and Collaboration & Engagement (p < 0.001), suggesting that teachers with advanced degrees tend to employ more effective and interactive technology-based practices. Similarly, Academic Position/Rank (AP/R) showed a significant relationship with Classroom Management (p = 0.005), implying that teachers in higher ranks may possess greater confidence and authority in managing technology-enhanced classrooms.

These findings are consistent with Kim and Lee (2022) and Santos and Castro (2023), who found that pedagogical and academic expertise influence how teachers apply ICT in instruction and engagement. Conversely, the lack of significant correlation between Length of Teaching Experience (LOTE) and ICT-related Trainings Attended supports studies by Sasota et al. (2023) and Goles et al. (2024), which indicate that training frequency alone does not guarantee long-term integration without sustained institutional and motivational support. Overall, the results highlight that educational qualification and academic role play a more substantial part in shaping technology use than experience or training quantity, underscoring the importance of continuous professional growth and advanced study in fostering effective classroom technology practices.

**Table 6. Correlation Between Respondents' and Their Level of Classroom Technology Utilization and Integration Strategies**

Indicator	LOTE		AP/R		HEA		TRAINING	
	P-Value	Decision	P-Value	Decision	P-Value	Decision	P-Value	Decision
Instructional Delivery	0.187	Accept H <sub>0</sub>	0.319	Accept H <sub>0</sub>	0.007	Reject H <sub>0</sub>	0.897	Accept H <sub>0</sub>
Assessment of Learning	0.611	Accept H <sub>0</sub>	0.571	Accept H <sub>0</sub>	0.092	Accept H <sub>0</sub>	0.948	Accept H <sub>0</sub>
Classroom Management	0.397	Accept H <sub>0</sub>	0.005	Reject H <sub>0</sub>	0.063	Accept H <sub>0</sub>	0.968	Accept H <sub>0</sub>
Collaboration & Engagement	0.189	Accept H <sub>0</sub>	0.259	Accept H <sub>0</sub>	<0.001	Reject H <sub>0</sub>	0.863	Accept H <sub>0</sub>

p-value < 0.05 Reject H<sub>0</sub>; p-value > 0.05 Accept H<sub>0</sub>  
 Legend: LOTE – Length of Teaching Experience AP/R – Academic Position/ Rank  
 HEA – Highest Educational Attainment TRAINING – ICT/IT/ Technology-related Training Attended

**Table 7. Correlation between Respondents' Profile and their Classroom Technology Integration Strategies**

Indicator	LOTE		AP/R		HEA		TRAINING	
	P-Value	Decision	P-Value	Decision	P-Value	Decision	P-Value	Decision
Instructional Delivery	0.799	Accept H <sub>0</sub>	<0.001	Reject H <sub>0</sub>	0.020	Reject H <sub>0</sub>	0.070	Accept H <sub>0</sub>
Assessment of Learning	0.338	Accept H <sub>0</sub>	0.053	Accept H <sub>0</sub>	0.004	Reject H <sub>0</sub>	0.166	Accept H <sub>0</sub>
Classroom Management	0.451	Accept H <sub>0</sub>	0.637	Accept H <sub>0</sub>	0.032	Reject H <sub>0</sub>	0.366	Accept H <sub>0</sub>
Collaboration & Engagement	0.533	Accept H <sub>0</sub>	0.347	Accept H <sub>0</sub>	0.006	Reject H <sub>0</sub>	0.464	Accept H <sub>0</sub>

p-value < 0.05 Reject H<sub>0</sub>; p-value > 0.05 Accept H<sub>0</sub>  
 Legend: LOTE – Length of Teaching Experience AP/R – Academic Position/ Rank  
 HEA – Highest Educational Attainment TRAINING – ICT/IT/ Technology-related Training Attended

Table 7 presents the correlation between teachers' profile variables and their classroom technology integration strategies. Results show that most p-values are greater than 0.05, indicating no significant relationship between most demographic variables and technology integration. However, significant relationships were found for Academic Position/Rank (AP/R) and Highest Educational Attainment (HEA). Specifically, AP/R was significantly correlated with Instructional Delivery ( $p < 0.001$ ), suggesting that teachers in higher ranks tend to be more proactive and confident in integrating digital tools into instruction. Meanwhile, HEA exhibited significant correlations with Instructional Delivery ( $p = 0.020$ ), Assessment of Learning ( $p = 0.004$ ), Classroom Management ( $p = 0.032$ ), and Collaboration and Engagement ( $p = 0.006$ ), implying that teachers with advanced qualifications are generally more capable and strategic in applying technology across different teaching domains.

These findings are consistent with Santos and Castro (2023) and Akram et al. (2022), who emphasized that pedagogical expertise and academic advancement enhance the depth and effectiveness of technology integration. Conversely, Length of Teaching Experience (LOTE) and Technology-related Trainings Attended were not significantly related to any indicator, aligning with Sasota et al. (2023) and Goles et al. (2024), who found that training frequency and tenure alone do not guarantee effective ICT application without sustained support and reflective practice.

Overall, the results highlight that higher educational attainment and professional standing foster stronger digital competence, leadership in technology adoption, and innovation in pedagogy. This suggests that empowering teachers through graduate studies, promotion opportunities, and institutional recognition can significantly enhance the quality of technology-driven instruction. As a result, schools and policymakers should prioritize academic advancement and leadership development as catalysts for deeper, more sustainable technology integration in education.

## 5. Conclusion and Future Works

The results of this study revealed that both digital native and digital migrant teachers exhibit a high level of classroom technology utilization and frequent integration of digital tools across all domains—instructional delivery, assessment of learning, classroom management, and collaboration and engagement. The findings confirmed that there is no significant difference between the two groups in terms of how they utilize and integrate technology in their teaching practices. This indicates that despite generational differences, teachers have adapted to the demands of 21st-century education and are actively embracing digital tools to enhance their instructional effectiveness. The increasing accessibility of educational technologies, coupled with institutional support and ongoing professional development initiatives, has likely contributed to narrowing the technological gap between digital natives and migrants, promoting a more uniform and inclusive culture of digital pedagogy.

Furthermore, the correlational analysis revealed that academic position or rank and educational attainment are the strongest predictors of effective technology integration, while length of teaching experience and ICT-related trainings showed no significant influence. This suggests that higher academic qualifications and leadership roles provide teachers with broader exposure and confidence in applying technology-based strategies, reinforcing the importance of continuous professional growth and higher learning. The study therefore concludes that both digital native and digital migrant teachers are capable and willing users of educational technologies, but greater emphasis should be placed on structured and sustained professional development programs to further enhance their technological competencies and pedagogical integration.

Future research may build upon these findings by exploring qualitative perspectives, such as interviews or classroom observations, to uncover the underlying attitudes, challenges, and contextual factors that influence teachers' technology integration practices. Expanding the study to include teachers from different educational levels or regions could also provide a more comprehensive understanding of how institutional contexts and resource availability shape digital practices. Additionally, future studies may examine the direct impact of technology integration on student learning outcomes, engagement, and performance to establish stronger links between teacher practices and learner success.

It is also recommended that future works investigate emerging and advanced technologies, such as artificial intelligence (AI), virtual reality (VR), and adaptive learning systems, to assess how these tools can be effectively integrated into teaching and learning. Moreover, longitudinal studies may be conducted to evaluate how sustained professional development and evolving technological infrastructures influence teachers' digital growth over time. These future directions will contribute to developing a more future-ready, digitally empowered teaching force capable of responding to the rapidly changing educational landscape.

## References

- [1] Abedi, E. A. (2024). Tensions between technology integration practices of teachers and ICT in education policy expectations: implications for change in teacher knowledge, beliefs and teaching practices. *Journal of computers in education*, 11(4), 1215-1234.
- [2] Akram, H., Abdelrady, A. H., Al-Adwan, A. S., & Ramzan, M. (2022). Teachers' perceptions of technology integration in teaching-learning practices: A systematic review. *Frontiers in psychology*, 13, 920317.
- [3] Boonmoh, A., Jumpakate, T., & Karpklon, S. (2021). Teachers' perceptions and experience in using technology for the classroom. *Computer-Assisted Language Learning Electronic Journal*, 22(1), 1-24.
- [4] Mónica de Jesús, C. P. (2023). Technology Integration in the Classroom: A literature review. *Revista Espiga*, 22(45), 20-38.
- [5] Cadiz, M. C. D., Manuel, L. A. F., Reyes, M. M., Natividad, L. R., & Ibarra, F. P. (2024). Technology integration in Philippine higher education: A content-based bibliometric analysis. *Jurnal Ilmiah Ilmu Terapan Universitas Jambi*, 8(1), 35-47.
- [6] Liu, M., Zhou, R., Dai, J., & Feng, X. (2022). Analysis and practice of using modern information technology for classroom teaching mode reform. *Mobile Information Systems*, 2022(1), 2565735.

- [7] Cahapay, M. B., & Anoba, J. L. D. (2021). Technological pedagogical knowledge self-efficacy and continuance intention of Philippine teachers in remote education amid COVID-19 crisis. *Journal of Pedagogical Research*, 5(3), 68-79.
- [8] Mayantao, R., & Tantiado, R. C. (2024). Teachers' utilization of digital tools and confidence in technology. *International Journal of Multidisciplinary Research and Analysis*, 7(05).
- [9] Bumidang, M. D., & Lucas, E. (2024). Technology Utilization in Learning: A Phenomenological Study of the Pre-Service Teachers in Northern Philippines. *International Social Sciences and Humanities*, 3(2), 119-126.
- [10] Goles, C., Sanchez, J. M., Sumalinog, G., Mananay, J., & Alejandro, I. M. (2024). Beyond the pandemic: The changing landscape of technology integration in higher education in Central Visayas, Philippines. *CTU Journal of Innovation and Sustainable Development*, 16(1), 150-159.
- [11] Obispo, R. (2023). Educators' perception of technology integration in the classroom: basis for the development of action plan. *International Journal of Multidisciplinary Research and Growth Evaluation*, 4(05), 110-119.
- [12] De Vera, J. L., Andrada, M. D., Bello, A., & De Vera, M. G. (2021). Teachers' competencies in educational technology integration on instructional methodologies in the new normal. *Lukad: An Online Journal of Pedagogy*, 1(1), 61-80.
- [13] Kim, J., & Lee, K. S. S. (2022). Conceptual model to predict Filipino teachers' adoption of ICT-based instruction in class: using the UTAUT model. *Asia Pacific Journal of Education*, 42(4), 699-713.
- [14] Paje, Y. M., Rogayan Jr, D. V., & Dantic, M. J. P. (2021). Teachers' Utilization of Computer-Based Technology in Science Instruction. *International Journal of Technology in Education and Science*, 5(3), 427-446.
- [15] Javier, B. F. (2021). Practices of Filipino Public High School Teachers on Digital Teaching and Learning Technologies during the COVID-19 Pandemic Basis for Learning Action Cell Sessions. *Online Submission*.
- [16] Tortola, R. L. (2024). Evaluating Technology Integration in the Philippines: A Narrative Review on Enhancing Elementary Teachers' Classroom Management Practices.
- [17] Du, W., Liang, R. Y., & Liu, D. (2022). Factors influencing school teachers' continuous usage intention of using VR technology for classroom teaching. *Sage Open*, 12(3), 21582440221114325.
- [18] Obielodan, O. O., Onojah, A. O., Onojah, A. A., Alabi, O. S., & Alimi, E. A. (2021). The teachers' extent of utilizing teaching methods for teaching basic technology. *Journal of Research in Instructional*, 1(2), 61-70.
- [19] Teng, D., Wang, X., Xia, Y., Zhang, Y., Tang, L., Chen, Q., ... & Yu, W. (2025). Investigating the utilization and impact of large language model-based intelligent teaching assistants in flipped classrooms. *Education and Information Technologies*, 30(8), 10777-10810.
- [20] Olumorin, C. O., Babalola, E. O., Ashaolu, S., & Omolafe, E. V. (2022). Students' attitude towards the utilization of google classroom for learning. *Indonesian Journal of Educational Research and Technology*, 2(3), 213-222.
- [21] Morales, M. P. E., Avilla, R. A., Butron, B. R., Ayuste, T. O. D., Masangcay, D. B., & Laureano, R. A. (2021). Technology Integration Traditions, Transitions and Best Practices in Philippine Higher STEAM Education. *Philippine Journal of Science*, 150(5).
- [22] Sasota, R. S., Cristobal, R. R., Sario, I. S., Biyo, J. T., & Magadia, J. C. (2021). Will-skill-tool (WST) model of technology integration in teaching science and mathematics in the Philippines. *Journal of Computers in Education*, 8(3), 443-464.
- [23] Santos, J. M., & Castro, R. D. (2021). Technological Pedagogical content knowledge (TPACK) in action: Application of learning in the classroom by pre-service teachers (PST). *Social Sciences & Humanities Open*, 3(1), 100110.
- [24] Bui, T. H. (2022). English teachers' integration of digital technologies in the classroom. *International Journal of Educational Research Open*, 3, 100204.

