Technology Integration and Students' Academic Performance

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Abstract — This study examines teachers' profiles, their perceived and actual use of technology tools, and the effect that such use has on students' academic performance, particularly in classroom discussions. Based on the premise that technology is a potential partner in the development of pedagogical practices, the study verifies how Google Classroom, Google Meet and Canva serve as support for 70 basic education teachers who teach at different educational levels.

Research Design Study design the research was descriptive-correlational in nature and collected quantitative data using a valid survey questionnaire and ranked score indicator. Descriptive statistics described characteristics of teachers and level of use and inferential statistics (including ANOVA, Pearson r, and chi-square tests) were used to investigate associations among the variables.

Results Both ratios of perceived and actual usage of technology tools with teaching experience, level of degree and ICT related Training were significant ($p < 0.05$), while those ratios to age or gender showed no significant differences. The most popular and effective tools were Google Classroom, then Google Meet and Canva. Additionally, there was a positive association between the levels of technology use and students' academic achievement, particularly in classroom conversations regarding participation, confidence, and understanding.

The implications are that teacher readiness and continuous ICT training are important for the realization of technology integration goals. The findings of this study suggest that continued organizational support in relation to resource accessibility, staff development and policy enactment is required to facilitate further improvements in engagement and learning.

Keywords — Technology Integration, Academic Performance, ICT in Education, Teacher Utilization, Digital Tools in Teaching

I. Introduction

"Technology won't replace great teachers, but technology in the hands of great teachers is transformational." – George Couros

The incorporation of ICT into the educational system has revolutionized teaching and learning throughout the world. Digital technology has provided both faculty and students with sophisticated new tools, including learning management systems, interactive applications and online forums for collaboration, allowing learning experiences to be more personalized and flexible. Recent research also indicates that well-implemented EdTech can increase student motivation, expand access to learning resources, and provide support for differentiation of instruction (OECD, 2023; UNESCO, 2023). But technology has different effects on academic achievement depending on access, the ability of teachers, and readiness at the institution.

The global adoption of digital learning has been fast-tracked by the COVID-19 pandemic. Using data from the World Bank (2022), over 94% of countries adopted distance teaching during closure. However, in this mass arrow to the north and west, there were some gaps beginning to show. In developing countries, just 55% of students had a digital connection deemed sufficient. In the Philippines, for example, in response to the COVID-19 pandemic, the Department of Education (DepEd) crafted modular learning packages online and a blended approach for more than 28 million learners (DepEd 2021). But lack of connectivity, access to devices and varying degrees of digital competence were major barriers, particularly in rural and outlying districts.

International experiences provide valuable insights. Other countries, such as South Korea and Finland, have even shown that systematic investment in ICT infrastructure, teacher development, and curriculum integration using digital technologies can increase student engagement and improve learning outcomes. Several Philippine public schools, however, are still dependent on print modules because of infrastructure issues and varying access to digital platforms.

The literature suggests several potential advantages of technology use, such as enhanced student engagement, collaborative learning experiences, immediate feedback, and data-driven instruction. Recent research also suggests, however, that while technology plays a crucial role, it is not an independent factor for the betterment of educational quality per se and its effectiveness depends upon pedagogical alignment, teacher preparedness and equitable access (UNESCO 2023).

In light of these realities, it is imperative to investigate the effects of technology integration on the scholastic proficiency of Filipino learners in local settings. This relationship is critical for policy guidance, supporting better classroom practices, and leveraging investments in educational technology to support student learning.

Literature Review

This section presents important scholarly works, policy reports, books, and empirical studies that helped shape the current research. The literature emphasizes technology integration, educators' digital proficiency, and students' academic achievement. By analyzing and critically evaluating these works, we can find research gaps that show why we need to do research in specific areas.

Conceptual Literature

Technology integration in education has long been associated with improved engagement and increased teaching effectiveness. Bebell and O'Dwyer (2010) stressed that technology in the classroom makes students more interested and motivated to learn, saying that digital tools make learning more interactive. Even though their research supports the importance of technology in education, it did not clearly show a direct link between student engagement and measurable academic success, leaving questions about whether increased motivation always leads to better performance.

Ertmer and Ottenbreit-Leftwich (2013) contended that educators' beliefs and self-efficacy profoundly affect the successful integration of technology. Their framework emphasizes the psychological and attitudinal aspects of instructional innovation. The study did not quantify the correlation between teacher beliefs and improved academic outcomes for students.

Tamim et al. (2011) conducted a thorough meta-analysis that indicated moderate positive impacts of technology on student achievement. This extensive synthesis reinforces the assertion that educational technology facilitates learning advancements. However, the study's extensive scope failed to consider contextual variables, including teacher competence levels and the conditions prevalent in developing countries. Hew and Brush (2007) found that insufficient training, limited access, and inadequate institutional support hinder technology integration. The study is important, but it needs to be updated to reflect the changes in education after the pandemic. In a separate study, Kay et al. (2017) investigated flipped classrooms and student-centered technologies, noting positive results, especially in higher education. However, their applicability to public elementary settings has not been comprehensively examined.

The Department of Education (DepEd, 2021) in the Philippines said that only 20% of students in public schools could reliably access online learning during the pandemic. This number shows that there are systemic inequalities, but it doesn't link limited access to actual academic performance after the pandemic. Ong (2022) also said that many Filipino teachers didn't get enough training in digital pedagogy when blended learning started. While the statistic highlights issues of preparedness, the study did not investigate quantifiable academic outcomes. Cristobal and Cristobal (2020) noted that rural schools frequently underutilize available educational technologies; however, the academic consequences of this underutilization were not explicitly examined.

Schmid et al. (2014) said that using technology to promote active learning strategies can improve learning outcomes around the world. But because it doesn't take into account cultural differences, it can't be used in collectivist societies like the Philippines. Li and Ma (2010) also found that computer-assisted instruction improves math performance, but they didn't look at how different levels of teacher skill might affect this. In the local context, Salandanan (2018) noted that Filipino educators are generally inclined to embrace digital instruction, yet they remain insufficiently prepared, thereby leaving unresolved inquiries regarding the influence of readiness on academic performance.

Buabeng-Andoh (2012) supported this perspective by asserting that teacher attitudes and institutional support are crucial for integration; however, he did not provide specific measures of academic performance. Inan and Lowther (2010) also created a readiness model that linked how ready teachers are to use technology, but they didn't connect readiness directly to how well students do in school. Alvarez (2021) found that students did worse in school when they were learning from home, but he didn't look at how well teachers knew how to use technology as a factor. In Bohol, Ballada and Calumba (2022) evaluated teachers' digital readiness without linking the results to student outcomes. Almario (2023) observed poor academic performance in certain Visayas schools despite the availability of EdTech; however, he did not investigate whether inadequate teacher integration contributed to these poor outcomes.

All of these theoretical works support the idea that educational technology has potential, but they also show that there is still a gap: there is not enough direct evidence linking teachers' digital skills to measurable student academic performance, especially in rural public elementary schools.

Research Literature

Studies show that more people are realizing that technology integration affects students' academic performance. De Guzman (2021) examined the efficacy of ICT utilization by teachers in Laguna and determined that their pedagogical approaches improved. However, the study did not directly measure how well the students did in school as a result. Similar to Ramirez (2020), who found a link between students' digital literacy and their academic success in blended learning settings, the study did not address the significance of the teacher's role and the quality of instruction.

In a different local study, Gonzales (2019) showed that ICT-based English instruction led to more student engagement, but the focus on a specific subject made it challenging to apply to other subjects. Lopez (2022) found that using Google Classroom helped senior high school students learn better, but they didn't look at how ready and trained the teachers were as factors that could have affected the results. Mendoza (2020) also saw favorable results in rural Bohol science classes that used ICT tools. However, they didn't look into long-term retention or consistency across subjects. Dela Cruz (2019) found links between technology integration and junior high

school performance, but the study's reliance on survey data instead of classroom observation limited the depth of the validation.

International results show the same trends. Lee (2018) found that using technology in the classroom made students in South Korea more motivated and improved their performance, but he didn't look at differences between rural and urban areas. Taylor (2021) emphasized infrastructure issues in low-income U.S. schools but inadequately examined teacher proficiency as a critical factor for success. Cheng (2023) showed that digital tools helped Chinese students do better in math, but he didn't include factors like how well the student's understood technology or how effective the teachers were at teaching. Sánchez (2022) found that teacher-led EdTech projects made students more involved in Latin America, but the lack of quantitative academic performance data made the results less conclusive.

All of these real-world studies show that using technology in the classroom is often linked to higher levels of engagement and, in some cases, better academic performance. Nonetheless, a persistent methodological deficiency endures—the absence of extensive, localized research directly linking teacher technological proficiency with quantifiable student academic performance, especially in rural public elementary schools. A lot of research focuses on engagement, readiness, or access, but not many show a clear, measurable link between how well a teacher knows their subject and how well their students do.

This gap highlights the imperative of the current study, which aims to furnish contextualized evidence from Talibon District 2 by investigating the correlation between teacher digital competence and students' academic performance.

II. Methodology

This chapter describes in detail the methodology and processes adhered to during this study. This section includes the research design, study area, study respondents, sampling procedure for selecting participants, research instruments used for data collection and treatment, measures for testing validity and reliability, and ethical considerations. The techniques and processes used to determine the level of technology integration and its influence on students' academic performance in selected public schools in the District of Ubay, Schools Division of Bohol, School Year 2024-2025 are detailed.

Research Design

The research is based on the need to provide empirical and factual evidence in building a knowledge base for effective pedagogical strategies and technology-enhanced teaching practices. This investigation will explore the association of teacher technology integration and student learning, thus paving the way for recommendations in crafting evidence. -/research-based provisions in instructional development to the Schools Division of Bohol. Transparency Core

values, including methodologic credibility and ethical integrity, are manifested throughout the research process.

The study is a descriptive-correlational research design. Descriptive (as how) The descriptive part seeks to find the current situation of technology integration with reference to perception and use by teachers. It also examines how much technology is used, how it's used, and how it's integrated into instruction. Thereby, the researcher can draw a clear picture of present classroom use without having to control variables.

On the contrary, the correlation deals with whether there is any association between the level of technology integration and students' achievement. More specifically, it investigates whether there is a statistically significant relationship between teachers' level of technology integration and measurable student learning results. Such a correlational approach is suitable for investigating relationships between variables under study in their normal states without experimental manipulation.

It is preferable for this study since it allows the researcher to dive into the depth of how integration of technology relates with academic performance in a real classroom setting. It allows the recognition of patterns, the strength of association, and potential predictive relationships while remaining ecologically valid. Nevertheless, correlational studies cannot demonstrate causal relations; they can only identify the presence and strength of associations. The authors recognize and interpret the findings in light of this limitation.

III. Results and Discussion

The obtained data is presented and discussed in this chapter. Data were recorded, tabulated, analyzed and interpreted using suitable statistical methods. We present these results following the research questions that guide this investigation.

Table 2 presents the frequency and percentage of the study's teacher respondents. The comparative age is such that most of the teachers are between 31 and 40 years old (49%), followed by some shrinking number belonging to the 41–50-year-old group (37%), with little count from teachers at 51 years and above (3%) or those who fall within the category of 21–30 years (11%). 5.8 The overall mean age and its standard deviation of participants are 38.63 years and 7.05, respectively, which means that most respondents are middle-aged and have good experience and flexibility to use technology in teaching. This corresponds with earlier research that middle-aged teachers combine experience with willingness to embrace digital teaching approaches (Ertmer & Ottenbreit-Leftwich, 2013; Salandanan, 2018).

With respect to gender, the female was largely represented (82.85% of all respondents), which is considerably reflective with regard to the general makeup of teachers in Philippine elementary schools, where the teaching profession is dominated by women. Only 17.14% of the sample were male teachers. Gender may also play a role, but it is likely mediated by other factors

such as teaching styles and attitudes toward technology; however, previous research has found that professional development and training have a greater effect than gender alone (Bebell & O'Dwyer, 2010).

Teacher education level is highly elevated, with half having units in master's programs, 22% already having a master's degree, 9% having units in doctorate programs, and 3% possessing the doctorate. Only 16 percent held a bachelor's degree. This profile shows that the teachers are well educated, which correlates with successful integration of technology tools into classroom teaching (Inan & Lowther, 2010; Ones & Shao, 2011). A more highly educated teaching force is also probably related to superior pedagogical decision-making and use of digital tools, as hinted at by extant literature.

The teaching experience in years indicates that the majority of respondents have 6–10 years (56%), followed by 1–5 years (31%), then 11–15 years (10%), and 16+ years (3%). The average years of experience is 7.21 with an SD of 3.55, suggesting a moderately experienced teaching force that can balance classroom management skills and adaptive technology integration strategies. Experience has been found to facilitate effective classroom instruction when it is matched with targeted professional development offerings that prepare practitioners for competent use of digital tools (Ertmer & Ottenbreit-Leftwich, 2013; Salandanan, 2018).

Last, but not least, the number of attended relevant trainings reflects a moderate professional development engagement [28.57% (4), 25.71% (10 or more), and 12.86% (6)]. The average of 5.99 trainings (SD 3.09) implies teachers have had a fair amount of exposure to capacity-building activities, although gaps exist. Literature continually stresses that the range and level of professional education substantially determine teachers' capacity to utilize technology in teaching (Tamim et al., 2011; Ones & Shao, 2011; DepEd, 2021).

Profile of Implementers Descriptors Dominant Middle-aged, female and Moderately experienced teaching force in higher education Well-grounded in higher education Moderate exposure to professional trainings Table 1. The profile of the implementers is summarized in Table 1. These features create an environment conducive for technology infusion, but they also indicate the necessity of consistent efforts to build capacity to maximize the use of digital tools for improving student learning.

Table 3 presents the mean and standard deviation of teachers' perceptions regarding the use of **Google Classroom** as a technology tool in teaching and learning. The **grand mean of 4.47** indicates that teachers **strongly agree** with the overall usefulness of Google Classroom for enhancing instructional practices. Among the specific indicators, teachers strongly agreed that Google Classroom **helps manage student submissions effectively** (**mean = 4.58, SD = 0.48**), suggesting that the platform significantly reduces administrative workload and allows teachers to track assignments more efficiently. Similarly, high agreement was observed for providing timely feedback (**mean = 4.54, SD = 0.49**) and enhancing student participation (**mean = 4.52, SD = 0.50**),

demonstrating that Google Classroom is valued not only for administrative purposes but also for improving interactive and participatory learning.

The slightly lower mean for **user-friendliness and ease of navigation** (**mean = 4.32, SD = 0.52**) reflects that while most teachers find the platform manageable, some may still encounter minor difficulties, possibly due to varying levels of digital literacy or previous experience with technology. The low standard deviations across all indicators (0.48–0.52) indicate that teachers' responses were **highly consistent**, showing a shared positive perception of Google Classroom as a reliable teaching tool.

Comparatively, these findings are consistent with earlier studies demonstrating that Google Classroom enhances student engagement, streamlines instructional processes, and supports blended learning (Bebell & O'Dwyer, 2010; Tamim et al., 2011; Ertmer & Ottenbreit-Leftwich, 2013). The results also align with DepEd (2021) reports highlighting the importance of technology integration in Philippine classrooms during the shift to online and modular learning. However, the slight variability in the user-friendliness indicator suggests that it is necessary to provide **ongoing teacher training and support**, ensuring that all educators can navigate the platform effectively and leverage all its features.

In conclusion, the study confirms that Google Classroom is a **widely accepted and effective tool** for teaching and learning, particularly in enhancing assignment management, feedback, and student participation. Nevertheless, targeted professional development focusing on technical proficiency and instructional strategies can further strengthen teachers' confidence and consistency in integrating Google Classroom into daily teaching practices.

Table 4 presents the mean and standard deviation of teachers' responses regarding the use of **Google Meet** as a tool for teaching and learning. Overall, the grand mean of **3.63** indicates that teachers generally **agree** with the usefulness of Google Meet for supporting classroom instruction. Among the indicators, teachers reported the highest agreement with "I effectively communicate with students through Google Meet" (**mean = 3.81, SD = 0.70**), suggesting that most teachers are confident in using the platform for instructional communication. On the other hand, the lowest mean was observed for "I use Google Meet to conduct virtual classes or meetings" (**mean = 3.42, SD = 0.74**), indicating that some teachers may be less comfortable or less frequent in using Google Meet for synchronous sessions. The standard deviations, ranging from **0.70 to 0.74**, reveal moderate variability in teachers' responses, implying differences in experience, access to stable internet, or familiarity with the platform.

Comparatively, these findings reflect similar trends reported in previous studies, which emphasize that teacher competence and readiness significantly influence the effective use of digital tools (Ertmer & Ottenbreit-Leftwich, 2013; Taylor, 2021). While Google Meet is widely accepted as a reliable platform for online instruction, the variability in responses indicates that it requires **targeted professional development and technical support**, particularly to enhance teacher

confidence in conducting virtual classes and leveraging advanced features like screen sharing. Overall, the study suggests that Google Meet contributes positively to instructional delivery and student engagement, but maximizing its potential requires addressing gaps in teacher preparedness and digital infrastructure.

Table 5 presents the mean and standard deviation of teachers' responses regarding the use of **Canva** as a technology tool in teaching and learning. Overall, the grand mean of **4.15** indicates that teachers **agree** with Canva's usefulness in enhancing classroom instruction. Among the indicators, teachers **strongly agree** that Canva is easy to use for educational content creation (**mean = 4.50, SD = 0.50**) and that students respond positively to Canva-designed materials (**mean = 4.50, SD = 0.50**). These findings suggest that Canva is perceived as an effective and user-friendly tool that supports student engagement.

Meanwhile, slightly lower mean scores were observed for indicators related to lesson creativity (**mean = 3.43, SD = 0.62**) and making presentations more engaging (**mean = 4.11, SD = 0.58**), indicating **moderate agreement** and higher variability among teachers' responses. The higher standard deviation for creativity in lesson planning implies that while some teachers feel confident using Canva to design innovative lessons, others are less comfortable or lack experience in applying it creatively.

Comparatively, these results align with previous studies emphasizing that digital tools like Canva enhance instructional delivery and student engagement when teachers are competent and confident in their use (Bebell & O'Dwyer, 2010; Tamim et al., 2011). However, consistent with Hew and Brush (2007) and Ong (2022), variation in teacher preparedness and training may affect the consistency of technology integration, especially in creative applications. Overall, the findings highlight the **positive perception and practical adoption of Canva**, while also pointing out the need for **targeted professional development** to maximize its potential in lesson planning and instructional creativity.

Table 6 presents the mean and standard deviation of teachers' responses regarding the **utilization of technology tools in teaching**, with a grand mean of **4.43** and an SD of **0.51**, indicating a general consensus among respondents that the use of ICT strongly supports teaching activities. Teachers reported high agreement for **"The use of ICT enables students to be more active and engaging in the lesson"** (**mean = 4.57, SD = 0.50**) and **"I think the use of ICT in teaching is a waste of time"** (**mean = 4.57, SD = 0.50**), highlighting that educators perceive ICT as both engaging for students and meaningful for instructional purposes. Similarly, responses for **"I have more time to cater to students' needs if ICT is used in teaching"** (**Mean = 4.42, SD = 0.51**) and **"Classroom management is out of control if ICT is used in teaching"** (**Mean = 4.46, SD = 0.49**) indicate that teachers recognize ICT as a tool that facilitates learning and enhances classroom efficiency.

The slightly lower mean for **"I am confident that my students learn best without the help of ICT"** (**mean = 4.25, SD = 0.53**) demonstrates that while teachers value traditional teaching approaches, they acknowledge that technology complements rather than replaces conventional instructional strategies. The narrow range of standard deviations (0.49–0.53) reflects **a high degree of agreement among respondents**, suggesting that the positive perception of ICT is widely shared among teachers in the District of Ubay.

These findings align with prior studies that emphasize the role of ICT in promoting **active learning, student-centered instruction, and enhanced engagement**. Bebell and O'Dwyer (2010) highlighted that technology integration can increase student motivation and participation, while Tamim et al. (2011) showed that ICT has a moderate positive impact on academic achievement. Ertmer and Ottenbreit-Leftwich (2013) proposed that teacher beliefs and self-efficacy significantly influence the effective use of technology in classrooms.

In the local Philippine context, the results align with findings from DepEd (2021) and Ong (2022), which indicated that teachers acknowledge the significance of digital tools in enhancing instruction, especially in rural areas where limited resources frequently hinder traditional teaching methods. The study shows that, when properly implemented, technology can bridge gaps in instructional delivery, allowing teachers to provide more personalized attention to students, monitor progress efficiently, and create more engaging learning experiences.

Moreover, the study highlights the dual nature of technology integration: while it enhances **efficiency, engagement, and instructional flexibility**, teachers remain cautious about over-reliance on digital tools, emphasizing that learning outcomes still depend on effective pedagogy and teacher facilitation. This insight suggests that professional development, adequate training, and ongoing support are critical to maximizing the benefits of ICT in teaching.

In conclusion, Table 6 demonstrates that teachers in the District of Ubay perceive ICT as a valuable tool that **enhances teaching quality, promotes active student participation, and supports classroom management**, while also reinforcing the idea that technology should complement—not replace—traditional instructional strategies. These findings can inform future initiatives aimed at increasing ICT adoption, designing professional development programs, and developing instructional activities that leverage technology for improved student learning outcomes.

Table 8 reflects teachers' perceptions of the utilization of technology tools in teaching and learning, with a grand mean of 4.43 and an SD of 0.50, indicating that teachers strongly agree on the effectiveness of technology tools in supporting instruction. The highest-rated indicators are "Technology tools allow me to provide personalized learning experiences for students" and "Technology tools in teaching and learning support collaborative learning among students" (both mean = 4.57, SD = 0.48), highlighting the value teachers place on personalization and collaboration facilitated by technology.

Other indicators, such as "I regularly integrate technology tools into my teaching practices" (mean = 4.32, SD = 0.50) and "I use technology tools to track and monitor student progress and performance" (mean = 4.36, SD = 0.49), demonstrate that teachers consistently use technology to improve classroom instruction and student monitoring. The SD values, ranging from 0.48 to 0.52, indicate minimal variability in responses, suggesting that teachers share a common perception regarding the positive impact of technology tools on teaching.

These findings align with international research that emphasizes technology integration as a facilitator for differentiated instruction, collaborative learning, and efficient classroom management (Ertmer & Ottenbreit-Leftwich, 2013; Tamim et al., 2011). Locally, this supports DepEd's (2021) recommendations on ICT integration for enhancing instructional effectiveness and student engagement. Overall, the data indicate that teachers recognize the critical role of technology tools not just as content delivery platforms but as active instruments that improve pedagogy, student interaction, and learning outcomes, reinforcing the need for continuous professional development and technical support in schools.

Table 9 presents the academic performance of students in classroom discussions**,** showing a grand mean of 3.88 with an SD of 0.57**,** which indicates that students are generally perceived as agreeing to perform well during class discussions. Among the indicators, the highest-rated areas are "The student listens attentively to peers and responds appropriately" **(**mean = 4.35, SD = 0.50**) and** "The student applies prior knowledge to current discussion topics" **(**mean = 4.22, SD = 0.52**),** reflecting students' strong active listening skills and ability to connect previous learning to current lessons**.**

Conversely, the lowest-rated indicator is "The student asks insightful questions related to the topic" **(**mean = 3.25, SD = 0.65**),** suggesting that while students are engaged, critical questioning and higher-order thinking during discussions remain areas for improvement**.** Moderate SD values (0.50–0.65) indicate some variability in student performance across different indicators, which may be influenced by individual student differences, subject complexity, or teacher facilitation.

Overall, the findings reveal that students are actively participating and demonstrating understanding during classroom discussions, yet there is room to enhance critical thinking, questioning skills, and collaborative engagement**.** These results align with previous literature emphasizing that technology integration, such as through Google Classroom or Canva, can support discussion engagement and scaffold higher-order thinking, providing opportunities for students to express ideas, analyze content, and collaborate effectively (Tamim et al., 2011; Hew & Brush, 2007)

Table 10 presents the relationship between teacher profile variables and their perceived utilization of three technology tools—Google Classroom, Google Meet, and Canva. Among the profile variables, the number of relevant trainings attended emerged as the most significant factor

influencing technology utilization. The correlation coefficients ranged from 0.48 for Google Classroom to 0.52 for Google Meet, indicating a moderate to strong positive relationship. This suggests that teachers who participate in more technology-focused trainings are more adept at using these tools to facilitate learning. Ertmer and Ottenbreit-Leftwich (2013), who emphasized that professional development strongly shapes teacher confidence, competence, and beliefs about technology, concur with this finding. Similarly, Ones and Shao (2011) highlighted that high digital competence among teachers significantly improves their ability to integrate technology into classroom instruction.

Highest educational attainment also showed a moderate positive correlation with the use of all three tools, indicating that teachers with advanced degrees or higher levels of education are more likely to integrate technology effectively. This aligns with the findings of Buabeng-Andoh (2012), who suggested that teachers with higher education levels are generally more receptive to adopting innovative teaching practices, including educational technology.

Other profile variables, such as age, gender, and years of teaching experience, showed low positive correlations or no significant association. Age and years of teaching experience had only a small effect, which means that younger teachers or those with less experience are not necessarily better at using technology in the classroom. Gender showed no significant correlation, reflecting a general parity in access to and use of technology tools among male and female educators in the study. These results resonate with global studies (Hew & Brush, 2007; Tamim et al., 2011), suggesting that while demographic factors may shape attitudes toward technology, professional training and pedagogical knowledge are far stronger predictors of actual utilization.

Comparatively, Google Meet exhibited the strongest correlation with training attended, which may reflect the increasing reliance on synchronous platforms during the post-pandemic era. This supports findings from Lopez (2022), who observed that teachers trained in online platforms showed higher efficacy in delivering lessons and managing virtual classrooms. Conversely, Canva showed a slightly lower but still significant correlation, indicating that while creativity tools are valued, their integration may be more dependent on individual teacher initiative and familiarity with design-based applications.

Table 11 presents the relationship between teacher profile variables and their pedagogical utilization of technology, measured across three dimensions: teaching, student learning, and teaching & learning combined. Across all profile variables, teachers consistently reported high levels of technology utilization, with most categories falling under the “Strongly Agree” interpretation, indicating a positive perception and active engagement in integrating technology into pedagogy.

Age demonstrates a clear pattern: as age increases, so does the mean score for technology use, albeit marginally. Teachers aged 51 and above recorded the highest means (Teaching: 4.49, Student Learning: 4.36, Teaching & Learning: 4.48), suggesting that experience may complement

confidence in integrating technology tools into pedagogical practice. This aligns with findings from Tamim et al. (2011) and Hew & Brush (2007), which noted that experience, when combined with exposure to training, can enhance effective technology use.

Gender differences were minimal, with female teachers slightly outperforming males across all dimensions (teaching & learning mean: 4.44 vs 4.39). This indicates that both male and female educators are equally capable of pedagogical integration of technology, reflecting similar access and familiarity with educational tools, consistent with Buabeng-Andoh (2012), who found gender not to be a significant determinant of technology use.

Educational attainment had a strong influence. Teachers holding master's and doctorate degrees, including those with units, consistently scored higher than those with only a bachelor's degree (teaching & learning mean: 4.38–4.49 vs 4.16). This suggests that higher academic qualifications correlate with greater competency in using technology pedagogically, likely due to greater exposure to research, advanced teaching methods, and professional development opportunities, supporting the observations of Ones and Shao (2011) and Ertmer & Ottenbreit-Leftwich (2013).

Years of teaching experience also showed a positive trend. Teachers with 16 years and above scored the highest across all dimensions (teaching & learning mean: 4.47), while teachers with 1–5 years had slightly lower means (4.29). This indicates that experience, coupled with exposure to technology integration practices, enhances the effective pedagogical use of tools, aligning with the notion that teacher confidence grows with practice and familiarity.

Finally, relevant trainings attended proved to be a critical factor. Teachers who had only one training recorded lower means (4.19), interpreted as "agree," while those with two trainings scored higher (4.44, "strongly agree"). This reinforces the importance of continuous professional development in building teacher capacity to utilize technology effectively, echoing the findings of Ertmer and Ottenbreit-Leftwich (2013) that structured training significantly improves technology integration in classrooms.

Table 12 shows the relationship between teacher profile variables and students' academic performance, highlighting which factors significantly influence learning outcomes. Different statistical tests were applied depending on the type of variable: Pearson correlation for interval/ratio variables, point-biserial correlation for dichotomous variables, and Spearman's rank correlation for ordinal variables.

Starting with age, the Pearson correlation value of 0.198 with a p-value of 0.102 indicates no significant relationship between teachers' age and students' academic performance. This suggests that the age of the teacher does not notably affect how well students perform in classroom discussions or assessments. Similarly, gender showed a very weak point-biserial correlation of 0.042 with a p-value of 0.712, also interpreted as no significant relationship, indicating that male and female teachers produce comparable student outcomes in terms of academic performance.

In contrast, educational attainment showed a Spearman's rank correlation of 0.431 with a p-value of 0.001, demonstrating a significant positive relationship with student performance. This implies that teachers with higher degrees (master's or doctorate) are more effective in enhancing student learning outcomes, likely because higher educational qualifications equip teachers with better pedagogical knowledge and technology integration skills, consistent with findings from Ones and Shao (2011) and Ertmer & Ottenbreit-Leftwich (2013).

Years of teaching experience also had a significant positive relationship (Spearman's rho = 0.384, p = 0.003), indicating that teachers with more experience tend to produce better-performing students. This aligns with the idea that experienced teachers are better at classroom management, instructional planning, and integrating technology tools like Google Classroom, Google Meet, and Canva effectively to support learning.

Finally, the number of trainings attended yielded the highest Pearson correlation (r = 0.455, p = 0.000), highlighting a strong significant relationship with student academic performance. This emphasizes the value of professional development: teachers who participate in more relevant trainings are more adept at using technology tools to enhance teaching and learning, resulting in improved student outcomes.

Overall, this analysis reveals that while demographic factors like age and gender may have little effect, teacher qualifications, experience, and training play a critical role in shaping student performance. These findings emphasize the need for targeted professional development programs, advanced teacher education, and ongoing support for pedagogical technology integration to maximize student academic success.

Table 13 presents the relationship between technology utilization and students' academic performance using the Pearson Product-Moment Correlation. The computed correlation coefficient (r = 0.612) with a p-value of 0.000 indicates a significant positive relationship. This means that higher levels of technology integration in teaching—through tools such as Google Classroom, Google Meet, and Canva—are strongly associated with improved student academic outcomes.

In practical terms, when teachers regularly and effectively utilize these technology tools for instructional purposes, students tend to participate more actively in classroom discussions, grasp concepts more efficiently, and demonstrate better performance in assessments. This finding aligns with previous studies, such as Tamim et al. (2011) and De Guzman (2021), which showed that technology integration positively influences student achievement by supporting engagement, collaboration, and differentiated instruction.

The strong positive correlation also points out the importance of teacher preparedness, pedagogical skills, and access to training in maximizing the effectiveness of technology in the classroom. It suggests that schools should spend money on both technology and professional development programs to help teachers use digital tools in their lessons more effectively.

IV. Conclusion

Based on the findings of this study, it can be concluded that technology integration in public elementary schools within the District of Ubay, Schools Division of Bohol, has a significant positive impact on students' academic performance. Teachers demonstrated a generally high level of confidence and competence in using technology tools such as Google Classroom, Google Meet, and Canva, both for instructional purposes and for enhancing student learning experiences. The findings indicate that when teachers actively utilize these digital tools, students become more engaged, collaborative, and responsive during classroom activities, ultimately leading to improved academic outcomes.

The study also revealed that teacher profile variables—particularly educational attainment, years of teaching experience, and participation in relevant training programs—are positively associated with their pedagogical utilization of technology tools. While age and gender showed no significant relationship with technology use or student performance, higher qualifications and more extensive training were correlated with more effective application of digital tools in teaching and learning.

Furthermore, the research highlights that structured and systematic use of technology fosters not only student engagement but also creativity, critical thinking, and participation, which are essential 21st-century skills. The strong positive relationship between technology utilization and academic performance underscores the necessity for schools to provide adequate technological resources and continuous professional development for teachers.

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