PANTAO
(International Journal of the Humanities and Social Sciences)
Volume 5, Issue 4
ISSN 3028-0877 | e-ISSN 3155-6043 | DOI 10.69651/2022PIJHSS

Elementary teachers' perceptions on the utilization of digital tools and technological self-efficacy

Jackelyn L. Pepito*
Cebu Technological University-Main Campus, Cebu City, Philippines

ABSTRACT

In the rapidly evolving landscape of education, the integration of digital tools has become a vital component of modern teaching practices. This study aimed to assess the perceptions on the utilization of digital tools and technological self-efficacy of elementary teachers of Salazar Colleges of Science and Institute of Technology, Cebu City for the school year 2025-2026 as a basis for an action plan. A descriptive-correlational research design was employed, using an adapted questionnaire as the primary data collection tool. The study involved 50 respondents from Salazar Colleges of Science and Institute of Technology, Cebu City. The simple percentage, weighted mean, and the Pearson Moment Product correlation R were used as the statistical tools. The data gathered were then analyzed statistically. Findings indicated that the overall mean of the respondents' perceptions on the extent of their utilization of digital tools is with a verbal description of agree. Likewise, the overall mean the respondents' extent of technological self-efficacy is with a verbal description of often. Moreover, data showed that age, highest educational attainment, and length of teaching experience have no significant relationship with teachers' extent of digital tool utilization because their computed t-values are lower than the critical value. In contrast, gender shows a significant relationship with digital tool utilization, as shown by the much higher computed t-value compared with the critical value. Furthermore, data showed the results reveal that age, highest educational attainment, and length of teaching experience have no significant relationship with teachers' technological self-efficacy, as shown by their computed t-values falling below the critical value. On the other hand, gender demonstrates a significant relationship with technological self-efficacy, with a computed t-value far exceeding the critical value. Finally, the overall mean of the challenges do respondents encounter in utilizing digital tools and technology is with a verbal description of often. Thus, based on the findings, the researcher recommends the development and implementation of an action plan.

Keywords: Administration and supervision, digital tools, technological self-efficacy, descriptive correlational, action plan, Cebu City.

Date Submitted: October 02, 2026
Date Accepted: October 09, 2026
Date Published: October 29, 2026

*Corresponding author / Email: jackelynpepito9@gmail.com
DOI: http://doi.org/10.69651/PIJHSS05041698

Recommended citation:
Pepito, J. L. (2026). Elementary teachers' perceptions on the utilization of digital tools and technological self-efficacy. Pantao (International Journal of the Humanities and Social Sciences) 5 (4), 1840-1859. http://doi.org/10.69651/PIJHSS05041698

INTRODUCTION

In the rapidly evolving landscape of education, the integration of digital tools has become a vital component of modern teaching practices. The effective utilization of digital technologies by teachers is now viewed as essential in delivering quality education and ensuring student engagement in the 21st-century learning environment (Venkatesh et al., 2021). The success of such integration depends not only on access to technological resources but also on teachers' confidence and willingness to use them effectively. The 21st-century educational environment continues to evolve rapidly due to advances in digital technology, transforming not only instructional methods but also expectations for teacher competence in digital integration. At the heart of successful technology adoption is teacher confidence, which plays a pivotal role in how effectively digital tools are utilized in the classroom (Kim & Lee, 2021). Confidence in digital technology often referred to as technological self-efficacy has become a key determinant in whether teachers integrate technology in pedagogically meaningful ways (Venkatesh et al., 2021).

Across various countries, research has revealed that even when access to technology is not an issue, a lack of confidence and self-efficacy can hinder teachers from effectively using digital tools (Alharthi et al., 2022). In developed nations such as the United States, United Kingdom, and South Korea, policies and funding have advanced ICT integration, yet disparities in digital fluency among educators persist (Scherer et al., 2021). The integration of digital tools in Philippine basic education has become more crucial due to rapid technological advancements and the challenges posed by the pandemic. According to Pua and Morales (2021), digital tools are now integral in delivering flexible learning modalities, including online and blended instruction. However, while access to digital tools has expanded, teachers' confidence in using them effectively remains a critical factor in maximizing their educational potential. In Cebu Province, where schools are a mix of urban and rural environments, the challenges and successes in adopting educational technology vary significantly. According to Torres and Mendoza (2022), while urban schools have greater access to stable internet and digital equipment, rural schools often face infrastructural limitations that hinder optimal technology integration.

However, while several studies in the Philippines examine technology integration in rural or broad provincial context, fewer have focused on urban elementary schools where resources may be available but teachers' technological self-efficacy and pedagogical integration remain uncertain. This localized gap is especially evident in institutions such as Salazar Colleges of Science and Institute of Technology, Cebu City. This gap also presents an opportunity to understand how localized factors, such as teachers' perceptions, readiness, and availability of technology toward the learning process might give significant relationship in a technology driven preschool environment. Addressing this challenge is critical for achieving the goals of education systems, such as those outlined in the Philippine Department of Education's thrusts toward digital learning. Strengthening teacher confidence through strategic support, training, and experience-based learning could bridge the gap.

Thus, it is the desire of the study to deeply unravel the facts of the perceptions on the utilization of digital tools and confidence in technology of elementary teachers of Salazar Colleges of Science and Institute of Technology, Cebu City for the school year 2025-2026. Thus, the findings of the study may lead to an action plan that will enhance the effective utilization of digital tools in teaching and strengthen teachers' confidence in technology integration through targeted professional development, access to digital resources, and continuous support mechanisms that promote innovative and technology-driven instruction of elementary school teachers in urban cities.

ISSN 3028-0877 | e-ISSN 3155-6043 | DOI 10.69651/2022PIJHSS

Statement of the problem

The study assessed the perceptions of elementary teachers at Salazar Colleges of Science and Institute of Technology, Cebu City, regarding their utilization of digital tools and technological self-efficacy during the school year 2025-2026, as a basis for developing an action plan.

Specifically, it sought to answer the following questions:

1. What are the respondents' profiles in terms of age, gender, highest educational attainment, length of teaching experience, and ICT-related training attended?
2. What are the respondents' perceptions regarding the extent of their utilization of digital tools?
3. What is the extent of the respondents' technological self-efficacy?
4. Is there a significant relationship between the respondents' profiles and their perceptions regarding the extent of their utilization of digital tools and technological self-efficacy?
5. What challenges do the respondents encounter in utilizing digital tools and technology?
6. Based on the findings of the study, what action plan could be developed?

METHODOLOGY

The methodology of this study is presented in a continuous account of its design, the flow of the study, the environment, the respondents, the instrument, the data gathering procedures, the statistical treatment, and the scoring procedure. This research employed a descriptive-correlation research design. An adapted questionnaire was used to assess the perceptions on the utilization of digital tools and the technological self-efficacy of elementary teachers of Salazar Colleges of Science and Institute of Technology, Cebu City for the school year 2025-2026 as a basis for an action plan. Specifically, the study examined the profile of the respondents; their perceptions on the extent of their utilization of digital tools; the extent of their technological self-efficacy; the significant relationship between the respondents' profiles and their perceptions on the extent of their utilization of digital tools and extent of technological self-efficacy; and the challenges encountered in utilizing digital tools and technology. Further, the study employed the purposive sampling method. This method required only a short period to accomplish since the respondents were available in the locale of the study. The researcher preferred to use this method because it required accessibility and punctuality of the possible fulfillment to be obtained by the researcher.

The flow of the study followed a system model employing the input, process, and output approaches, as illustrated in Figure 2. The input contained the profile of the respondents; the perceptions on the extent of their utilization of digital tools; the extent of technological self-efficacy; the significant relationship between the respondents' profiles and their perceptions on the extent of their utilization of digital tools and extent of technological self-efficacy; and the challenges encountered in utilizing digital tools and technology. Further, the study employed the purposive sampling method. The process was a method for gathering and synthesizing variables. It included the method, the gathering of data, the organization of data, and the data themselves. This analyzed the results of the questionnaires, and the data gathered were tabulated, analyzed, computed, and evaluated to determine the results. The output of this research provided the researcher with empirical data to create an action plan that could enhance the effective utilization of digital tools in teaching and strengthen teachers' confidence in technology integration through targeted professional development, access to digital resources,

and continuous support mechanisms that promote innovative and technology-driven instruction. This included the following elements: areas of concern, objectives, strategies, persons involved, budget, source of budget, time frame, expected outcome, and actual accomplishment.

The study was conducted at Salazar Colleges of Science and Institute of Technology, Labangon, Cebu City, as shown in the location map of the research environment in Figure 3. Labangon is situated at approximately 10.2991, 123.8805, in the island of Cebu. The elevation at these coordinates is estimated at 15.9 meters or 52.2 feet above mean sea level. The population of Labangon grew from 24,753 in 1990 to 32,825 in 2020, an increase of 8,072 people over 30 years. The latest census figures in 2020 denote a negative growth rate of 0.41%, or a decrease of 652 people, from the previous population of 33,477 in 2015.

The respondents of this study were the teachers of the school mentioned above. The total number of respondents of the study was 50, which was computed through percentage. As presented in Table 1, the distribution of the respondents consisted of teachers with a frequency (f) of 50, equivalent to 100.00%, which also constituted the total of 50 respondents at 100.00%.

The study employed an adapted and modified survey questionnaire from the study of Mayantao & Tantiado, (2024). The research-based questionnaire was composed of four (4) parts. The first part answered the profiles of the respondents, particularly as to their age, gender, highest educational attainment, length of teaching experience, and ICT-related trainings attended. The second part answered the perceptions on the extent of their utilization of digital tools, which comprised a total of ten (10) statements. In addition, the third part answered the extent of technological self-efficacy, which comprised a total of 10 statements. Finally, the fourth part answered the challenges encountered in utilizing digital tools and technology.

Before the administration of the research instrument, the researcher sought permission from the public schools' district supervisor and the school principal of the selected school, with the recommending approval of the research adviser and the Dean of the College of Advanced Studies of Cebu Technological University. After permission was given, the preliminary data gathering (research questionnaire) was administered to the pre-identified respondents on hand. The researcher may guide the respondents in filling up the questionnaires.

The study involved the correlational method, and the following statistical treatments were used. Simple percentage was used to determine the percentage of the respondents' profiles and described the profile and frequency of the respondents. Weighted mean determined the distribution results of the extent of their utilization of digital tools; the extent of technological self-efficacy; and the challenges respondents encounter in utilizing digital tools and technology. The Pearson Moment Product correlation R tested the significant relationship between the respondents' profiles and their perceptions on the extent of their utilization of digital tools and extent of technological self-efficacy.

For the scoring procedure, the researcher used the Five-point Likert Scale, which required an individual participant to respond to a series of statements in the questionnaire as to the extent of their utilization of digital tools; the extent of technological self-efficacy; and the challenges respondents encounter in utilizing digital tools and technology by indicating strongly agree, agree, neutral, disagree, or strongly disagree. A scale of 5 with the range of 4.21-5.00 was categorized as Strongly Agree (SA), which means that the respondents strongly agree with the statement. A scale of 4 with the range of 3.41-4.20 was categorized as Agree (A), which means that the respondents agree with the statement. A scale of 3 with the range of 2.61-3.40 was categorized as Neutral (N), which means that the respondents are neutral with the statement. A scale of 2 with the range of 1.81-2.60 was categorized as Disagree (D), which means that the respondents disagree with the statement. Finally, a scale of 1 with the range of 1.00-1.80 was categorized as Strongly Disagree (DA), which means that the respondents strongly disagree with the statement.

To avoid ambiguities in the study, the following terms were defined operationally. Action Plan referred to the structured set of strategies and activities designed based on the study's findings to enhance elementary teachers' digital tool usage and technology confidence, and it includes objectives, interventions, responsible persons, and timelines. Confidence referred to the self-perceived belief and assurance of elementary teachers in their ability to effectively use digital tools for various instructional and professional tasks, and it includes their level of comfort, skill awareness, and willingness to adopt technology in the classroom. Digital Tools referred to the technology-based resources such as computers, laptops, tablets, smartphones, educational apps (e.g., Google Workspace, Microsoft Office, Canva, Kahoot), learning management systems (e.g., Google Classroom), and other online platforms used by teachers to enhance instruction and student learning. Elementary Teachers referred to the licensed educators teaching at the primary (Grades 1–6) level in public or private schools, and in this study, they are the main participants whose use of digital tools and confidence in technology are being examined. Respondents' Profiles referred to the demographic and professional characteristics of the participating elementary teachers, including age, gender, highest educational attainment, length of teaching experience, and related and relevant training. Technology referred to the hardware, software, and internet-based systems that support teaching and learning processes, and this includes devices, applications, and platforms that enable digital instruction, communication, and collaboration. Utilization referred to the extent to which elementary teachers apply and integrate digital tools in their teaching practices, classroom management, lesson planning, communication, and assessment activities.

RESULTS AND DISCUSSION

This chapter presents and interprets the data gathered from 50 elementary teachers of Salazar Colleges of Science and Institute of Technology, Labangon, Cebu City, for the school year 2025-2026. The study used a descriptive-correlational research design and purposive sampling. Data were collected with a questionnaire adapted and modified from the instrument of Mayantao and Tantiado (2024). The questionnaire had four parts: the respondents' profile (age, gender, highest educational attainment, length of teaching experience, and ICT-related trainings attended), the extent of utilization of digital tools (ten statements), the extent of technological self-efficacy (ten statements), and the challenges encountered in utilizing digital tools and technology. Responses were scored on a five-point Likert scale, where 4.21-5.00 is strongly agree, 3.41-4.20 is agree, 2.61-3.40 is neutral, 1.81-2.60 is disagree, and 1.00-1.80 is strongly disagree. Simple percentages described the profile, weighted means described the three perception variables, and the Pearson product moment correlation r tested the relationship between the respondents' profiles and both the extent of digital tool utilization and technological self-efficacy. All discussion rests on the data gathered, and each result is interpreted in direct relation to the objectives of the study.

Profile of the respondents

In terms of age, 38 respondents or 76.00% were 21-30 years old, 10 or 20.00% were 31-40 years old, two or 4.00% were 41-50 years old, and none (0, or 0.00%) were 51-60 years old, for a total of 50 respondents or 100.00%. The sample is therefore composed largely of teachers in their twenties and thirties. Such teachers are often described as digital natives or early adopters, who grew up during the rapid expansion of digital devices and internet access and are generally more comfortable with online platforms, educational software, and

interactive technologies than older cohorts. Mouza et al. (2020) reported that younger teachers adopt digital platforms more readily because they see technology as integral to instruction. Tondeur et al. (2021) found that early-career teachers report stronger technological self-efficacy, which supports their willingness to experiment with new instructional technologies. König et al. (2022) observed fewer barriers to technology integration among younger teachers during remote and hybrid learning transitions. Trust and Whalen (2020) and Hsu (2023) likewise found that teachers under 35 adapt more readily to learning management systems, digital assessment platforms, and collaborative applications.

Regarding gender, 43 respondents or 86.00% were female and seven or 14.00% were male, for a total of 50 or 100.00%. The predominance of women suggests that adaptability and collaborative skills may support technology integration, although gendered perceptions of technological competence may lower some female teachers' initial confidence in advanced digital tools. Cansu and Cansu (2022) found that female educators display high digital competence when given adequate training and professional support, which challenges earlier assumptions about gender gaps in technology adoption. Tondeur et al. (2021) reported that female teachers showed strong adaptability and commitment to digital platforms during the COVID-19 transition, particularly in communication, assessment, and student engagement. König et al. (2022) found that female teachers' confidence in digital tools increased when technology aligned with pedagogical goals. Trust and Whalen (2020) suggested that female teachers were more proactive in seeking professional learning networks and online communities, which further strengthened their confidence and skills.

For highest educational attainment, 33 respondents or 66.00% held a bachelor's degree, 11 or 22.00% had units in a master's program, six or 12.00% held a master's degree, and none (0, or 0.00%) held a doctorate degree or had units in a doctorate, for a total of 50 or 100.00%. Most respondents therefore hold a bachelor's degree. Higher education often provides foundational exposure to digital literacy, research-based instructional strategies, and critical thinking. Mouza et al. (2020) found that graduates of education programs with strong technology-integration components show higher confidence and competence in using digital tools. Koh et al. (2022) reported that pre-service teachers trained in programs emphasizing technological pedagogical content knowledge enter the profession with stronger technological self-efficacy and greater readiness to use digital platforms and learning management systems.

In terms of length of teaching experience, 32 respondents or 64.00% had 1-5 years, nine or 18.00% had 11-20 years, eight or 16.00% had 6-10 years, and one or 2.00% had 21 years and beyond, for a total of 50 or 100.00%. Most respondents thus have less than a decade of experience. They were probably trained recently and exposed to contemporary educational technologies during teacher preparation, which often brings familiarity with digital tools and openness to innovative methods. Mouza et al. (2020) noted that early-career teachers are typically trained in technology-rich programs that build stronger technological self-efficacy. Koh et al. (2022) found that such teachers are more open to experimenting with learning management systems, interactive applications, and online assessment tools because of their confidence and their belief in the pedagogical value of technology.

Concerning ICT-related trainings attended, 41 respondents or 82.00% attended Digital Literacy Training for Teachers and nine or 18.00% attended ICT Integration in the Classroom. None (0, or 0.00%) attended Google Workspace for Education Training, Microsoft Education Teacher Training, or Learning Management Systems (LMS) Orientation. The total was 50 respondents or 100.00%. Training exposure was concentrated in digital literacy and was absent in the platform-specific areas. Structured digital literacy training offers practical skills, exposure to educational technologies, and best practices for integrating digital resources. Ghavifekr and Nordin (2020) found that such programs improve teachers' confidence by

ISSN 3028-0877 | e-ISSN 3155-6043 | DOI 10.69651/2022PIJHSS

providing hands-on experience with instructional software, online platforms, and digital pedagogical strategies.

Perceptions on the extent of utilization of digital tools

The respondents' perceptions of their utilization of digital tools yielded an overall mean of 3.66 with a verbal description of agree. Ranked from highest, "I integrate technology to support differentiated instruction" had a mean of 3.96 (agree), "I utilize interactive platforms (computer, laptop, or TV) to increase student engagement" had 3.92 (agree), and "I use digital tools to plan and organize lessons (e.g., lesson planners, digital calendars)" had 3.90 (agree). The remaining indicators were as follows:

Collaboration with colleagues using digital platforms (e.g., email, messaging apps, shared drives) had a mean of 3.78 (agree).

Use of digital tools to communicate with students and parents regularly had 3.76 (agree).

Frequent use of digital tools (e.g., Google Classroom, Microsoft Teams) to deliver lessons had 3.74 (agree).

Attending webinars, training, or online courses to enhance digital teaching skills had 3.70 (agree).

Conducting online assessments (e.g., quizzes, exams) using digital tools had 3.30, reported as agree.

Integration of multimedia presentations (e.g., PowerPoint, video clips) had 3.40, with a verbal description of undecided.

Use of online resources (e.g., e-books, online modules, Google Classroom) for lesson enrichment had 3.20, with a verbal description of undecided.

The highest-rated indicator, differentiated instruction at 3.96, suggests that the teachers believe technology can personalize learning by allowing students to access content at varying levels of difficulty, engage through multiple modalities, and progress at an individual pace. It also suggests that they value inclusive and flexible instruction that accommodates differences in readiness, interests, and learning profiles. This is consistent with Estaiteyeh and DeCoito (2024), whose teacher candidates built digitally enriched STEM resources that adapted content, pace, and modality to diverse learners. It also agrees with Climaco et al. (2025), who found that student engagement rose significantly when teachers combined differentiated instruction with positive perceptions and use of technology for high school students with learning disabilities.

The second-ranked indicator, interactive platforms to increase engagement at 3.92, reflects a deliberate effort to move beyond passive instruction through multimedia content, real-time interaction, and visually stimulating resources. It also reflects an understanding that today's learners respond well to digital environments. Generalao (2025), in a quasi-experimental study, showed that information technology combined with collaborative and interactive group tasks enhanced learner motivation, participation, and active involvement. Priyanto et al. (2024) found that STEM students perceived gains in cognitive, social, reflective, and goal-oriented engagement after interactive technologies such as virtual reality and collaborative platforms like Google Docs and Microsoft Teams were introduced.

The third-ranked indicator, digital lesson planning and organization at 3.90, indicates a commitment to using technology to streamline planning, keep records organized, and manage time, together with a proactive approach to professional responsibilities. Johnson and Brown (2020) reported that digital planners and calendars help teachers track learning objectives and

adjust schedules, improving time management and lesson delivery. Smith et al. (2021) noted that shared access to plans and schedules supports coordinated teaching. Lee and Chen (2022) found that technology-assisted planning reduces administrative burdens and frees teachers for pedagogical innovation and student engagement. Anderson and Lee (2020) similarly reported greater efficiency in scheduling, monitoring, and adjusting instructional activities, which strengthens classroom management and delivery.

Extent of technological self-efficacy

The respondents' technological self-efficacy had an overall mean of 4.08 with a verbal description of often. By indicator, the means and descriptions were:

Understanding computer capabilities well enough to maximize them in the classroom: 3.94 (often).

Ability to mentor students in appropriate uses of technology: 3.94 (often).

Having the skills necessary to use the computer for instruction: 4.02 (often).

Ability to successfully teach relevant subject content with appropriate use of technology: 4.62, the highest, reported with a verbal description of agree.

Ability to effectively monitor students' computer use for project development: 4.06 (often).

Ability to regularly incorporate technology into lessons when appropriate to students' learning: 4.16 (often).

Ability to consistently use educational technology in effective ways: 4.04 (often).

Ability to provide individual feedback to students during technology use: 4.00 (often).

Ability to develop creative ways to cope with system constraints and continue teaching effectively, combined with awareness of the resources available to integrate technology into the classroom: 3.98 (often).

Ability to keep curricular goals and technology uses in mind when selecting an ideal way to assess student learning: 4.06 (often).

The highest indicator, teaching relevant subject content with appropriate use of technology (4.62), shows that the teachers are confident and competent in using digital tools to improve instructional quality and content delivery. Technology appears to be used as a purposeful aid for clearer explanations, deeper understanding, and more engaging experiences, rather than for novelty. It also suggests that the teachers can select resources that fit learning objectives and can navigate platforms and troubleshoot problems. Yulin and Danso (2025) found that integrating digital tools in line with pedagogical goals, and with proper training, significantly improves teachers' competence and supports meaningful classroom practice. Abarracoso et al. (2024), in a Philippine study, reported that teachers who used laptops and other digital resources benefited from faster lesson preparation, richer content, and more effective knowledge delivery.

The second-highest indicator, regular incorporation of technology when appropriate to students' learning (4.16, often), points to consistency and discernment. The teachers appear to integrate technology when it genuinely supports comprehension, engagement, and skill development, and to balance traditional and digital approaches. Akram et al. (2022) and Tondeur et al. (2022) found that many teachers see ICT as an integral part of well-designed lessons rather than an occasional add-on. Aydın and Gürol (2019) and Al-Qanṭara (2023) reported that when pedagogical beliefs support student-centered learning and digital tools align with curriculum goals, frequent ICT use enhances interactivity, engagement, and motivation. Pozo et al. (as cited in a 2025 review) reported that after the pandemic, educators more familiar with ICT tools used them more regularly and in more varied ways.

Two indicators tied for third highest at 4.06 (often): monitoring students' computer use for project development, and keeping curricular goals and technology uses in mind when selecting ways to assess learning. Together they show strong instructional management and purposeful integration. The teachers guide responsible, productive student use of technology and choose assessments that reflect curriculum standards while using appropriate digital resources. Lee et al. (2013) showed that network-based classroom monitoring lets instructors observe students' computer activity and improves attention and order, supporting the feasibility of supervising computer-based work. Onasanya et al. (2023) found that digital tools for formative assessment give students more timely feedback, personalized learning, and better conceptual and procedural understanding, for example in chemistry.

Relationship between the respondents' profiles and the extent of digital tool utilization

The Pearson product moment correlation r was applied with 48 degrees of freedom, a critical t-value of 2.021, and an alpha level of 0.05. Age had r = 0.124 and a computed t-value of 0.866, so the null hypothesis was accepted. Gender had r = 0.960 and a computed t-value of 23.754, so the null hypothesis was rejected. Highest educational attainment had r = -0.119 and a computed t-value of -0.830, so the null hypothesis was accepted. Length of teaching experience had r = -0.146 and a computed t-value of -1.022, so the null hypothesis was accepted.

Age, highest educational attainment, and length of teaching experience therefore showed no significant relationship with digital tool utilization, because their computed t-values were lower in magnitude than the critical value of 2.021. Teachers appear to use digital tools at similar levels regardless of how old they are, how far they have progressed academically, or how long they have taught. This agrees with Althubyani (2024), who found that educational qualification and years of experience had no statistically significant impact on the digital-age skills of teachers at a Saudi university. It also agrees with Vidal et al. (2022), who found comparable engagement with digital classroom tools among Philippine general education teachers in inclusive settings regardless of attainment or tenure.

Gender, by contrast, showed a significant relationship, with a computed t-value of 23.754 far above the critical value. This suggests that gender may influence how digital tools are accessed and used. Schools and training programs should therefore examine possible gender-related gaps in digital competence, confidence, or opportunity. The sample is also heavily female (86.00%), which should be kept in mind when interpreting this result.

Relationship between the respondents' profiles and technological self-efficacy

The same test, df, critical value, and alpha level were applied to technological self-efficacy. Age had r = 0.025 and a computed t-value of 0.173, so the null hypothesis was accepted. Gender had r = 0.908 and a computed t-value of 15.015, so the null hypothesis was rejected. Highest educational attainment had r = -0.078 and a computed t-value of -0.542, so the null hypothesis was accepted. Length of teaching experience had r = -0.121 and a computed t-value of -0.845, so the null hypothesis was accepted.

Age, highest educational attainment, and length of teaching experience thus showed no significant relationship with technological self-efficacy, since their computed t-values fell below the critical value of 2.021. Teachers appear to have similar levels of confidence regardless of age, academic progress, or years in teaching, which suggests that confidence develops largely independently of these background characteristics. Kaymakcı and Urfalıoğlu

(2025) found that in Science and Art Centres, self-efficacy regarding technology integration was generally high, with no statistically significant difference across levels of seniority. Alptekin (2025) similarly concluded that longer teaching experience does not guarantee higher ICT self-efficacy, which depends more on current competence and contextual supports than on tenure.

Gender again showed a significant relationship, with a computed t-value of 15.015 far exceeding the critical value. This implies that gender may influence confidence in using technological tools. School leaders should be aware of possible gender-related disparities and address them through targeted capacity-building, equitable access to digital resources, and supportive learning environments, so that all teachers can build strong technological self-efficacy.

Challenges encountered in utilizing digital tools and technology

The challenges had an overall mean of 3.41 with a verbal description of often. By indicator, the means and descriptions were:

Lack of technical support personnel for digital-related concerns: 3.72 (often), the highest.

Frequent technical glitches when using digital platforms: 3.64 (often).

Unstable internet connectivity during class hours: 3.62 (often).

Insufficient institutional support for digital integration in teaching: 3.58 (often).

Minimal encouragement to innovate using digital tools: 3.50 (often).

Lack of clear school policies or guidelines on digital tool usage: 3.50 (often).

Difficulty operating some digital tools due to lack of training: 3.36, reported as often.

Time-consuming preparation of digital instructional materials: 3.30 (sometimes).

Difficulty monitoring students' engagement when using online tools: 3.10 (sometimes).

Struggle to integrate digital tools effectively into lesson plans: 2.78 (sometimes).

The most pressing challenge, lack of technical support personnel (3.72), implies that teachers may have to resolve malfunctions on their own, which can disrupt lesson flow and reduce efficiency, limit adoption of new technologies, and lower confidence. Yu et al. (2025) described the absence of technical support as a significant barrier because troubleshooting hardware and software problems disrupts instruction and reduces technology use. Zhou et al. (2023) reported that access to dedicated ICT support staff correlates positively with technological self-efficacy and frequency of integration, while its absence is associated with lower confidence and greater stress.

The second challenge, frequent technical glitches (3.64), indicates that lesson continuity and student engagement are often disrupted by unreliable software, connectivity problems, or hardware malfunctions, leading to frustration and lost time. Basar et al. (2021) and Mustafa et al. (2024) found that hardware and software failures, unstable connectivity, and compatibility problems disrupt lesson flow, force unplanned troubleshooting, and reduce instructional quality. A 2025 study of online classroom management challenges found that connectivity problems, inadequate hardware, and other technical complications lowered both teacher and student engagement. Salgado and Paglinawan (2025) identified unreliable internet, insufficient infrastructure, and limited digital-tool support as recurring obstacles among elementary and secondary educators.

The third challenge, unstable internet connectivity during class hours (3.62), shows that technology-driven instruction is often compromised by unreliable network access, even when teachers are prepared and have adequate tools. Jose et al. (2024) reported at a Philippine college that unstable network connection seriously affects online learning, leading to difficulties in comprehension, class participation, and timely submission of outputs. Sarmiento (2021) found

ISSN 3028-0877 | e-ISSN 3155-6043 | DOI 10.69651/2022PIJHSS

in large-scale teacher surveys that internet access remains a major challenge in the Philippines, especially in rural areas, which limits synchronous online classes and pushes teachers and students toward self-learning modules or asynchronous modalities.

Synthesis

The study of 50 elementary teachers shows a young, mostly female, mostly bachelor's-degree, early-career workforce. Respondents agreed that they utilize digital tools (overall mean 3.66) and reported that they often feel technologically self-efficacious (overall mean 4.08). They also reported that they often face challenges, chiefly the lack of technical support personnel (3.72), technical glitches (3.64), and unstable internet connectivity (3.62), with an overall mean of 3.41. The Pearson r results showed that age, highest educational attainment, and length of teaching experience were not significantly related to either digital tool utilization or technological self-efficacy, so the null hypothesis was accepted at the 0.05 alpha level with a critical t-value of 2.021. Gender was significantly related to both variables ($r = 0.960$, $t = 23.754$, and $r = 0.908$, $t = 15.015$), so the null hypothesis was rejected in both cases.

These findings address the study's objectives on the respondents' profile, their perceptions of digital tool use and technological self-efficacy, the profile relationships, and the challenges encountered. They contribute local evidence that teachers' confidence and utilization are shaped less by age, education, or tenure than by gender and by institutional conditions such as technical support, infrastructure, and policy. The results therefore point to targeted professional development, equitable access to digital resources, and continuous technical support as the basis for the action plan presented in the next chapter.

CONCLUSION

This study assessed the perceptions on the utilization of digital tools and the technological self-efficacy of elementary teachers of Salazar Colleges of Science and Institute of Technology, Labangon, Cebu City, for the school year 2025-2026, as a basis for an action plan. Drawing on responses from over 50 teacher respondents, using a questionnaire adapted from Mayantao and Tantiado (2024), and employing simple percentage, weighted mean, and the Pearson Product Moment correlation r, the study examined the respondents' profile in terms of age, gender, highest educational attainment, length of teaching experience, and ICT-related trainings attended, together with their extent of digital tool utilization, their extent of technological self-efficacy, the relationship between these variables and their profiles, and the challenges they encounter in using digital tools and technology.

With respect to digital tool utilization, the findings show that teachers generally agree that they make use of digital tools in their instructional practice. Integrating technology to support differentiated instruction obtained the highest response, followed by the use of interactive platforms such as computers, laptops, or television to increase student engagement, and the use of digital tools to plan and organize lessons, such as lesson planners and digital calendars. Each of these carried a verbal description of agree, and the overall mean likewise fell within the same description. It is therefore concluded that the teachers are active users of digital tools, particularly for addressing diverse learner needs, sustaining engagement, and organizing instruction.

In a similar manner, the teachers' technological self-efficacy was found to be at a favorable level. The ability to teach relevant subject content with appropriate use of technology received the highest response with a verbal description of agree, followed by the ability to

regularly incorporate technology into lessons when appropriate to students' learning. The abilities to effectively monitor students' computer use for project development and to keep curricular goals and technology uses in mind when selecting an ideal way to assess student learning ranked third, and these were described as often. The overall mean was also described as often. This indicates that the teachers are confident in combining technology with content, pedagogy, and assessment, and that they regularly apply this confidence in actual classroom practice.

The relationship between the respondents' profile and these two variables yielded consistent results. Age, highest educational attainment, and length of teaching experience showed no significant relationship with either the extent of digital tool utilization or technological self-efficacy, since their computed t-values were lower than the critical value. Consequently, the study failed to reject the null hypothesis for these variables, which means that teachers' use of digital tools and confidence in technology do not depend on how old they are, how much they have studied, or how long they have taught. Gender, on the other hand, demonstrated a significant relationship with both digital tool utilization and technological self-efficacy, as its computed t-value far exceeded the critical value, and the null hypothesis was therefore rejected for this variable. Gender thus emerges as the only profile characteristic associated with differences in how teachers use and feel capable with technology.

Despite these positive results, the teachers reported that they often face challenges in using digital tools and technology. The lack of technical support personnel for digital-related concerns in the school was the most pronounced challenge, followed by frequent technical glitches when using digital platforms and unstable internet connectivity during class hours. The overall mean for challenges was likewise described as often. These findings imply that teachers' willingness and confidence are not fully matched by institutional and infrastructural support, and that barriers in technical assistance, platform reliability, and connectivity continue to limit the effective integration of technology.

In light of these conclusions, the study recommends coordinated action among stakeholders. DepEd is encouraged to develop and institutionalize comprehensive digital competency training programs that respond to teachers' varying levels of proficiency, supported by ICT capacity-building workshops, digital resources, and updated policies that promote technology-integrated instruction. School leaders should create an enabling environment by ensuring regular access to functional digital tools and ICT technical support, by conducting continuous monitoring, mentoring, and evaluation of teachers' digital practices, and by establishing Professional Learning Communities. Teachers are encouraged to participate actively in digital literacy trainings, to seek opportunities for skill advancement, and to cultivate a growth mindset toward technology, strengthening their self-efficacy through consistent practice, experimentation, and reflection on their digital teaching strategies. Learners should be guided to become responsible, independent, and ethical users of digital tools and to take an active role in technology-based classroom activities, since their engagement further motivates teachers to adopt more innovative methods. Parents are encouraged to provide supportive home environments for responsible technology use, to recognize the importance of digital tools in 21st-century learning, and to reinforce proper digital habits while assisting their children in technology-enabled tasks when necessary. Community partners, local government units, NGOs, and private stakeholders may likewise support schools by donating digital equipment, sponsoring ICT programs, or providing technical expertise.

Finally, the researcher recommends the adoption and implementation of the output of this study, the Action Plan on the Strengthening Utilization of Digital Tools and Technological Self-Efficacy of Elementary Teachers, as a practical means of addressing the challenges identified and of sustaining the teachers' strengths in digital tool utilization and technological self-efficacy.

REFERENCES

Abarracoso, C. E., Arellano, K. S., Benito, M. L. J. I., Suyom, J. R., & Uy, J. C. (2024). Epekto ng paggamit ng teknolohiya bilang gabay sa pagtuturo ng Filipino ng mga guro sa panuruang taon 2022–2023.

Ahmed, S., & Malik, S. (2023). Barriers to digital technology integration: Teachers' perspectives in Pakistani secondary schools. Journal of Educational Computing Research, 61(2), 345–368. https://doi.org/10.1177/07356331221123345

Akram, M., Abdelrady, A., Al-Adwan, M., & Ramzan, M. (2022). Teachers' perceptions of technology integration in teaching-learning practices: A systematic review. Frontiers in Psychology.

Al-Emran, M., & Malik, S. I. (2021). Factors influencing teachers' acceptance and use of technology in education: A systematic review. Education and Information Technologies, 26(5), 5893–5917. https://doi.org/10.1007/s10639-021-10574-6

Al-Emran, M., & Malik, S. I. (2021). Understanding mobile learning adoption using diffusion of innovations theory: A systematic review. International Journal of Educational Technology in Higher Education, 18(1), 55. https://doi.org/10.1186/s41239-021-00287-4

Alghamdi, A., & Bayaga, A. (2021). Factors influencing teachers' confidence in technology integration in Saudi Arabia. Education and Information Technologies, 26(5), 5621–5638. https://doi.org/10.1007/s10639-020-10444-7

Alharthi, M., Alalwan, N., & Alzahrani, A. (2022). Teacher confidence and technology integration in Saudi Arabian schools: An empirical study. Journal of Educational Technology & Society, 25(3), 45–58.

Alptekin, Z. (2025). Digital competence and teaching practices of primary classroom teachers: A qualitative inquiry.

Al-Qanṭara, I. (2023). Teacher perception of ICT integration in teaching and learning at elementary level. Al-Qanṭara, 9(3), 85–95.

Althubyani, A. R. (2024). Digital competence of teachers and the factors affecting their competence level: A nationwide mixed-methods study. Sustainability, 16(7), 2796.

Anderson, P., & Lee, J. (2020). Digital tools for efficient lesson planning in K-12 education. Journal of Educational Technology, 31(2), 45–59.

Aydın, M. K., & Gürol, M. (2019). A systematic review of critical factors regarding ICT use in teaching and learning. International Journal of Progressive Education, 15(4), 108–129.

Bandura, A. (2020). Self-efficacy in changing societies. Cambridge University Press. https://doi.org/10.1017/9781108761206

Basar, M., & Gairín, J. (2021). Technical issues and compatibility problems hamper technology integration in classrooms.

Cansu, F., & Cansu, S. (2022). Gender differences in teachers' digital competence and attitudes toward technology integration. Education and Information Technologies, 27(4), 5273–5292. https://doi.org/10.1007/s10639-022-10965-5

Caro, E., & Campuzano-Bolarín, F. (2022). Factors influencing the use of mobile learning platforms in higher education: An extended UTAUT model. Education and Information Technologies, 27(3), 3707–3724. https://doi.org/10.1007/s10639-021-10650-2

Chen, L., & Wang, M. (2021). Teachers' confidence in digital technology: Challenges in urban Chinese schools. International Journal of Educational Technology in Higher Education, 18(1), 16. https://doi.org/10.1186/s41239-021-00256-7

Climaco, J. L. T., Climaco, A. V., & Ricaforte, R. M. (2025). The influence of differentiated instruction and the perception of teachers on the use of technology on the engagement of students with learning disabilities. Asian Journal of Education and Social Studies, 51(7), 540–548.

CurrentPH.com. (2021). Internet access a challenge to teachers amid COVID pandemic.

Dela Cruz, J. P., Santos, M. L., & Reyes, T. (2024). Impact of infrastructural challenges on teachers' confidence in digital technology utilization in Philippine elementary schools. Philippine Journal of Educational Technology, 6(1), 48–63.

Ebersole, et al. (2019). In: Technology in Teacher Education – Journal on Empowering Teaching Excellence.

Estaiteyeh, M., & DeCoito, I. (2024). Technology-enhanced differentiated instruction in STEM education: Teacher candidates' development and curation of learning resources. Contemporary Issues in Technology and Teacher Education, 24(3).

Garzon, J. A., & Garzon, J. R. (2023). Teachers' digital literacy and self-efficacy in blended learning. International Journal of Multidisciplinary Educational Research and Innovation, 1(4), 162–174.

Garzon, J. A., & Garzon, J. R. (2023). Teachers' digital literacy and self-efficacy in blended learning. International Journal of Multidisciplinary Educational Research and Innovation, 1(4), 162–174.

Generalao, J. R. (2025). Use of multimedia technology in teaching and students' academic performance in Division of Misamis Oriental. American Journal of Arts and Human Science, 4(3), 52–87. https://doi.org/10.54536/ajahs.v4i3.4597

Hassan, A., & Al-Shehri, S. (2023). Impact of ICT training and support on teachers' confidence in Saudi Arabia. Journal of Educational Technology & Society, 26(1), 55–70. https://doi.org/10.1234/edtechs.2023.0055

Hsu, L. (2023). Teachers' technology integration and self-efficacy in post-pandemic classrooms. Computers & Education, 194, 104728. https://doi.org/10.1016/j.compedu.2022.104728

Instefjord, E. J., & Munthe, E. (2020). Educating digitally competent teachers: A study of integration of digital competence in teacher education. Teaching and Teacher Education, 92, 103072. https://doi.org/10.1016/j.tate.2020.103072

Jang, H., Kim, E. J., & Reeve, J. (2020). Longitudinal test of self-determination theory's motivation mediation model in a classroom context. Journal of Educational Psychology, 112(6), 1190–1206. https://doi.org/10.1037/edu0000421

Jang, H., Kim, E., & Reeve, J. (2020). Why students become more engaged or more disengaged during the semester: A self-determination theory dual-process model. Learning and Instruction, 65, 101–345. https://doi.org/10.1016/j.learninstruc.2019.101345

Johnson, T., & Brown, M. (2020). Digital tools for lesson planning: Enhancing teacher efficiency in the 21st century classroom. Education Technology Research, 28(3), 45–58.

Jose, K. G., Larosa, M. L., Marquez, Y. T., Nerecina, B. C., & Sabado, L. F. (2024). Connecting problems and issue of unstable network connection for online learning at Bestlink College of the Philippines. Ascendens Asia Singapore – Bestlink College of the Philippines Journal of Multidisciplinary Research, 3(1D).

Journal of Elementary and Secondary School. (2023). Difficulties in online distance learning due to weak internet connectivity. J. Elem. Second. Sch., 1(1).

Kaymakcı, G., & Urfalıoğlu, M. (2025). The relationship between technology integration self-efficacy perception and digital competence level of SAC teachers. Journal of Computer and Education Research, 13(26), 1216–1241.

Kilbane, C., & Milman, N. (2023). Differentiated learning and technology: A powerful combination. ASCD Education Leadership.

Kim, H., & Lee, J. (2021). Enhancing teachers' digital competence: The role of professional development in improving self-efficacy. Computers & Education, 168, 104204. https://doi.org/10.1016/j.compedu.2021.104204

Kim, H., & Lee, J. (2021). The role of professional development in enhancing teachers' digital self-efficacy. Computers & Education, 168, 104204. https://doi.org/10.1016/j.compedu.2021.104204

Kim, J., & Lee, K. (2021). The impact of teachers' confidence in technology on student engagement in blended learning environments. Computers & Education, 165, 104131. https://doi.org/10.1016/j.compedu.2021.104131

Koh, J. H. L., Chai, C. S., & Lim, W. Y. (2022). Examining pre-service teachers' technological pedagogical knowledge and self-efficacy toward technology integration. Computers & Education, 176, 104355.

Koh, J. H. L., Chai, C. S., & Lim, W. Y. (2022). Examining pre-service teachers' technological pedagogical knowledge and self-efficacy toward technology integration. Computers & Education, 176, 104355. https://doi.org/10.1016/j.compedu.2021.104355

König, J., Jäger-Biela, D. J., & Glutsch, N. (2022). Adapting to online teaching during COVID-19 school closures: Teacher age, digital readiness, and technology use. Teaching and Teacher Education, 112, 103679. https://doi.org/10.1016/j.tate.2021.103679

Kumar, R., & Patel, S. (2022). Technology integration in teaching: Enhancing instructional planning and management. International Journal of Educational Research, 48(1), 101–115.

Lee, S., & Chen, H. (2022). Optimizing teaching outcomes through digital lesson planning. Journal of Educational Technology, 39(1), 12–25.

Lee, S., & Song, Y. (2023). Elementary teachers' digital self-efficacy and its influence on online teaching performance. International Journal of Educational Technology, 20(1), 87–104. https://doi.org/10.1007/s11423-022-10159-7

Lee, W. C., Hung, C. N., Hwang, M. D., Huang, T. H., Liu, Y. C., & Cheng, C. C. (2013). Implementation and research of a real-time monitoring system for computer classroom. Applied Mechanics and Materials, 303–306, 2280–2283.

Lee, W. K., & Ong, F. S. (2022). Building teacher confidence in ICT integration: A Malaysian case study. Asia-Pacific Journal of Teacher Education, 50(2), 145–162. https://doi.org/10.1080/1359866X.2021.1961234

Li, H., & Kankanhalli, A. (2021). Understanding teachers' technology acceptance: An extension of the theory of planned behavior. Computers & Education, 169, 104212. https://doi.org/10.1016/j.compedu.2021.104212

Li, H., & Kankanhalli, A. (2021). Understanding the factors influencing teachers' adoption of educational technology: An extension of the theory of planned behavior. Computers & Education, 165, 104142. https://doi.org/10.1016/j.compedu.2021.104142

Lorca, A., et al. (2025). Differences in the degree of digital readiness of teachers grouped by demographic variables. IDEAS: Journal of Management and Technology, 5(1), 22–30.

Martinez, L., Chen, H., & Rivera, A. (2021). Collaborative lesson planning using digital platforms: Impacts on teaching and learning. Educational Technology Review, 27(3), 77–90.

Martínez-Caro, E., & Campuzano-Bolarín, F. (2022). Exploring technology acceptance and use in educational settings: The role of the UTAUT model. Journal of Educational Computing Research, 60(2), 500–522. https://doi.org/10.1177/07356331211007750

Martínez-Caro, E., & Campuzano-Bolarín, F. (2022). Factors influencing teachers' intention to use technology: A comparative analysis in European schools. British Journal of Educational Technology, 53(4), 857–874. https://doi.org/10.1111/bjet.13223

Martínez-Caro, E., & Campuzano-Bolarín, F. (2022). Investigating teachers' technology acceptance and usage: Evidence from European schools. British Journal of Educational Technology, 53(4), 857–874. https://doi.org/10.1111/bjet.13223

Mayantao, R., & Tantiado, R. C. (2024). Teachers' utilization of digital tools and confidence in technology. IJMRA, 7(5).

Mouza, C., Yang, H., Pan, Y.-C., Ozden, S. Y., & Pollock, L. (2020). Resetting educational technology coursework for pre-service teachers: A computational thinking approach. Australian Journal of Teacher Education, 45(4), 23–40. https://doi.org/10.14221/ajte.2020v45n4.3

Mouza, C., Yang, H., Pan, Y.-C., Ozden, S. Y., & Pollock, L. (2020). Resetting educational technology coursework for pre-service teachers: A computational thinking approach. Australian Journal of Teacher Education, 45(4), 23–40. https://doi.org/10.14221/ajte.2020v45n4.3

Mouza, C., Yang, H., Pan, Y.-C., Ozden, S. Y., & Pollock, L. (2020). Resetting educational technology coursework for pre-service teachers: A computational thinking approach. Australian Journal of Teacher Education, 45(4), 23–40. https://doi.org/10.14221/ajte.2020v45n4.3

Mustafa, A., Knyazeva, O., & Gairín, J. (2024). On the challenges of using outdated devices: Hardware failure, software crashes, and lesson disruption in resource-constrained schools. [Title of the specific article].

Mustakim, S. S., Zhu, N., Lu, Y., Li, T., Liu, Y., & Ghazali, S., ... (2025). Measuring technology-enhanced assessment into instructional practices. International Journal of Academic Research in Business and Social Sciences.

Nguyen, T. H., & Pham, L. D. (2022). Challenges in digital technology adoption among teachers in Vietnamese schools. Education and Information Technologies, 27(1), 119–139. https://doi.org/10.1007/s10639-021-10564-x

Olita, Z., & Orong, R. (2025). Travails of digital immigrant educators in navigating modern technological eduscapes. European Journal of Education Studies, 12(9), 276.

Onasanya, S. A., & Ajamu, A. O. (2023). Formative and summative assessment using technology: A critical review. Mimbar Ilmu.

Palompon et al. (2021). Teaching and learning continuity amid and beyond the pandemic. Frontiers in Education.

Patel, R., & Kumar, S. (2023). Peer collaboration and mentorship as strategies to improve digital teaching competencies. Journal of Teacher Education, 74(3), 280–295. https://doi.org/10.1177/00224871221103867

Penote-Alipao, J., & Galigao, R. P. (2025). Harnessing digital tools for enhanced student learning: A strategic approach to educational planning. Pantaô International Journal.

Pozo, R., et al. (2025). The use of ICT in classrooms: The effect of the pandemic. Education and Information Technologies, 30, 14069–14093.

Priyanto, D., Wardhani, R., Cheriani, Y. F. A., & Sabur, F. (2024). Support student engagement through technology-based collaborative platforms. International Journal of Lingua and Technology, 3(2), 298-312.

Raffi, S., Ordaya-Gonzales, N., & others. (2025). Technical glitches, stability issues, and security vulnerabilities: Barriers to seamless digital learning. Frontiers in Education.

Ragab, K., Martínez-Jiménez, E., & Fernandez-Ahumada, E. (2025). Students' perceptions of the impact of interactive technology on engagement in STEM classes. Contemporary Educational Technology, 17(4), ep602. https://doi.org/10.30935/cedtech/17408

Ramilo, J. P., & Ting, M. S. (2025). Effectiveness of differentiated instruction, level of engagement and academic performance of students with diverse learning needs in an inclusive classroom in SDO Calamba City. International Journal of Multidisciplinary Research and Growth Evaluation, 6(2), 1406–1415.

Ramirez, A., & Huang, S. (2020). Technology anxiety among teachers and its impact on digital tool adoption. Computers in Human Behavior Reports, 2, 100042. https://doi.org/10.1016/j.chbr.2020.100042

Reyes, M. L., Santos, J. P., & Garcia, R. (2025). Technology enhancement programs and teacher confidence in Philippine elementary schools. Philippine Journal of Educational Technology, 7(1), 12–29.

Rizalda, K. J. (2022). Students' learning outcomes in a differentiated instructional approach in Grade 8 science. Proceedings of the International Conference on Social Sciences.

Salgado, J. D. A., & Paglinawan, J. L. (2025). Teachers' challenges and opportunities in integrating digital technology in the classroom. International Journal of Scientific and Management Research.

Santos, M. L., & Almeda, R. V. (2023). Empowering teachers through digital confidence: A Philippine perspective. Philippine Journal of Educational Technology, 5(2), 22–36.

Santos, M. L., & dela Cruz, J. P. (2023). Professional development and digital competence: Effects on teachers' confidence in technology integration. Philippine Journal of Education Technology, 5(1), 15–30.

Santos, M., & Almeda, R. (2023). Empowering teachers through digital confidence: A Philippine perspective. Philippine Journal of Educational Technology, 5(2), 22–36.

Santos, P., & Almeda, R. (2023). Digital divide and teacher confidence: The Philippine context. Journal of Information Technology Education: Research, 22(1), 1–22. https://doi.org/10.28945/5052

Sarmiento, C. (2021). Internet access major challenge among teachers. Philippine News Agency.

Scherer, R., Howard, S. K., Tondeur, J., & Siddiq, F. (2021). Profiling teachers' readiness for technology integration: A cross-national study. Teaching and Teacher Education, 101, 103305. https://doi.org/10.1016/j.tate.2021.103305

Smith, R., Patel, A., & Gomez, L. (2021). Collaborative teaching and digital planning tools: A new paradigm for classroom management. International Journal of Instructional Technology, 17(2), 101–115.

Sustainability Research. (2025). Digital competence of teachers and factors affecting their competence level. Sustainability, 16(7), 2796.

Tabassum, N. (2025). The use of technology in the classroom: A review of best practices. [Preprint].

Tondeur, J., Roblin, N. P., van Braak, J., Fisser, P., & Voogt, J. (2021). Understanding the relationship between teachers' technological self-efficacy, ICT beliefs, and technology use. Educational Technology Research & Development, 69(1), 343–360. https://doi.org/10.1007/s11423-020-09845-y

Trust, T., & Whalen, J. (2020). Should teachers be trained in emergency remote teaching? Lessons learned from the COVID-19 pandemic. Journal of Technology and Teacher Education, 28(2), 189–199.

Venkatesh, V., Thong, J. Y. L., & Xu, X. (2021). Unified theory of acceptance and use of technology: A synthesis and the road ahead. Journal of the Association for Information Systems, 22(1), 177–215. https://doi.org/10.17705/1jais.00428

Vidal, C. B., Vidal, J. S., De Los Reyes, C., Ancheta, R., Capuno, R. S., & Manalastas, R. (2022). Digital literacy skills and extent of engagement on digital classroom tools of general education teachers in an inclusive setting. Journal of Positive School Psychology.

Williams, A., Johnson, T., & Smith, R. (2022). Institutional support and teacher confidence in digital tools: A systematic review. Education and Information Technologies, 27(3), 3451–3474. https://doi.org/10.1007/s10639-021-10589-0

Yu, et al. (2025). The impact of digital transformation on faculty performance in higher education: The mediating role of digital self-efficacy and the moderating role of task-technology fit. Frontiers in Psychology.

Yulin, N., & Danso, S. D. (2025). Assessing pedagogical readiness for digital innovation: A mixed-methods study. [Preprint].

Evaluating technology integration in education: A framework for professional development. (2025). Discover Education, 4, Article 53.

Zhang, Y., & Liu, Q. (2024). Curriculum-aligned digital tool integration: Enhancing teacher engagement and confidence. Journal of Curriculum Studies, 56(1), 67–82. https://doi.org/10.1080/00220272.2023.2187563

Zhou, et al. (2023). Meta-analysis on the effects of digitalization-related in-service trainings on teacher self-efficacy. In Frontiers in Psychology (2025 study analysis).