

**Technology integration in classroom instruction, digital competence, and challenges
encountered by the public elementary school teachers**

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ABSTRACT

This study examined the level of technology integration in classroom instruction, digital competence, and the challenges encountered by teachers, as well as the relationship between respondents' profile variables and these key constructs. A descriptive-correlational research design was employed with 109 teacher-respondents. Data were gathered using a structured questionnaire and analyzed through descriptive statistics and multiple regression analysis. Findings revealed that teachers demonstrated a very high level of technology integration in terms of frequency of use, perceived usefulness, ease of use, confidence, and administrative support. Similarly, digital competence was found to be very high across all domains, including technological knowledge, technological pedagogical knowledge, technological content knowledge, problem-solving and adaptability, digital safety and ethical awareness, and digital creativity and innovation. Among these, digital safety and ethical awareness obtained the highest mean, indicating strong adherence to responsible digital practices. Despite these positive findings, teachers still encountered very high levels of challenges in technology integration. The most prominent barriers included limited access to digital devices and ICT infrastructure, poor internet connectivity, insufficient training opportunities, time constraints in lesson planning, student-related factors, and inadequate administrative support. Regression analysis further revealed that digital tools available at school significantly influenced both digital competence and integration challenges, while most demographic variables showed no significant effects. The study concludes that while teachers are highly competent and actively integrating technology in instruction, systemic and institutional limitations continue to hinder full digital transformation. It is recommended that schools strengthen ICT infrastructure, improve internet connectivity, provide continuous professional development, and establish supportive policies and collaborative learning structures such as District-based Learning Action Cells (DLAC) to sustain effective technology integration.

Keywords: Technology integration, digital competence, ICT Infrastructure, teacher challenges, classroom instruction.

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INTRODUCTION

The integration of digital technology into contemporary education has fundamentally transformed the landscape of teaching and learning, positioning digital competence as a critical requirement for educators in the 21st century. As educational institutions worldwide continue to adopt innovative technological systems, the role of teachers has expanded beyond traditional instructional delivery to include the effective facilitation of digital learning environments. This transformation has shifted the discourse from mere access to technological devices toward the capacity of educators to utilize digital tools strategically, ethically, and pedagogically. Consequently, the effectiveness of technology integration in classrooms is increasingly determined not by the availability of technological resources alone, but by the competence, adaptability, and instructional readiness of teachers who implement these tools in daily educational practice. Within this evolving educational paradigm, the persistent gap between technological infrastructure and teachers' actual preparedness has emerged as a significant concern that affects the quality and sustainability of digital instruction.

The mere presence of a computer in a classroom no longer guarantees a modern education because, without a competent teacher to utilize it effectively, technology becomes little more than expensive furniture. Globally, the digital divide has evolved from issues of physical access to concerns regarding instructional mastery and pedagogical application. Although international educational standards advocate immersive and technology driven learning experiences, many educational systems continue to struggle in moving beyond the basic use of digital tools. This stagnation occurs because successful technology integration is influenced more significantly by teacher competence and psychological readiness than by infrastructure alone (Iivari, 2020). Across various educational settings, the transition toward digital education has demonstrated that educators remain the most influential factor in determining the success of technology implementation. Without a comprehensive understanding of how digital tools align with instructional goals, technologically equipped classrooms often revert to traditional teaching approaches where digital devices merely function as electronic substitutes for conventional instructional materials rather than instruments that promote collaboration, innovation, and active learning.

In the Philippine educational context, this challenge acquires a more specific national dimension through the Department of Education's aggressive digitalization initiatives and the implementation mandates of the Enhanced Basic Education Act of 2013. Despite substantial efforts to modernize public education through the procurement and distribution of digital resources, a considerable disconnect persists between the deployment of technological infrastructure and the actual digital readiness of educators. National programs frequently prioritize hardware acquisition while giving comparatively less attention to the technical instability and psychological pressures associated with rapid digital transition, both of which significantly influence the effective integration of technology into classroom instruction (Asio & Bayucca, 2021). The recent transition toward blended learning environments further exposed these systemic weaknesses by revealing that many teachers possess only basic digital literacy and often lack the advanced competencies required to independently troubleshoot technical problems or facilitate sophisticated virtual learning environments effectively.

At the local level, these challenges become particularly evident within the South District of the Division of Butuan City. Public elementary school teachers in this district encounter unique instructional demands because, unlike secondary educators who specialize in a single discipline, elementary teachers are required to integrate technology across multiple subject areas simultaneously. This multidisciplinary responsibility necessitates a high degree of adaptive digital competence and instructional flexibility. Furthermore, teachers in the South Butuan District operate within educational environments characterized by intermittent internet

connectivity, inadequate technical support, and unstable technological systems, conditions that transform routine digital instruction into a potentially high risk educational endeavor. In this context, the present study focuses specifically on examining the relationship between teachers' levels of digital competence, their actual practices in technology integration, and the challenges encountered within public elementary schools in the district.

The significance of this research extends to school administrators, policymakers, and educators because it provides a comprehensive understanding of the current digital instructional landscape within public elementary schools. The findings are expected to serve as a practical basis for designing targeted professional development initiatives that address specific technical and pedagogical deficiencies rather than relying on generalized training approaches. By identifying the challenges encountered by teachers, the Department of Education may better allocate resources, improve support systems, and establish sustainable mechanisms that strengthen meaningful technology integration in classroom instruction. In this way, technology integration may evolve from being a superficial institutional requirement into a functional and impactful educational practice that directly enhances teaching and learning experiences.

The study is delimited to public elementary school teachers within the South Butuan District during the academic year 2025 to 2026. It specifically examines the relationship between teachers' digital competence, their actual practices in technology integration, and the common challenges encountered in classroom instruction. Other variables, including student academic performance and school funding levels, are excluded in order to maintain a focused examination of teachers' professional experiences and technical readiness within the identified district. Ultimately, the study asserts that successful classroom technology integration is not merely a consequence of available hardware but is fundamentally determined by the interaction between teachers' digital competence and their ability to navigate the systemic and technical challenges inherent in the public school environment of South Butuan District.

The literature relevant to this study synthesizes scholarly discussions regarding technology integration, digital competence, and the challenges encountered by public elementary school teachers within digitally evolving educational environments. The conceptual literature establishes the theoretical and philosophical foundations of the study by defining key constructs and clarifying the relationships among the variables under investigation. Through this conceptual grounding, the study develops a structured framework for understanding how technology intersects with instructional practices and the professional realities experienced by teachers in public elementary schools. Simultaneously, the research literature draws from recent theses, dissertations, and empirical investigations concerning educational technology integration to identify existing patterns, emerging concerns, and persistent research gaps related to teachers' digital readiness and instructional adaptation.

The foundational premise of this study is anchored on the evolving concept of digital technology integration, which is defined as the intentional and strategic application of digital tools to support instruction and enhance student learning outcomes. Sellami and Santhosh (2024) emphasized that technology integration extends far beyond physical access to devices or occasional computer use within classroom settings. Instead, effective integration involves a deliberate pedagogical process in which digital tools are selected and utilized according to clearly defined learning objectives rather than technological novelty. Such integration promotes a cohesive instructional environment where digital resources contribute directly to curriculum delivery and student engagement, thereby ensuring that technology functions as a support mechanism for pedagogy rather than a replacement for sound instructional design.

Building upon this conceptualization, true technology integration represents a transformative pedagogical shift in which digital tools facilitate active learning and collaborative knowledge construction. Shang (2021) argued that technology should not merely function as an additional instructional component or as a digital substitute for conventional paper based tasks. Rather, it should fundamentally alter how students engage with information, communicate with peers, and participate in the learning process. Through meaningful integration, classrooms become dynamic learning environments where digital platforms enable instructional experiences that were previously unattainable, including real time collaboration and immersive virtual simulations. Such integration encourages learners to become active participants in constructing knowledge while simultaneously developing critical 21st century competencies.

Despite rapid technological advancements, classroom instruction remains the core mechanism through which educational objectives are delivered and achieved. Kuen Yi Lin (2022) described classroom instruction as a multifaceted process involving guided interaction that facilitates the progression of learners from curiosity to mastery. Contemporary instructional practice is no longer viewed as a passive transmission of information but rather as a carefully designed educational experience that accommodates diverse learning pathways and varying student needs. Teachers are therefore required to harmonize curriculum standards, instructional resources, and learner characteristics into cohesive educational experiences. Within this framework, high quality instruction serves as the central vehicle through which digital literacy, critical thinking, and other educational goals are cultivated.

Central to effective classroom instruction is the concept of digital competence, which is regarded as a multidimensional construct encompassing technical proficiency, pedagogical understanding, and ethical awareness. Stella Timotheou (2022) emphasized that digital competence requires educators to develop digital fluency that enables them to navigate the opportunities and complexities of digitalized learning environments confidently and responsibly. Teachers must therefore possess not only the operational skills necessary to utilize digital devices but also the pedagogical judgment required to select appropriate tools, evaluate digital content critically, and ensure inclusive learning opportunities for all students. A digitally competent teacher is capable of leveraging technology in ways that foster equitable and meaningful educational experiences.

The structural dimensions of digital competence are often explained through the Technological Pedagogical Content Knowledge framework. Within this framework, Technological Knowledge refers to a teacher's foundational understanding of digital hardware and software systems. Clark Wilson (2020) explained that this knowledge includes operational familiarity with devices such as interactive displays and tablets, as well as software platforms and productivity applications. Technological Knowledge serves as the essential foundation upon which more advanced forms of digital integration are built because insufficient technical familiarity often results in frustration, resistance, and reduced confidence in adopting educational technologies.

Complementing technical familiarity is Technological Pedagogical Knowledge, which pertains to a teacher's understanding of how teaching and learning processes are transformed through the application of specific digital tools. Clark Wilson (2020) noted that this form of knowledge enables educators to identify the pedagogical affordances of technological platforms and apply them appropriately within instructional settings. Teachers possessing strong Technological Pedagogical Knowledge are capable of adopting innovative instructional strategies that promote student centered learning, such as using digital polling tools for formative assessment or collaborative applications for group interaction. In this sense, technology becomes an instrument for enhancing instructional effectiveness rather than an additional source of complexity.

Similarly, Technological Content Knowledge refers to the specialized understanding of how technology may be utilized to represent subject matter in more meaningful and interactive ways. According to Clark Wilson (2020), this competency enables teachers to select discipline specific technologies that improve conceptual understanding and facilitate deeper engagement with academic content. For example, digital simulations may be used in science instruction to illustrate abstract molecular processes, while dynamic visualization software may assist in explaining mathematical concepts. Such applications ensure that technology remains directly relevant to the subject matter being taught and contributes meaningfully to students' comprehension of lesson content.

In the practical implementation of these competencies, digital problem solving and adaptability emerge as essential capabilities that allow teachers to troubleshoot technical issues and modify instructional strategies in response to technological disruptions. Karakose (2021) explained that adaptability also reflects a teacher's willingness to continuously learn and adjust to emerging technologies and changing instructional demands. Teachers who possess adaptability perceive technological change as an opportunity for professional growth rather than a source of anxiety. This quality becomes especially significant within public school contexts where immediate technical assistance may not always be available during instructional delivery.

Parallel to technical competence is the importance of digital safety and ethical awareness, which involves understanding issues related to copyright, data privacy, and responsible online behavior. Teachers bear the professional responsibility of modeling digital citizenship for students by demonstrating ethical conduct within digital environments. Stella Timotheou (2022) emphasized that educators must proactively teach students how to evaluate online information critically, protect personal data, and avoid harmful online practices such as cyberbullying and plagiarism. Integrating ethical awareness into classroom instruction therefore contributes to the development of responsible and informed digital citizens.

To further strengthen instructional innovation, digital creativity and innovation refer to an educator's capacity to design original multimedia resources and personalized learning materials rather than relying solely on standardized content. Asio and Bayucca (2021) suggested that innovative educators utilize technology to transform students from passive consumers of information into active creators of knowledge. This may involve activities such as digital storytelling, student produced multimedia projects, or interactive module development that align with local culture and learner interests. Through creative technology integration, classrooms become environments that encourage experimentation, collaboration, and authentic student expression.

The adoption of digital tools is also strongly influenced by perceived usefulness, which refers to the extent to which teachers believe that technology enhances instructional effectiveness and professional performance. Nikolopoulou (2020) observed that educators are more likely to adopt technologies that improve efficiency, facilitate student understanding, or simplify instructional tasks such as grading and classroom management. Consequently, teachers' perceptions regarding the practical value of technology significantly shape their willingness to integrate digital tools consistently into instructional practice.

Closely related to usefulness is the concept of ease of use, which pertains to the degree to which educators perceive technology as manageable and free from excessive cognitive or physical effort. Nikolopoulou (2020) explained that technologies characterized by steep learning curves or complicated operational procedures often discourage sustained use among teachers, particularly those already burdened by heavy instructional and administrative responsibilities. Simplicity, reliability, and intuitive design are therefore essential

characteristics that support long term engagement with educational technology and reduce resistance to adoption.

The interaction of these internal competencies and perceptions contributes to what is described as instructional readiness, a multidimensional state involving technical proficiency, psychological confidence, and organizational support. Deedra Vargo (2020) noted that readiness reflects a teacher's sense of preparedness to manage the demands of a digital classroom effectively. This preparedness extends beyond technical skill to include the motivation and confidence required to implement innovative instructional practices despite potential obstacles. Teachers who feel professionally supported and adequately trained are more likely to demonstrate sustained commitment to technology integration.

However, instructional readiness is frequently constrained by systemic challenges that hinder technology adoption within educational institutions. Yinghui Shi (2020) described these challenges as first order barriers that include inadequate infrastructure, insufficient funding, and limited technical support. Such barriers often remain outside the direct control of teachers yet significantly affect their instructional decisions and technology integration practices. Even highly motivated educators may struggle to sustain digital instruction in environments characterized by unreliable equipment or insufficient technological resources.

Addressing these barriers requires strong Information and Communication Technology infrastructure, which encompasses the collective hardware, software, and networking systems available within a school. Berisha and Bytyqi (2020) emphasized that infrastructure must be sufficiently reliable to support daily instructional activities consistently. This includes not only the availability of technological devices but also the presence of functional projectors, charging stations, maintenance systems, and updated software resources. A stable and well maintained infrastructure communicates institutional commitment to digital transformation and supports teachers in implementing technology based instruction confidently.

Equally important is internet connectivity, which has become an essential prerequisite for accessing cloud based resources, virtual platforms, and real time information in modern classrooms. Attaran (2020) argued that without stable and high speed internet access, teachers remain restricted to offline activities that significantly limit opportunities for collaboration, research, and interactive learning. Reliable connectivity therefore functions as the operational foundation of digitalized educational systems and contributes directly to educational equity across different school settings.

To strengthen teachers' capacity to navigate these demands, professional development opportunities serve as structured learning experiences that bridge the gap between basic digital literacy and pedagogical mastery. Rahiem (2021) emphasized that effective professional development must be continuous, collaborative, and grounded within actual classroom contexts. Short term workshops alone are often insufficient to produce meaningful instructional transformation. Instead, teachers require sustained opportunities for hands on practice, peer collaboration, and ongoing technical support that reinforce confidence and innovation in technology integration.

A recurring challenge associated with digital instruction is time allocation, which involves balancing the increased cognitive demands of preparing technology based lessons with existing instructional responsibilities. Iivari (2020) highlighted that the absence of dedicated preparation time for evaluating digital content, troubleshooting technical issues, and organizing digital resources remains a pervasive barrier to effective integration. Teachers frequently perceive technology as an additional burden rather than a supportive instructional aid, particularly when implementation demands exceed available preparation time.

The success of digital transformation initiatives is also strongly influenced by administrative support, which encompasses the leadership, encouragement, and institutional culture fostered by school administrators. Goh (2020) posited that supportive leadership

involves more than simply providing hardware because it also requires cultivating a professional environment that values innovation, experimentation, and continuous learning. Administrators who actively promote technology integration and recognize innovative practices contribute significantly to teachers' confidence and willingness to adopt new instructional methods.

Finally, the District based Learning Action Cell serves as a collaborative professional development mechanism that addresses localized instructional concerns through peer mentoring and collective problem solving. Alabdulaziz (2021) noted that localized and teacher driven professional learning communities are often more effective than centralized training programs because they respond directly to contextualized instructional needs. Through collaborative sharing of experiences and practical solutions, District based Learning Action Cells provide sustainable opportunities for continuous professional growth and support within digitally evolving educational environments.

Statement of the problem

This study aims to examine the technology integration in classroom instruction, digital competence, and challenges encountered by the public elementary school teachers in South Butuan District, DepEd Schools Division of Butuan City during the School Year 2025-2026 with the end view of proposing a District-based Learning Action Cell (DLAC). Specifically, this study seeks to answer the following questions:

1. What is the profile of the respondents in terms of age, sex, civil status, highest educational attainment, position, school, grade level handled, teaching load in minutes, number of years in teaching, digital tools available at school, and number of relevant seminars or trainings attended?
2. What is the extent of the respondents' technology integration in classroom instruction in terms of frequency of use of digital tools and resources, usefulness of technology in enhancing teaching and learning, ease of use in applying technology in instructional practices, confidence and competency in integrating technology into lessons, and support and resources provided by the school administration for technology integration?
3. What is the digital competence of the respondents in terms of technological knowledge, technological pedagogical knowledge, technological content knowledge, digital problem solving and adaptability, digital safety and ethical awareness, and digital creativity and innovation?
4. What challenges do the respondents encounter in integrating technology in classroom instruction in terms of access to digital devices and ICT infrastructure, access to internet connectivity, training and professional development opportunities, time allocation for lesson planning and instructional delivery, student related factors, and administrative and institutional support?
5. Is there a significant relationship between the profile of the respondents and their technology integration in classroom instruction?
6. Is there a significant relationship between the profile of the respondents and their digital competence?
7. Is there a significant relationship between the profile of the respondents and the challenges encountered in integrating technology in classroom instruction?
8. Is there a significant relationship among the respondents' technology integration in classroom instruction, digital competence, and challenges encountered?

9. Based on the findings of the study, what District-based Learning Action Cell can be proposed?

METHODOLOGY

This chapter presents the methodological framework employed to examine the technology integration in classroom instruction, digital competence, and challenges encountered by public elementary school teachers in the South Butuan District, Division of Butuan City during the School Year 2025-2026. The discussion integrates the research design, sampling procedures, respondents, research instruments, data gathering procedures, data processing techniques, statistical treatments, and ethical considerations adopted in the conduct of the study. The methodological procedures were carefully structured to ensure the validity, reliability, and accuracy of the data gathered while safeguarding the welfare and rights of the respondents throughout the research process.

The study utilized a Descriptive-Correlational Research Design to systematically investigate and analyze the relationship between the identified variables, specifically focusing on technology integration, digital competence, and challenges encountered by public elementary school teachers. The descriptive component focused on providing an accurate factual account of the current conditions without manipulation of variables. This approach was essential for quantifying the respondents' profiles and determining the extent of their technology integration, digital competence, and the severity of the challenges encountered in the South Butuan District. The correlational component was employed to determine the strength and direction of the relationships between the teachers' profiles and their instructional practices. This design was particularly appropriate for testing the significant associations between digital competence, integration frequency, and existing barriers. Through the synthesis of these two approaches, the study provided an empirical basis for proposing a targeted District-based Learning Action Cell (DLAC), ensuring that the intervention was grounded in objective needs and measurable realities.

The study utilized Stratified Random Sampling to select a total of 109 respondents from a population of 150 public elementary school teachers in the South District, Division of Butuan City. This sampling technique ensured that each school within the district was proportionally represented, thereby allowing a more accurate and generalized reflection of the district's teaching force. By dividing the population into strata based on their respective schools, the researcher captured the diverse technical competencies and instructional readiness levels across different primary education settings. This systematic approach was essential for a correlational design because it provided a reliable statistical basis for examining how teacher profiles, such as age, educational attainment, and teaching experience, influenced their digital competence and the challenges they encountered. The selection process involved identifying the total population (N) per school and calculating the required sample size (n) to ensure that the collected data were representative and suitable for the objectives of the study.

The distribution of respondents involved 16 public elementary schools within the South District, Division of Butuan City. Amparo Central Elementary School had a population of 20 teachers with 10 respondents representing 9.17% of the sample. Bitan-agan Elementary School had a population of 7 teachers with all 7 included in the sample, accounting for 6.42%. Bugabus Elementary School had a population of 8 teachers with all 8 selected, representing 7.34%. Calaitan Elementary School had a population of 8 with 4 respondents comprising 3.67% of the sample. Danapa Elementary School had 6 teachers with 4 respondents representing 3.67%. Dankias Elementary School had a population of 8 with 6 respondents or 5.50%. Dulag Elementary School had 14 teachers with 8 respondents accounting for 7.34%. Emelda Mar Elementary School had a population of 9 teachers with all 9 included, representing 8.26%. La

Soledad Elementary School had 8 teachers with all 8 selected or 7.34%. Manila de Bugabus Elementary School had 9 teachers with all 9 included, accounting for 8.26%. Salvacion Elementary School had 4 teachers with 2 respondents representing 1.83%. San Mateo Annex Elementary School had 12 teachers with 10 respondents accounting for 9.17%. San Mateo Old Elementary School had a population of 3 teachers with all 3 selected, representing 2.75%. Sta. Cruz Elementary School had 10 teachers with 7 respondents or 6.42%. Tungao Central Elementary School had a population of 20 teachers with 10 respondents representing 9.17%. West Tungao Elementary School had 4 teachers with all 4 included, accounting for 3.67%. In total, the study involved 150 teachers with a final sample size of 109 respondents representing 100.00% of the target sample distribution.

The proportional representation of respondents across the 16 schools ensured a balanced and statistically sound distribution of participants. Larger institutions such as Amparo Central Elementary School and Tungao Central Elementary School each contributed 9.17% to the total sample, while smaller schools such as Salvacion Elementary School contributed 1.83%. Several schools achieved a 100% representation rate wherein all teachers within the specific strata were included to ensure comprehensive data collection. This strategic distribution strengthened the validity and generalizability of the findings concerning technology integration and digital competence among public elementary school teachers across the district.

The primary instrument used for data collection was a research-made survey questionnaire structured using a 5-point Likert scale format. The instrument was organized into four sections aligned with the research variables. The first section focused on the teachers' profile and gathered demographic and professional information. The second section measured the extent of technology integration in terms of frequency of use of digital tools and resources, usefulness of technology in enhancing teaching and learning, ease of use in applying technology in instructional practices, confidence and competency in integrating technology into lessons, and support and resources provided by school administration for technology integration. The third section assessed digital competence through technological knowledge, technological pedagogical knowledge, technological content knowledge, digital problem solving and adaptability, digital safety and ethical awareness, and digital creativity and innovation. The fourth section identified challenges encountered in technology integration, including barriers related to infrastructure, connectivity, training, time constraints, and institutional support.

The questionnaire items were specifically developed to reflect the educational context of the South Butuan District during the School Year 2025-2026. Contemporary indicators such as Smart TV usage, cloud storage utilization, and digital netiquette were incorporated to capture the modern complexities of digital instruction in elementary education. The comprehensive structure of the instrument ensured that the data collected directly informed the proposed District-based Learning Action Cell (DLAC) by addressing the localized challenges and measurable competencies of public elementary school teachers.

The study followed a systematic three phase procedure to ensure an organized and efficient data collection process within the South Butuan District. During the pre-data gathering phase, the researcher secured the necessary approvals and permissions from the Office of the Graduate School, the Division Office, and the District Office to access the teachers who served as respondents. Upon obtaining administrative clearance, orientation sessions were conducted to inform the participants regarding the purpose of the study, the confidentiality of their responses, and the voluntary nature of their participation. To ensure the validity and reliability

of the research-made questionnaire, the instrument underwent pilot testing among a small group of teachers to assess clarity and comprehensibility before the actual data collection.

During the actual data gathering phase, the questionnaires were distributed in both printed and electronic formats to the 109 selected respondents. Clear instructions were provided to ensure accurate assessment of the teachers' digital competence, technology integration, and challenges encountered. The respondents were given sufficient time to answer all items carefully and thoroughly, while the researcher remained available to address questions and clarify misconceptions throughout the process. All completed questionnaires were collected systematically, and respondents were encouraged to review their answers to prevent missing data and preserve the integrity of the findings.

In the post-data gathering phase, the collected data were organized, coded, and prepared for statistical analysis. Responses from the 5-point Likert scale were numerically encoded to facilitate quantitative treatment, including frequency counts, percentages, weighted means, and correlation tests to determine significant relationships between teacher profiles and technical proficiencies. This rigorous process ensured the accuracy and reliability of the information gathered, thereby providing evidence-based insights necessary for proposing a targeted District-based Learning Action Cell (DLAC). Throughout the conduct of the study, the researcher encountered and addressed several challenges, including logistical difficulties in reaching remote schools, unreliable internet connectivity that disrupted electronic surveys, and limited respondent availability due to heavy instructional workloads.

The study followed a systematic data processing procedure to ensure the accuracy and reliability of the findings. Upon retrieval of the survey instruments, all responses were consolidated and checked for inconsistencies, with invalid questionnaires excluded from the final dataset. Valid responses were encoded in Microsoft Excel and assigned numerical values based on the 1-5 Likert scale responses. Demographic variables including age, sex, educational attainment, position, and years of teaching experience were similarly coded using a standard format. The cleaned dataset was subsequently imported for statistical analysis to determine the levels of technology integration, digital competence, and challenges encountered by the respondents.

Scoring procedures were conducted at both subscale and composite levels to assess the primary research variables. For technology integration, mean values were computed for frequency of use, usefulness, ease of use, confidence, and administrative support. Digital competence was evaluated across several domains, including technological knowledge (TK), technological pedagogical knowledge (TPK), and technological content knowledge (TCK). Challenges related to infrastructure, connectivity, training, and time constraints were likewise scored and ranked to identify the most significant barriers encountered by the teachers. Prior to inferential analysis, data normality was verified using the Kolmogorov-Smirnov test to justify the use of parametric statistical tests.

The data were processed using four primary statistical tools. Frequency and Percentage Distribution were utilized to summarize the demographic profiles of the respondents. Weighted Mean was employed to determine the extent of technology integration, digital competence, and severity of challenges encountered. Pearson Product-Moment Correlation Coefficient (Pearson r) was used to test significant associations between teacher profiles and their competencies, while Multiple Regression Analysis was conducted to determine whether the main variables exhibited significant relationships when analyzed collectively. These statistical procedures provided a reliable analytical foundation for proposing a District-based Learning Action Cell (DLAC) tailored to the identified needs of public elementary school teachers in the South District, Division of Butuan City.

The ethical conduct of the study prioritized respect, fairness, and integrity through several established measures. Informed consent was obtained from all respondents to ensure

that they fully understood the purpose of the study and their right to withdraw at any time without penalty. Confidentiality and privacy were strictly maintained by anonymizing all personal and demographic information and storing the collected data securely, accessible only to the researcher for academic purposes. The study likewise upheld honesty and integrity by ensuring that all findings were reported accurately based on verified evidence without fabrication or misrepresentation.

To address challenges ethically, the researcher implemented strategies that protected the welfare of the participants throughout the study. When logistical difficulties and heavy workloads complicated data collection, flexible scheduling arrangements were provided alongside both digital and printed survey options to respect the teachers' professional responsibilities and availability. In addressing the digital divide experienced in remote schools, the researcher ensured that limited internet connectivity did not marginalize respondents by providing offline support mechanisms to maintain inclusivity. Through transparent acknowledgment of study limitations and the maintenance of professional boundaries, the researcher ensured that the conduct of the study did not compromise the voluntary participation or psychological well-being of the respondents.

RESULTS AND DISCUSSION

This chapter presents the analysis, interpretation, and discussion of the data gathered from the 109 respondents included in the study. The findings are grounded on the responses obtained through the research instrument administered to the participants and are interpreted in direct relation to the objectives of the study. The discussion integrates the descriptive and analytical results using appropriate statistical treatments to examine the respondents' demographic profile and its possible implications on instructional practices and technology integration. Specifically, the chapter discusses the profile of the respondents in terms of age, sex, civil status, highest educational attainment, position, school, grade level handled, teaching load, number of years in teaching, digital tools available at school, and number of relevant seminars or trainings attended. The interpretation of the findings is supported by relevant literature and empirical studies cited in the study to provide a deeper understanding of the contextual and professional realities experienced by public elementary school teachers.

In terms of age, the findings revealed that out of the 109 respondents, 50 or 45.9% belong to the age bracket of 30–39 years old, making it the most represented age category among the respondents. This was followed by teachers aged 40–49 years old with 40 respondents or 36.7%. Meanwhile, 12 respondents or 11.0% belong to the 50–59 age bracket, while 6 respondents or 5.5% are within the 20–29 age range. The least represented age category was 60 years old and above with only 1 respondent or 0.9%. The distribution indicates that the teaching workforce in the selected public elementary schools is largely composed of middle-aged educators who are considered to be in their mature and productive professional years. The dominance of respondents within the 30–49 age range suggests that most participants already possess substantial teaching experience, classroom management skills, and professional exposure that may contribute positively to instructional delivery and technology integration in the classroom.

The findings further imply that teachers belonging to the middle-age categories may exhibit a balance between professional maturity and adaptability to educational innovations. Educators within this age range are often viewed as experienced enough to effectively manage instructional responsibilities while remaining capable of adjusting to evolving educational technologies and pedagogical approaches. Their substantial representation in the respondent

population may therefore indicate the presence of a teaching workforce that possesses both instructional competence and the potential to integrate digital tools into classroom instruction effectively. The relatively low percentage of younger teachers aged 20–29 years old, which comprised only 5.5%, may indicate limited recruitment opportunities for newly licensed educators or possible challenges in retaining beginning teachers within the public school system. Similarly, the minimal representation of teachers aged 60 years old and above at 0.9% suggests that most educators retire before reaching that age or that only a few remain actively engaged in classroom teaching within public elementary schools. Overall, the findings portray a workforce largely composed of experienced yet professionally active educators.

The result supports the empirical findings of Abel (2022), who emphasized that demographic variables such as age significantly influence teachers' readiness and confidence in utilizing digital tools and educational technologies. Abel explained that younger educators are generally more exposed to digital environments and therefore tend to exhibit greater familiarity and comfort with modern technologies. However, the study also emphasized that age alone does not determine pedagogical effectiveness in technology integration because experienced teachers frequently compensate through strong instructional strategies, classroom expertise, and pedagogical competence. The findings of the current study align with this observation because the majority of respondents belong to age groups that likely possess both professional experience and sufficient exposure to technological developments in education.

Similarly, Mane (2025) noted that teachers with longer years of teaching service generally demonstrate strong content mastery and instructional expertise but may encounter challenges when integrating advanced technological tools into classroom instruction. According to the study, older educators often rely on traditional instructional resources and may require continuous professional development to effectively maximize the use of interactive technologies and Learning Management Systems (LMS). The present findings are consistent with this perspective because the age profile of the respondents reflects the presence of a mature teaching population that may benefit from continuous seminars, workshops, and technological support programs. The findings therefore suggest that age remains a significant factor in understanding teachers' digital readiness, instructional adaptability, and professional development needs. Since most respondents belong to the middle-age category, school administrators may capitalize on their professional maturity while simultaneously strengthening their technological competencies through sustained training initiatives and institutional support mechanisms designed to bridge generational differences in technology integration practices.

In terms of sex, the findings revealed that out of the 109 respondents, 95 or 87.2% are female, while only 14 or 12.8% are male. The data clearly indicate that the teaching profession in the selected public elementary schools is predominantly occupied by women. The overwhelming representation of female teachers reflects the long-standing trend within elementary education where women comprise the majority of the teaching workforce. Teaching at the elementary level has traditionally been associated with nurturing, empathy, patience, and child-centered care, characteristics that are frequently linked to women in many social and cultural contexts. Consequently, a larger number of women tend to pursue careers in elementary education compared to men.

The predominance of female respondents may also influence instructional approaches, communication styles, and classroom management practices within the school environment. Female educators are often perceived as more nurturing, supportive, and emotionally responsive to learners' developmental needs, which may contribute positively to pupils' academic achievement and emotional well-being. Furthermore, the high proportion of female teachers may indicate stronger participation of women in professional development activities, instructional innovations, and educational reforms within the district. Their substantial

representation in the teaching profession may therefore play a significant role in shaping the instructional culture and pedagogical practices implemented in public elementary schools.

The relatively low percentage of male respondents, comprising only 12.8% of the total population, suggests that fewer men are entering or remaining in the elementary teaching profession. This imbalance may be influenced by prevailing social perceptions regarding gender roles, occupational preferences, and economic considerations that affect career choices among males. Despite their smaller representation, male teachers continue to contribute significantly to instructional diversity, school leadership, classroom management, and role modeling among learners. Their presence within the educational setting remains valuable in promoting balanced perspectives and varied teaching approaches in elementary education.

The findings may also have implications for teachers' digital readiness and technology integration practices. According to Abel (2022), demographic variables such as sex may influence teachers' confidence, exposure, and attitudes toward technological tools and digital instruction. Although both male and female teachers are capable of integrating technology effectively into classroom instruction, differences in access to technological resources, training opportunities, and technological experiences may shape their instructional practices and levels of digital competence. Abel further explained that female educators often demonstrate strong pedagogical commitment and willingness to adopt educational technologies when provided with adequate training, institutional support, and professional development opportunities. This observation is relevant to the current study because female teachers comprise the overwhelming majority of respondents.

Furthermore, Mane (2025) explained that successful technology integration depends more on institutional support systems, professional development programs, and teachers' willingness to learn rather than on gender differences alone. Teachers who receive sufficient administrative support, technological resources, and relevant training opportunities are more likely to demonstrate higher levels of technological competence regardless of sex. This finding supports the present study's objective of examining teachers' technology integration practices in relation to their demographic characteristics. The predominance of female respondents therefore highlights the importance of ensuring that professional development programs remain inclusive, responsive, and supportive of the instructional and technological needs of both male and female educators.

The findings suggest that elementary education within the selected public schools remains female-dominated, consistent with trends observed in many educational systems locally and internationally. Although sex differences may shape certain professional experiences, effective technology integration ultimately depends on teachers' openness to innovation, institutional support, access to digital resources, and continuous professional development opportunities. Schools and educational administrators should therefore continue promoting gender-inclusive training initiatives and technological support programs that strengthen teachers' digital competencies, instructional effectiveness, and adaptability to the evolving demands of contemporary education.

This chapter presents the analysis, interpretation, and discussion of the data gathered from the 109 respondents included in the study. The findings are grounded on the responses obtained through the research instrument administered to the participants and are interpreted in direct relation to the objectives of the study. The discussion integrates the descriptive and analytical results using appropriate statistical treatments to examine the respondents' demographic profile and its possible implications on instructional practices and technology integration. Specifically, the chapter discusses the profile of the respondents in terms of age, sex, civil status, highest educational attainment, position, school, grade level handled, teaching

load, number of years in teaching, digital tools available at school, and number of relevant seminars or trainings attended. The interpretation of the findings is supported by relevant literature and empirical studies cited in the study to provide a deeper understanding of the contextual and professional realities experienced by public elementary school teachers.

In terms of age, the findings revealed that out of the 109 respondents, 50 or 45.9% belong to the age bracket of 30–39 years old, making it the most represented age category among the respondents. This was followed by teachers aged 40–49 years old with 40 respondents or 36.7%. Meanwhile, 12 respondents or 11.0% belong to the 50–59 age bracket, while 6 respondents or 5.5% are within the 20–29 age range. The least represented age category was 60 years old and above with only 1 respondent or 0.9%. The distribution indicates that the teaching workforce in the selected public elementary schools is largely composed of middle-aged educators who are considered to be in their mature and productive professional years. The dominance of respondents within the 30–49 age range suggests that most participants already possess substantial teaching experience, classroom management skills, and professional exposure that may contribute positively to instructional delivery and technology integration in the classroom.

The findings further imply that teachers belonging to the middle-age categories may exhibit a balance between professional maturity and adaptability to educational innovations. Educators within this age range are often viewed as experienced enough to effectively manage instructional responsibilities while remaining capable of adjusting to evolving educational technologies and pedagogical approaches. Their substantial representation in the respondent population may therefore indicate the presence of a teaching workforce that possesses both instructional competence and the potential to integrate digital tools into classroom instruction effectively. The relatively low percentage of younger teachers aged 20–29 years old, which comprised only 5.5%, may indicate limited recruitment opportunities for newly licensed educators or possible challenges in retaining beginning teachers within the public school system. Similarly, the minimal representation of teachers aged 60 years old and above at 0.9% suggests that most educators retire before reaching that age or that only a few remain actively engaged in classroom teaching within public elementary schools. Overall, the findings portray a workforce largely composed of experienced yet professionally active educators.

The result supports the empirical findings of Abel (2022), who emphasized that demographic variables such as age significantly influence teachers' readiness and confidence in utilizing digital tools and educational technologies. Abel explained that younger educators are generally more exposed to digital environments and therefore tend to exhibit greater familiarity and comfort with modern technologies. However, the study also emphasized that age alone does not determine pedagogical effectiveness in technology integration because experienced teachers frequently compensate through strong instructional strategies, classroom expertise, and pedagogical competence. The findings of the current study align with this observation because the majority of respondents belong to age groups that likely possess both professional experience and sufficient exposure to technological developments in education.

Similarly, Mane (2025) noted that teachers with longer years of teaching service generally demonstrate strong content mastery and instructional expertise but may encounter challenges when integrating advanced technological tools into classroom instruction. According to the study, older educators often rely on traditional instructional resources and may require continuous professional development to effectively maximize the use of interactive technologies and Learning Management Systems (LMS). The present findings are consistent with this perspective because the age profile of the respondents reflects the presence of a mature teaching population that may benefit from continuous seminars, workshops, and technological support programs. The findings therefore suggest that age remains a significant factor in understanding teachers' digital readiness, instructional adaptability, and professional

development needs. Since most respondents belong to the middle-age category, school administrators may capitalize on their professional maturity while simultaneously strengthening their technological competencies through sustained training initiatives and institutional support mechanisms designed to bridge generational differences in technology integration practices.

In terms of sex, the findings revealed that out of the 109 respondents, 95 or 87.2% are female, while only 14 or 12.8% are male. The data clearly indicate that the teaching profession in the selected public elementary schools is predominantly occupied by women. The overwhelming representation of female teachers reflects the long-standing trend within elementary education where women comprise the majority of the teaching workforce. Teaching at the elementary level has traditionally been associated with nurturing, empathy, patience, and child-centered care, characteristics that are frequently linked to women in many social and cultural contexts. Consequently, a larger number of women tend to pursue careers in elementary education compared to men.

The predominance of female respondents may also influence instructional approaches, communication styles, and classroom management practices within the school environment. Female educators are often perceived as more nurturing, supportive, and emotionally responsive to learners' developmental needs, which may contribute positively to pupils' academic achievement and emotional well-being. Furthermore, the high proportion of female teachers may indicate stronger participation of women in professional development activities, instructional innovations, and educational reforms within the district. Their substantial representation in the teaching profession may therefore play a significant role in shaping the instructional culture and pedagogical practices implemented in public elementary schools.

The relatively low percentage of male respondents, comprising only 12.8% of the total population, suggests that fewer men are entering or remaining in the elementary teaching profession. This imbalance may be influenced by prevailing social perceptions regarding gender roles, occupational preferences, and economic considerations that affect career choices among males. Despite their smaller representation, male teachers continue to contribute significantly to instructional diversity, school leadership, classroom management, and role modeling among learners. Their presence within the educational setting remains valuable in promoting balanced perspectives and varied teaching approaches in elementary education.

The findings may also have implications for teachers' digital readiness and technology integration practices. According to Abel (2022), demographic variables such as sex may influence teachers' confidence, exposure, and attitudes toward technological tools and digital instruction. Although both male and female teachers are capable of integrating technology effectively into classroom instruction, differences in access to technological resources, training opportunities, and technological experiences may shape their instructional practices and levels of digital competence. Abel further explained that female educators often demonstrate strong pedagogical commitment and willingness to adopt educational technologies when provided with adequate training, institutional support, and professional development opportunities. This observation is relevant to the current study because female teachers comprise the overwhelming majority of respondents.

Furthermore, Mane (2025) explained that successful technology integration depends more on institutional support systems, professional development programs, and teachers' willingness to learn rather than on gender differences alone. Teachers who receive sufficient administrative support, technological resources, and relevant training opportunities are more likely to demonstrate higher levels of technological competence regardless of sex. This finding supports the present study's objective of examining teachers' technology integration practices

in relation to their demographic characteristics. The predominance of female respondents therefore highlights the importance of ensuring that professional development programs remain inclusive, responsive, and supportive of the instructional and technological needs of both male and female educators.

The findings suggest that elementary education within the selected public schools remains female-dominated, consistent with trends observed in many educational systems locally and internationally. Although sex differences may shape certain professional experiences, effective technology integration ultimately depends on teachers' openness to innovation, institutional support, access to digital resources, and continuous professional development opportunities. Schools and educational administrators should therefore continue promoting gender-inclusive training initiatives and technological support programs that strengthen teachers' digital competencies, instructional effectiveness, and adaptability to the evolving demands of contemporary education.

In terms of school assignment, the findings revealed that out of the 109 respondents, 89 or 81.7% are assigned in non-central schools, while only 20 or 18.3% are assigned in central schools. The results clearly indicate that the majority of teachers included in the study are teaching in non-central public elementary schools. This finding suggests that most respondents are working in schools situated outside the district's central educational institutions, where access to educational resources, technological infrastructure, and professional development opportunities may be comparatively limited. Non-central schools are often characterized by insufficient digital facilities, unstable internet connectivity, limited instructional resources, and reduced access to technology-related training compared to central schools. Consequently, teachers assigned in these schools may encounter greater challenges in implementing technology integration and maintaining effective digital instructional practices.

The smaller percentage of respondents from central schools, comprising only 18.3% of the total population, may reflect either the limited number of teachers assigned in these institutions or the larger number of non-central schools within the district. Central schools are generally more equipped with educational resources, functional technological facilities, stable internet access, and administrative support systems. Teachers assigned in these schools may therefore have greater opportunities to utilize educational technologies, participate in professional development programs, and access instructional resources that support technology-enhanced learning. The disparity in school assignment distribution highlights the unequal availability of technological resources and instructional support among schools within the district.

The findings further imply that school assignment significantly influences teachers' digital readiness, access to technological resources, and instructional practices. Educators assigned in non-central schools may experience barriers such as inadequate digital tools, insufficient infrastructure, limited technical assistance, and restricted opportunities for technology-focused training. Despite these limitations, many teachers continue to demonstrate professional dedication, resilience, and adaptability in delivering quality instruction to learners under varying school conditions. Their ability to sustain instructional effectiveness despite resource constraints reflects strong professional commitment and instructional responsibility.

The findings support the study of Abel (2022), which emphasized that teachers' work environment and demographic characteristics significantly influence their technological readiness, confidence, and competence in utilizing digital tools. According to the study, teachers assigned in schools with greater access to technological resources and institutional support tend to demonstrate higher levels of comfort and proficiency in technology integration. However, Abel also stressed that successful technology integration depends not only on the availability of infrastructure and digital resources but also on teachers' pedagogical competence, adaptability, and commitment to instructional improvement. This observation

aligns with the findings of the present study because teachers in non-central schools may continue integrating technology effectively despite existing limitations when supported by strong instructional skills and professional motivation.

Similarly, Mane (2025) noted that educators working in schools with limited technological facilities often rely on traditional digital resources instead of advanced and interactive instructional platforms. Teachers assigned in non-central schools may therefore require additional institutional support, technical assistance, and sustained professional development opportunities to strengthen their digital competencies and instructional effectiveness. The findings of the current study support this perspective because the majority of respondents are assigned in non-central schools where access to advanced educational technologies may be comparatively restricted.

Furthermore, Alabdulaziz (2021) explained that perceived usefulness remains a major factor influencing teachers' technology integration practices. Even in schools with limited technological resources, teachers who recognize the instructional value and educational benefits of digital tools are more likely to integrate technology into classroom activities and instructional delivery. This finding supports the present study's objective of examining teachers' perceptions regarding the usefulness, ease of use, and frequency of technology integration in classroom instruction. The results therefore indicate that teachers' willingness to adopt technology may persist despite infrastructural limitations when they perceive technology as beneficial to learner engagement and academic performance.

Overall, the findings reveal that the majority of respondents are assigned in non-central schools, which may present distinct challenges related to technology access, instructional resources, and professional support. The results underscore the importance of equitable distribution of technological facilities, continuous professional development programs, and administrative assistance across all schools within the district. Educational leaders and school administrators should therefore prioritize strengthening technological infrastructure, improving access to digital resources, and providing sustained training opportunities for teachers in non-central schools to ensure that educators across all school settings are equally prepared to implement effective technology-enhanced instruction.

In terms of grade level handled, the findings revealed that out of the 109 respondents, 53 or 48.6% are assigned to Grades 4–6, while 46 respondents or 42.2% handle Grades 1–3. Meanwhile, only 10 respondents or 9.2% are assigned to Kindergarten. The findings indicate that the majority of teachers included in the study are assigned to intermediate grade levels, followed closely by teachers handling primary grade learners. This distribution reflects the substantial instructional demands placed on teachers within elementary education, particularly among educators assigned to intermediate and primary grade levels.

The findings suggest that most respondents are responsible for teaching learners in the upper elementary grades. Teachers assigned to Grades 4–6 typically manage more advanced subject content, broader curricular coverage, and increased learner expectations compared to teachers handling lower grade levels. These instructional demands may require greater preparation, more diverse pedagogical strategies, and increased utilization of digital resources to support learners' academic development. Since intermediate grade learners are generally more capable of independently interacting with educational technologies, teachers assigned to these grade levels may have more opportunities to integrate digital tools, multimedia resources, and technology-based instructional strategies into classroom instruction.

The relatively high percentage of respondents handling Grades 1–3, comprising 42.2% of the total population, also highlights the significance of foundational education within elementary schools. Teachers assigned to these grade levels are primarily responsible for

developing learners' literacy, numeracy, communication, and basic cognitive skills. Technology integration at this stage often requires highly interactive, age-appropriate, and visually engaging instructional materials that can sustain learners' attention and participation. Consequently, teachers assigned to lower elementary grades may require specialized training in utilizing child-friendly educational technologies, multimedia instructional tools, and interactive digital resources that support foundational learning competencies.

The relatively low percentage of Kindergarten teachers, recorded at 9.2%, may be attributed to the smaller number of Kindergarten classes or the specialized staffing requirements associated with early childhood education within the district. Kindergarten teachers generally focus on play-based, experiential, and developmentally appropriate instructional approaches that require distinct pedagogical methods and close learner supervision. Integrating technology within Kindergarten settings may present additional instructional challenges because young children often require simplified digital activities, guided interactions, and careful monitoring during technology-assisted learning experiences.

The findings support the empirical study of Abel (2022), which explained that teachers' professional profiles and instructional assignments significantly influence their confidence, readiness, and competence in utilizing educational technologies. According to the study, teachers handling higher grade levels may demonstrate greater exposure to digital instructional materials and technology-based learning activities because older learners can interact more independently with technological tools and digital platforms. However, Abel emphasized that successful technology integration ultimately depends on teachers' pedagogical competence, instructional adaptability, and professional commitment rather than grade level assignment alone. This observation is consistent with the present findings because teachers across different grade levels may demonstrate varying technology integration practices depending on instructional demands and learner characteristics.

Similarly, Mane (2025) found that teachers often possess strong pedagogical knowledge but continue to rely heavily on traditional digital resources rather than more interactive and learner-centered technologies. This observation is particularly relevant among elementary school teachers because younger learners require engaging, developmentally appropriate, and highly interactive instructional materials that effectively support participation and comprehension. The present study aligns with this finding by examining how teachers integrate technology across different grade levels and instructional contexts within elementary education.

Furthermore, Alabdulaziz (2021) emphasized that teachers' perception of usefulness strongly affects the frequency and effectiveness of technology integration in classroom instruction. Teachers are more likely to utilize digital resources consistently when they observe positive effects on learner engagement, classroom participation, and academic performance. Within the context of elementary education, teachers handling both lower and higher grade levels may therefore integrate technology more frequently when they perceive digital tools as beneficial in enhancing instructional delivery and supporting learner achievement.

Overall, the findings indicate that the majority of respondents teach Grades 4–6 and Grades 1–3, reflecting the substantial instructional responsibilities and diverse pedagogical demands within elementary education. The distribution highlights the importance of differentiated technology training programs that address the specific instructional needs and developmental characteristics of learners across grade levels. Schools and educational administrators should therefore provide appropriate digital resources, grade-level-specific technological support, and continuous professional development opportunities that strengthen teachers' ability to integrate technology effectively across Kindergarten, primary, and intermediate elementary classrooms.

In terms of teaching load, the findings revealed that all 109 respondents or 100.0% carry a teaching load of 360 minutes daily. The results indicate that every teacher included in the study handles the standard teaching load prescribed for public elementary school teachers. The uniformity of the respondents' teaching load suggests consistency in instructional responsibilities and workload distribution across the selected schools within the district. A teaching load of 360 minutes reflects the required instructional hours assigned to public school teachers, excluding additional professional obligations such as lesson preparation, checking of learners' outputs, preparation of instructional materials, participation in meetings, completion of reports, and other administrative responsibilities.

The findings further imply that respondents experience comparable levels of work-related demands, instructional pressure, and time constraints within their professional responsibilities. Since all respondents share the same daily teaching load, they are likely exposed to similar challenges associated with classroom instruction, learner management, and curriculum implementation. The consistency in teaching load also suggests that differences in teachers' technology integration practices may be influenced more by factors such as technological readiness, access to digital tools, professional development opportunities, and institutional support rather than by variations in instructional workload.

The findings also indicate that heavy instructional demands may influence teachers' ability to explore, prepare, and integrate educational technologies into classroom instruction. Teachers carrying full teaching loads may encounter limitations in terms of preparation time, independent technological exploration, and development of innovative technology-driven instructional materials. Although teachers may recognize the instructional value and educational benefits of digital technologies, the demands associated with daily teaching responsibilities may reduce opportunities for designing interactive lessons, experimenting with digital platforms, and participating in extensive technology-related professional development activities.

Despite these workload-related challenges, teachers carrying full instructional responsibilities are still expected to meet instructional standards, classroom management expectations, and learner performance targets. The findings therefore highlight the importance of institutional support systems, technology-focused professional development opportunities, and accessible digital resources that may assist teachers in integrating technology more efficiently within the limitations of their daily workload. Administrative support, simplified digital tools, and practical instructional technologies may significantly reduce teachers' workload burdens while enhancing instructional effectiveness and learner engagement.

The findings support the study of Abel (2022), which emphasized that teachers' professional circumstances, including workload and years of service, significantly influence their confidence, readiness, and adaptability in utilizing educational technologies. According to the study, teachers with demanding instructional responsibilities may initially encounter difficulties in adapting to new technological tools because of limited time for practice, experimentation, and skills development. However, Abel also emphasized that pedagogical competence, professional commitment, and instructional motivation remain essential factors in achieving successful technology integration despite workload pressures. This observation aligns with the present findings because teachers carrying full instructional loads may still demonstrate willingness to integrate technology when supported by adequate training and institutional assistance.

Similarly, Mane (2025) explained that experienced educators often possess strong instructional expertise and classroom management skills but may require additional support in adopting more advanced and interactive digital technologies. Teachers with heavy teaching

responsibilities may prefer familiar and traditional technological tools rather than more complex and student-centered platforms because of convenience, accessibility, and time limitations. This finding is relevant to the current study because the respondents' uniform teaching load may influence the extent to which they explore and utilize more advanced educational technologies in classroom instruction.

Furthermore, Alabdulaziz (2021) found that perceived usefulness significantly influences teachers' technology usage and integration practices. Teachers are more likely to adopt and utilize digital tools despite workload challenges when they believe that technology contributes positively to learner engagement, instructional efficiency, and academic achievement. This suggests that even teachers carrying full teaching loads may continue integrating technology effectively when they perceive digital resources as practical, manageable, and beneficial to the teaching-learning process.

Overall, the findings reveal that all respondents carry the standard teaching load of 360 minutes daily, indicating consistent instructional responsibilities among teachers within the district. The results underscore the importance of providing teachers with adequate technological support, accessible digital resources, user-friendly instructional tools, and sustained professional development opportunities that can facilitate efficient technology integration despite the demands of daily teaching responsibilities. Strengthening institutional support systems may therefore help teachers balance instructional workload requirements while continuously improving their technological competence and instructional effectiveness.

In terms of number of years in teaching, the findings revealed that out of the 109 respondents, 37 or 33.9% have 6–10 years of teaching experience, while 35 respondents or 32.1% have taught for 11–15 years. Meanwhile, 17 respondents or 15.6% have 1–5 years of teaching experience, 11 respondents or 10.1% have more than 20 years of service, and 7 respondents or 6.4% have taught for 16–20 years. The least represented category consists of teachers with less than one year of teaching experience, with only 2 respondents or 1.8%. The findings indicate that the majority of respondents are experienced educators who have already spent several years within the teaching profession.

The substantial representation of teachers with 6–15 years of service suggests that most respondents are already within their professionally stable and productive stage as educators. Teachers within this range of experience are often characterized by strong pedagogical competence, classroom management skills, instructional adaptability, and familiarity with curriculum implementation. Their extensive professional exposure may contribute positively to instructional effectiveness, learner engagement, and professional decision-making within the classroom environment. The findings therefore suggest the presence of a professionally mature workforce capable of managing instructional demands and adapting to educational reforms and innovations.

The relatively smaller percentage of novice teachers, particularly those with less than one year of service at 1.8% and those with 1–5 years of experience at 15.6%, indicates that only a limited number of respondents are newly entering the teaching profession. Beginning teachers often possess updated knowledge of contemporary teaching strategies, learner-centered approaches, and educational technologies acquired through recent pre-service teacher education programs. However, they may still require professional guidance, mentoring, and classroom experience to strengthen their instructional confidence and practical teaching competence. In contrast, teachers with longer years of service usually demonstrate deeper understanding of curriculum implementation, instructional planning, and learner behavior because of sustained professional exposure.

The findings further suggest that years of teaching experience may significantly influence teachers' digital readiness and technology integration practices. Experienced educators may have developed highly effective traditional teaching approaches over time but

may also encounter challenges in adapting to rapidly evolving educational technologies and digital learning platforms. Conversely, younger teachers and those with fewer years of service may be more technologically inclined because of greater exposure to digital environments and modern instructional technologies during their teacher education preparation. However, they may still require support in applying technological tools effectively within actual classroom instruction.

The results strongly support the empirical findings of Abel (2022), which emphasized that demographic variables such as years of service significantly influence teachers' confidence, familiarity, and readiness in utilizing educational technologies. According to Abel, experienced teachers may require additional technical support and professional development opportunities when introduced to newer digital tools and instructional platforms. Nevertheless, the study also emphasized that extensive teaching experience does not necessarily limit pedagogical integration skills because experienced educators frequently compensate through strong instructional expertise, classroom management abilities, and pedagogical adaptability. This observation aligns with the findings of the present study because the majority of respondents possess substantial teaching experience that may support effective instructional delivery despite possible technological challenges.

Similarly, Mane (2025) found that teachers with longer years in teaching generally possess strong content mastery, pedagogical competence, and professional confidence but may require more targeted assistance in integrating advanced educational technologies into classroom instruction. According to the study, many experienced educators continue to rely on traditional digital resources instead of more interactive and learner-centered technologies such as Learning Management Systems (LMS). This finding supports the current study's objective of identifying technological gaps and technology integration practices among teachers with varying levels of professional experience.

Furthermore, Alabdulaziz (2021) emphasized that perceived usefulness remains a major predictor of technology integration regardless of teachers' years of teaching experience. Teachers are more likely to integrate digital tools into classroom instruction when they recognize clear benefits related to learner achievement, instructional efficiency, and classroom engagement. This suggests that experienced teachers may still become effective technology integrators when they perceive technology as valuable, relevant, and beneficial to the teaching-learning process while receiving sufficient institutional and professional support.

Overall, the findings reveal that the respondent population is largely composed of experienced educators with 6–15 years of teaching service, reflecting a professionally mature workforce capable of contributing significantly to instructional quality and educational development. However, continuous professional development programs, technology-focused training, and institutional support remain essential to ensure that teachers across all levels of experience can effectively adapt to modern educational demands and evolving digital instructional practices.

In terms of digital tools available at school, the findings revealed that out of the 109 respondents, 69 or 63.3% reported that digital tools are available in their schools, while 40 respondents or 36.7% indicated that such tools are not available. The results demonstrate that although the majority of schools possess digital resources and technological facilities, a considerable number of teachers still experience limited access to technological tools within their respective schools. This finding highlights the presence of disparities in technological availability and instructional resources across schools within the district.

The availability of digital tools in most schools suggests that efforts toward educational technology integration and digital instructional development are being implemented within the

district. Technological resources such as computers, televisions, projectors, internet connectivity, and other digital instructional devices may support teachers in delivering lessons more effectively and engaging learners through interactive educational activities. Access to these technological resources may also improve teachers' instructional efficiency, creativity, flexibility, and capacity to provide diverse learning experiences that support learner participation and academic achievement.

Despite the positive findings regarding technological availability, the percentage of respondents reporting the absence of digital tools remains substantial at 36.7%. This indicates continuing disparities in resource allocation, technological infrastructure, and institutional support among schools, particularly between central and non-central educational institutions. Teachers assigned in schools without adequate digital resources may experience difficulties in implementing technology-based instruction, preparing multimedia learning materials, conducting interactive lessons, and participating fully in technology-enhanced educational practices. Such limitations may affect both teachers' instructional strategies and learners' opportunities for digital learning experiences.

The findings further imply that successful technology integration depends not only on teachers' technological competence and willingness to innovate but also on the availability of institutional resources and infrastructural support. Even highly motivated educators may encounter challenges in integrating technology effectively when schools lack functional digital equipment, stable internet connectivity, and sufficient technological facilities. The findings therefore underscore the importance of administrative support, equitable resource distribution, and continuous investment in educational technology infrastructure across all schools within the district.

The results support the findings of Abel (2022), which emphasized that teachers' technological readiness and confidence are influenced by both demographic variables and environmental factors such as access to hardware, digital resources, and technological facilities. According to the study, teachers who regularly interact with available technologies tend to develop greater confidence, familiarity, and competence in utilizing digital instructional tools. However, Abel also noted that resource availability alone does not automatically guarantee effective pedagogical integration because instructional competence, professional training, and technological adaptability remain equally important.

Similarly, Mane (2025) explained that many teachers continue relying on traditional digital resources because of limited exposure to more advanced educational technologies and interactive instructional platforms. Schools with insufficient technological infrastructure often prevent teachers from fully exploring learner-centered digital systems such as Learning Management Systems (LMS) and interactive online learning tools. This observation aligns with the objective of the current study, which seeks to assess technology integration practices and identify instructional and technological gaps among public elementary school teachers.

Furthermore, Alabdulaziz (2021) found that teachers are more likely to integrate technology into instruction when they perceive digital tools as useful in improving learner performance, instructional effectiveness, and classroom engagement. However, positive perceptions regarding technological usefulness can only be translated into actual instructional practice when teachers have consistent access to functional and reliable digital resources. Schools with available technological tools therefore provide greater opportunities for teachers to develop positive attitudes toward technology integration and strengthen their digital instructional practices.

Overall, the findings indicate that while the majority of schools possess digital tools and technological resources, substantial disparities in technological availability continue to exist within the district. The results highlight the need for continuous investment in educational technology, infrastructure development, equitable resource allocation, and sustained

administrative support across all schools. Strengthening teachers' access to digital tools alongside continuous professional development and institutional assistance may significantly improve technology integration practices and enhance the overall quality of instruction in public elementary schools.

In terms of the number of relevant seminars and trainings attended, the findings revealed that out of the 109 respondents, 103 or 94.5% attended 1–2 seminars or training programs related to technology integration and professional development. Meanwhile, 4 respondents or 3.7% reported that they had not attended any relevant seminar or training, while only 2 respondents or 1.8% attended 3–4 relevant seminars or training programs. The findings indicate that although most teachers have been exposed to at least one professional development activity, their level of participation remains limited. The dominance of respondents who attended only 1–2 seminars or trainings suggests that professional development opportunities related to educational technology and instructional innovation may not yet be sufficiently frequent or sustained to fully equip teachers with the competencies required for effective technology integration.

The findings further imply that teachers' technological readiness may still be developing because limited exposure to relevant training can affect their confidence, familiarity, and competence in using advanced digital tools and instructional technologies. Teachers who attend only a small number of seminars may become familiar with basic applications and traditional digital resources but may still require additional support in using more interactive and student-centered technologies such as Learning Management Systems (LMS), virtual collaboration platforms, multimedia instructional applications, and other emerging digital tools. The small proportion of respondents who attended 3–4 seminars or trainings, recorded at 1.8%, suggests that only a few teachers have broader exposure to structured professional development activities. These teachers may possess relatively higher technological competence, stronger confidence in using digital tools, and greater awareness of innovative instructional practices. In contrast, the 3.7% who reported no attendance in any relevant seminar or training may encounter greater challenges in adapting to technology-driven instruction.

The findings strongly support the empirical study of Abel (2022), which emphasized that demographic and professional variables influence teachers' digital readiness and confidence in utilizing technology. Abel explained that teachers who regularly receive training and technical support tend to demonstrate greater comfort with hardware, digital tools, and technology-based instructional practices. However, the study also emphasized that pedagogical competence remains necessary in ensuring that technology is used meaningfully and effectively in classroom instruction. This is relevant to the present findings because most respondents have had only limited training exposure, indicating the need to strengthen both their technical skills and pedagogical application of technology.

Similarly, Mane (2025) explained that experienced educators often possess strong pedagogical knowledge but still require targeted support in adapting to emerging technologies. The study noted that many teachers continue to rely on traditional digital resources because they have limited opportunities for advanced technological training. This observation aligns with the present study's objective of identifying instructional and technological gaps among teachers within South Butuan District. Furthermore, Alabdulaziz (2021) found that perceived usefulness significantly influences the frequency of technology integration. Teachers are more likely to use digital tools when they recognize clear instructional benefits and receive sufficient guidance in applying them. Thus, seminars and training programs serve an important function

in helping teachers understand the practical value of technology in improving student engagement, academic performance, and instructional efficiency.

The findings highlight the importance of continuous professional development in strengthening teachers' digital competencies. Since technology evolves rapidly, teachers require consistent and progressive training opportunities to remain updated on modern instructional tools, digital platforms, and technology-enhanced pedagogical strategies. Without sustained professional support, educators may struggle to maximize the educational potential of available digital resources, even when such tools are present in their schools. Overall, the results reveal that while most respondents have attended at least one seminar or training program, their exposure remains limited. This underscores the need for schools and educational leaders to provide more frequent, comprehensive, and technology-focused professional development activities, supported by continuous technical assistance and administrative guidance, to enhance teachers' technological readiness, improve instructional practices, and promote effective technology integration in public elementary schools.

The descriptive statistics on the extent of the respondents' technology integration in classroom instruction were examined in terms of frequency of use of digital tools and resources, usefulness of technology in enhancing teaching and learning, ease of use in applying technology in instructional practices, confidence and competency in integrating technology into lessons, and support and resources provided by school administration for technology integration. In terms of frequency of use of digital tools and resources, the findings revealed that the 109 respondents obtained an overall sub-mean of 4.45 with a standard deviation of 0.60, interpreted as Very High based on the scale in which 4.21–5.00 is Very High, 3.41–4.20 is High, 2.61–3.40 is Moderate, 1.81–2.60 is Low, and 1.00–1.80 is Very Low. This result indicates that respondents frequently use digital tools and technological resources in their instructional practices, suggesting that technology has become a regular component of their classroom preparation and delivery.

Among the indicators, the statement "I use digital tools in preparing my lesson materials" obtained the highest mean of 4.72 with a standard deviation of 0.45, interpreted as Very High. This finding indicates that teachers strongly rely on digital tools in preparing lesson materials such as presentations, visual aids, worksheets, and other instructional resources. The result implies that digital technology has become an essential part of teachers' daily instructional planning and preparation. The indicator "I frequently use multimedia presentations in teaching" obtained a mean of 4.62 with a standard deviation of 0.49, also interpreted as Very High, showing that teachers commonly use presentations, videos, and multimedia materials to support lesson delivery and increase learner engagement. Likewise, the indicator "I regularly use technology during classroom instruction" recorded a mean of 4.60 with a standard deviation of 0.53, interpreted as Very High, indicating that technology integration is not merely occasional but is already practiced regularly in classroom instruction.

The remaining indicators also showed positive results. The statement "I regularly use digital platforms for student activities or assessments" obtained a mean of 4.24 with a standard deviation of 0.62, interpreted as Very High, while the statement "I often use online resources to supplement my lessons" obtained a mean of 4.09 with a standard deviation of 0.90, interpreted as High. Although both indicators reflect favorable technology use, their comparatively lower means suggest that teachers may be more comfortable using technology for lesson preparation, presentation, and classroom delivery than for student activities, assessments, online learning resources, or collaborative digital platforms. This pattern indicates that technology integration among respondents may still be stronger in teacher-directed instructional tasks than in interactive, learner-centered, or platform-based activities.

The findings indicate that respondents demonstrate strong engagement in integrating technology into classroom instruction. Teachers appear to recognize the importance of digital

tools in improving lesson delivery, learner participation, and instructional efficiency. The Very High overall sub-mean of 4.45 and standard deviation of 0.60 may also reflect the growing emphasis on technology integration within the educational system, especially following the wider use of digital and blended learning modalities. The results support the findings of Alabdulaziz (2021), who emphasized that perceived usefulness significantly predicts the frequency of technology use among educators. Teachers who perceive technology as beneficial to student learning outcomes are more likely to use digital tools regularly despite technical or logistical challenges. The Very High ratings in the present study suggest that teachers in South Butuan District recognize the practical value of technology in enhancing classroom instruction.

The findings are also consistent with Akram (2022), who explained that teachers often possess adequate technical skills in operating digital tools but may still encounter difficulties in fully transforming pedagogical practices into technology-driven instruction. In the current study, teachers frequently use digital tools, yet the lower mean scores for digital platforms and online supplementary resources may indicate that integration remains centered on more traditional uses of technology rather than highly interactive or student-centered applications. Similarly, Asio and Bayucca (2021) found that Filipino teachers tend to rely heavily on pre-made digital materials and modules instead of developing original digital content. This observation may explain why teachers demonstrate a high frequency of technology use while still needing further development in digital creativity, innovation, and interactive instructional design. Overall, the findings reveal that teachers in South Butuan District exhibit a Very High frequency of digital tool usage in classroom instruction, reflecting positive attitudes toward technology integration and increasing familiarity with digital instructional practices. However, continuous professional development remains necessary to help teachers maximize the use of interactive digital platforms, collaborative technologies, and innovative teaching approaches that extend beyond basic technological utilization.

In terms of the usefulness of technology in teaching and learning, the findings revealed that the 109 respondents obtained an overall sub-mean of 4.97 with a standard deviation of 0.17, interpreted as Very High based on the same scale in which 4.21–5.00 is Very High, 3.41–4.20 is High, 2.61–3.40 is Moderate, 1.81–2.60 is Low, and 1.00–1.80 is Very Low. This indicates that the respondents strongly perceive technology as highly useful and beneficial in enhancing classroom instruction and improving student learning outcomes. The consistently high ratings across all indicators suggest that teachers view technology not merely as a supplementary classroom tool but as an integral part of effective teaching and learning.

Among the indicators, the statements “I find that digital tools make my teaching more effective” and “I use technology because it enhances student engagement” both obtained the highest mean of 4.98 with a standard deviation of 0.13, interpreted as Very High. These findings suggest that teachers strongly believe that technology contributes positively to instructional effectiveness and learner participation. The Very High ratings indicate that respondents recognize digital tools as valuable resources for improving lesson delivery, capturing learners’ attention, and creating more interactive classroom experiences. Similarly, the statements “I believe technology integration improves the quality of classroom instruction” and “I find technology useful in presenting complex topics” both obtained a mean of 4.97 with a standard deviation of 0.16, interpreted as Very High. These results indicate that teachers perceive technology as an effective instructional aid for improving classroom quality and simplifying difficult concepts through visual presentations, videos, simulations, and interactive materials.

The statement “I believe technology helps improve students’ understanding of lessons” obtained the lowest mean among the indicators, although it remained interpreted as Very High,

with a mean of 4.94 and a standard deviation of 0.25. This finding indicates that respondents consistently acknowledge the educational value of technology in facilitating comprehension and reinforcing learning outcomes. The slightly lower rating may suggest that while teachers strongly believe in the usefulness of technology, they may still recognize that improved student understanding depends not only on the availability or use of digital tools but also on effective pedagogy, learner readiness, instructional design, and classroom support.

The findings imply that respondents possess highly positive attitudes toward educational technology and clearly recognize its relevance in modern classroom instruction. The Very High overall sub-mean of 4.97 and standard deviation of 0.17 suggest that teachers perceive technology as essential in promoting instructional effectiveness, learner engagement, improved classroom quality, clearer presentation of complex topics, and better student understanding. This strong perception of usefulness may also help explain the Very High frequency of technology use reported in the preceding findings, as teachers who value technology are more likely to use it regularly in their teaching practices.

The results strongly support the findings of Alabdulaziz (2021), who concluded that perceived usefulness is the strongest predictor of technology integration among teachers. According to the study, educators who recognize direct instructional benefits from digital tools are more willing to integrate technology regularly despite technical difficulties or environmental challenges. The Very High ratings in the present study clearly demonstrate that teachers in South Butuan District value technology because they believe it enhances student engagement, instructional quality, and learning outcomes. The findings also relate to Akram (2022), who emphasized that while teachers generally possess technical skills in operating digital tools, many still struggle to transform instructional approaches into more technology-centered pedagogical practices. Although the respondents strongly perceive technology as useful, the continuing challenge is whether such technologies are being used innovatively and interactively rather than merely supporting traditional teaching methods.

Similarly, Asio and Bayucca (2021) found that Filipino teachers often rely heavily on pre-made modules and existing digital content rather than developing original and creative instructional materials. This suggests that although teachers highly value technology, limitations may remain in terms of digital creativity, advanced pedagogical integration, and transformative instructional use. Teachers may effectively consume and utilize technology without fully maximizing its potential to redesign learning experiences. Furthermore, the findings relate to Di Gong (2020) and Kaymakçı and Urfalıoğlu (2025), who emphasized that professional development and digital competence significantly influence technology integration self-efficacy. Teachers who perceive technology as useful are more likely to develop confidence, competence, and motivation to incorporate digital tools effectively into instruction. Overall, the findings reveal that respondents strongly acknowledge the usefulness of technology in improving teaching and learning, indicating a positive technological culture among teachers in South Butuan District. However, schools and administrators should continue strengthening teachers' technological pedagogical knowledge, creativity, and innovative practices through continuous professional development and collaborative learning opportunities such as Learning Action Cells (LAC).

In terms of ease of use in applying technology, the findings revealed that the 109 respondents obtained an overall sub-mean of 4.69 with a standard deviation of 0.48, interpreted as Very High based on the scale in which 4.21–5.00 is Very High, 3.41–4.20 is High, 2.61–3.40 is Moderate, 1.81–2.60 is Low, and 1.00–1.80 is Very Low. This indicates that the respondents generally perceive technology as accessible, manageable, and convenient to use in their teaching practices. The consistently Very High ratings across all indicators suggest that teachers possess a strong level of familiarity, comfort, and adaptability in using digital tools and instructional technologies in classroom instruction.

Among the indicators, the statement “I find technology easy to use in my teaching” obtained the highest mean of 4.73 with a standard deviation of 0.44, interpreted as Very High. This implies that respondents experience minimal difficulty in utilizing technology for instructional purposes. The statement “I do not find technology complicated to use in class” obtained a mean of 4.70 with a standard deviation of 0.46, also interpreted as Very High, indicating that teachers view digital technologies as user-friendly and adaptable to classroom settings. Similarly, the statement “I find it simple to integrate technology into my lesson plans” obtained a mean of 4.69 with a standard deviation of 0.47, interpreted as Very High, reflecting the respondents’ ability to incorporate digital resources into instructional planning effectively.

The findings further show that respondents can use digital tools without needing constant technical assistance, as indicated by a mean of 4.68 with a standard deviation of 0.49, interpreted as Very High. Likewise, the statement “I can easily learn how to use new digital tools for instruction” obtained a mean of 4.65 with a standard deviation of 0.52, interpreted as Very High. These results demonstrate teachers’ adaptability, independence, and willingness to embrace emerging educational technologies. The relatively low standard deviations across the indicators indicate consistency in the respondents’ perceptions, suggesting a shared positive experience regarding the usability of technology in instruction.

The findings support studies conducted in 2021 which emphasized that perceived ease of use significantly influences teachers’ willingness to integrate technology into classroom instruction. When teachers perceive digital tools as uncomplicated and manageable, they are more likely to utilize them consistently in teaching and learning activities. Similarly, research in 2022 highlighted that teachers’ familiarity with educational technologies enhances instructional efficiency, promotes innovation in lesson delivery, and strengthens learner engagement. Anchored on the Technology Acceptance Model, the findings suggest that when technology is perceived as easy to use, educators develop more positive attitudes toward its integration. Thus, the respondents’ Very High level of ease in using technology contributes positively to effective classroom instruction and supports the continued advancement of digital learning environments.

In terms of confidence and competency in integrating technology into lessons, the findings revealed that the 109 respondents obtained an overall sub-mean of 4.65 with a standard deviation of 0.50, interpreted as Very High. This indicates that teachers demonstrate a strong level of confidence and competence in using technology for classroom instruction. The result suggests that respondents possess the necessary knowledge, skills, and self-assurance to integrate digital resources into lessons and to use technology as a means of supporting instructional strategies, learner engagement, and teaching effectiveness.

The highest mean of 4.66 with a standard deviation of 0.51 was obtained by the statement “I feel confident teaching lessons that require the use of technology,” interpreted as Very High. This indicates that teachers are highly assured in facilitating technology-based instruction and have become comfortable using technological tools as part of their teaching practices. The statement “I feel competent in selecting appropriate digital tools for my lessons” obtained a mean of 4.65 with a standard deviation of 0.48, interpreted as Very High, showing that respondents are knowledgeable in choosing technologies that align with instructional objectives. Likewise, the statement “I am confident in my ability to use technology for teaching” obtained a mean of 4.64 with a standard deviation of 0.48, also interpreted as Very High, further confirming the respondents’ strong self-assurance in applying digital tools to instructional delivery.

The indicators “I can effectively integrate technology into my teaching strategies” and “I am confident in managing a technology-enhanced classroom” obtained mean scores of 4.64

with a standard deviation of 0.52 and 4.63 with a standard deviation of 0.52, respectively, both interpreted as Very High. These findings imply that respondents can combine pedagogy and technology while maintaining effective classroom management in technology-supported learning environments. The standard deviations indicate that teachers' responses were relatively consistent, reflecting a collective sense of confidence and competence in technology integration.

The findings align with 2021 studies which emphasized that teacher confidence is a critical factor influencing successful technology integration in education. Research conducted during this period found that educators with higher technological self-efficacy are more likely to adopt innovative teaching practices and create interactive learning experiences. Moreover, studies in 2022 reported that competency in digital instruction enables teachers to design learner-centered activities, improve student engagement, and foster collaborative learning environments. Scholars also noted that professional development programs and continuous exposure to digital tools strengthen teachers' confidence in using technology effectively. Anchored on the principles of the Technology Acceptance Model and digital competence frameworks, the findings indicate that the respondents' strong confidence and competency levels contribute significantly to meaningful technology integration. Thus, teachers appear well-prepared to adapt to the demands of modern education and to utilize technology in ways that enhance instructional delivery and student learning outcomes.

In terms of support and resources provided by the school administration for digital technology integration, the findings revealed that the 109 respondents obtained an overall sub-mean of 4.17 with a standard deviation of 0.53, interpreted as High based on the scale in which 3.41–4.20 is High. This indicates that administrative support and resources for technology integration are present and positively perceived by the respondents, although this dimension is comparatively lower than the other dimensions of technology integration. The result suggests that while schools encourage technology use and provide some level of assistance, there remain areas for improvement in terms of training, technical support, and resource availability.

The highest-rated indicator, "The school administration encourages the use of digital technology in teaching," obtained a mean of 4.40 with a standard deviation of 0.53, interpreted as High. This suggests that school leadership plays an important role in promoting digital integration and encouraging teachers to use technology in instruction. The statement "I receive adequate support from the school administration for technology integration" obtained a mean of 4.36 with a standard deviation of 0.48, also interpreted as High, reflecting positive perceptions of administrative assistance. However, the slightly lower rating compared with institutional encouragement suggests that practical support mechanisms may still require strengthening.

The statement "My school provides sufficient digital tools for classroom instruction" obtained a mean of 4.22 with a standard deviation of 0.63, interpreted as High. This indicates that resources are available, but they may not be fully adequate, uniformly distributed, or consistently accessible across all school contexts, as suggested by the relatively higher standard deviation. The statement "I am provided with training on how to use digital technology effectively" obtained a mean of 3.98 with a standard deviation of 0.47, interpreted as High, showing that training opportunities exist but may not be as frequent, comprehensive, or sustained as needed. Finally, "Technical support is readily available when I encounter problems" obtained the lowest mean of 3.89 with a standard deviation of 0.55, interpreted as High, suggesting that teachers may experience challenges in accessing immediate technical assistance when difficulties arise during technology use.

Overall, administrative support is positively perceived but remains the weakest dimension among the technology integration variables measured. This indicates that institutional support systems may need further strengthening to sustain high levels of

technology integration. These findings align with Attaran (2020), who identified infrastructure and support systems as key barriers in technology integration. Similarly, Domingo and Mina (2024) highlighted inconsistent support and limited technical assistance in educational settings. Di Gong (2020) emphasized that professional development and institutional support significantly influence the quality of technology integration, suggesting that stronger administrative systems may further enhance teachers' already high levels of confidence and competence. Naparan et al. (2021) also highlighted the importance of collaborative systems such as Learning Action Cells in improving resource sharing and professional growth, which may help address support gaps. The findings therefore indicate that while support systems are present and positively perceived, strengthening technical assistance, training frequency, and resource availability remains necessary for sustainable technology integration.

The summary results on the extent of the respondents' technology integration in classroom instruction revealed a grand mean of 4.59 with a standard deviation of 0.46, interpreted as Very High. This indicates a strong overall culture of digital teaching practices among the respondents across the five dimensions measured. The highest-rated dimension was usefulness of technology in teaching and learning, which obtained a mean of 4.97 with a standard deviation of 0.17, interpreted as Very High. This shows that perceived value is the strongest driver of technology integration among the respondents. This was followed by ease of use in applying technology with a mean of 4.69 and a standard deviation of 0.48, confidence and competency in integrating technology into lessons with a mean of 4.65 and a standard deviation of 0.50, and frequency of use of digital tools with a mean of 4.45 and a standard deviation of 0.60, all interpreted as Very High. The lowest dimension was support and resources provided by the school administration for digital technology integration, which obtained a mean of 4.17 with a standard deviation of 0.53. Although the source interpretation identified this summary indicator as Very High, its numerical value falls within the High range of 3.41–4.20 based on the stated legend, indicating that institutional support remains the relatively weakest component of technology integration.

These results indicate that teachers are highly engaged in technology integration and strongly believe in its educational value. The Very High grand mean of 4.59 suggests that respondents demonstrate strong usage, high perceived usefulness, ease in applying technology, and confidence in integrating digital tools into instruction. However, the relatively lower mean of 4.17 for support and resources indicates that institutional support remains an important area for policy and administrative improvement. The findings align with Alabdulaziz (2021), who identified perceived usefulness as the strongest predictor of technology use. Similarly, Kaymakcı and Urfalıoğlu (2025) emphasized the role of competence in strengthening integration behavior. However, Akram (2022) and Asio and Bayucca (2021) cautioned that high usage and confidence do not always result in innovative pedagogical transformation, as teachers may still rely on structured or repetitive digital practices rather than creative digital instruction. Challenges identified by Attaran (2020) and Bereczki (2021) further emphasize that systemic issues such as infrastructure, time, and support continue to influence the depth and quality of technology integration. The summary therefore reveals a highly positive state of technology integration while also indicating the need for sustained improvement in institutional support and pedagogical innovation to fully maximize digital education outcomes.

The next set of findings presents the respondents' digital competence in terms of technological knowledge, technological pedagogical knowledge, technological content knowledge, digital problem-solving and adaptability, digital safety and ethical awareness, and digital creativity and innovation. In terms of technological knowledge, the findings revealed that the 109 respondents obtained an overall sub-mean of 4.66 with a standard deviation of

0.47, interpreted as Very High. This indicates that teachers possess strong foundational technical skills necessary for operating, managing, and maintaining digital tools used in instructional settings. The result suggests that respondents have the operational competence needed to support effective classroom technology integration.

Among the indicators, the statement “I can operate hardware like laptops, projectors, and Smart TVs” obtained the highest mean of 4.85 with a standard deviation of 0.36, interpreted as Very High. This suggests that teachers demonstrate a very high level of basic technical proficiency, reflecting the foundational requirement of digital competence in which the ability to operate devices serves as the entry point for deeper technology integration in instruction. The statement “I can connect devices to peripheral equipment (printers, speakers)” obtained a mean of 4.76 with a standard deviation of 0.43, interpreted as Very High, while “I can manage digital files effectively (naming, saving, cloud storage)” obtained a mean of 4.72 with a standard deviation of 0.45, also interpreted as Very High. These results indicate strong operational and organizational digital skills that are essential for ensuring smooth classroom instruction and efficient use of digital resources.

The statement “I am proficient in using basic productivity software (Word, Excel)” obtained a mean of 4.68 with a standard deviation of 0.47, interpreted as Very High, while “I know how to install and update educational applications/software” obtained the lowest mean of 4.29 with a standard deviation of 0.66, also interpreted as Very High. Although still very high, the comparatively lower mean and higher standard deviation for installing and updating educational applications or software suggest that more advanced technical maintenance skills may vary among respondents. This pattern indicates that teachers are highly competent in routine digital tasks but may require additional support in more technical functions related to software management.

Overall, the findings suggest that teachers possess strong technological foundations that support effective classroom integration of digital tools. This aligns with Sellami and Santhosh (2024), who emphasized that technology integration begins with functional digital access and the strategic use of tools in instructional settings rather than simple exposure. However, Shang (2021) cautioned that technical proficiency alone does not guarantee pedagogical transformation. Teachers may be skilled in operating devices but may still require development in using them to foster active learning, collaboration, and deeper cognitive engagement. Timotheou (2022) further explained that digital competence must extend beyond operational skills to include critical evaluation, adaptability, and safe use of technology. Thus, while the respondents’ technological knowledge is Very High, continued professional development remains necessary to strengthen higher-order digital fluency and ensure that technical competence translates into meaningful instructional innovation.

In terms of technological pedagogical knowledge, the findings revealed that the 109 respondents obtained an overall sub-mean of 4.59 with a standard deviation of 0.52, interpreted as Very High. This indicates that teachers are highly capable of integrating technology into their pedagogical practices in ways that enhance teaching effectiveness, promote student engagement, and support meaningful classroom interaction. The highest-rated indicator, “I can choose technologies that enhance my specific teaching style,” obtained a mean of 4.63 with a standard deviation of 0.50, interpreted as Very High. This suggests that respondents make intentional decisions in selecting digital tools based on instructional needs, teaching approaches, and classroom contexts rather than using technology merely for convenience.

The indicators “I use technology to facilitate student-centered learning activities” and “I can use digital tools to manage classroom interactions effectively” both obtained a mean of 4.60, with standard deviations of 0.53 and 0.49, respectively, and were interpreted as Very High. These findings indicate that respondents are not simply using technology for presentation purposes but are actively applying it to support participatory, interactive, and learner-centered

classroom environments. The statement “I can adapt my teaching methods to suit a digital environment” obtained a mean of 4.58 with a standard deviation of 0.51, interpreted as Very High, showing that teachers demonstrate pedagogical flexibility in adjusting their instructional methods to digital or technology-supported settings. Meanwhile, the statement “I use technology to provide immediate feedback on student work” obtained a mean of 4.55 with a standard deviation of 0.54, also interpreted as Very High, indicating that teachers recognize the role of digital tools in supporting timely assessment and responsive instruction.

These findings align with Shang (2021), who emphasized that true technology integration transforms classrooms into dynamic learning ecosystems where learners actively construct knowledge through digital engagement. The results also reflect the perspective of Sellami and Santhosh (2024), who described digital integration as a deliberate pedagogical strategy in which technology is not treated as an add-on but as an embedded instructional component. From the standpoint of Lin (2022), effective classroom instruction requires the harmonization of curriculum, pedagogy, and learner needs, and the respondents’ Very High technological pedagogical knowledge indicates that they are able to use technology as a mediating tool to make instruction more interactive, flexible, and responsive. Timotheou (2022) likewise emphasized that digital competence includes the ability to apply technology in pedagogically meaningful ways. Overall, the findings suggest that respondents possess strong technological pedagogical knowledge, enabling them to design and implement digitally enriched instruction that supports active, student-centered learning.

In terms of technological content knowledge, the findings revealed that the 109 respondents obtained an overall sub-mean of 4.27 with a standard deviation of 0.63, interpreted as Very High. This suggests that teachers demonstrate strong competence in understanding how technology interacts with subject matter and how digital tools can be used to enhance content delivery. The highest-rated indicator, “I understand how technology changes the way my subject is taught,” obtained a mean of 4.75 with a standard deviation of 0.43, interpreted as Very High. This indicates that respondents have strong awareness of the transformative role of digital tools in curriculum delivery and subject instruction.

The statement “I know which technologies are best for teaching my specific subject” obtained a mean of 4.58 with a standard deviation of 0.53, interpreted as Very High, while “I can find high-quality digital resources relevant to my curriculum” obtained a mean of 4.43 with a standard deviation of 0.61, also interpreted as Very High. These findings indicate that teachers are capable of selecting and curating digital materials that align with curriculum standards and instructional objectives. This supports Sellami and Santhosh (2024), who emphasized that effective technology integration requires intentional selection of tools aligned with learning goals. However, the lower mean scores for “I use subject-specific software to explain complex concepts,” which obtained 4.07 with a standard deviation of 0.72, and “I use digital simulations or virtual labs to demonstrate topics,” which obtained 3.50 with a standard deviation of 0.85, suggest that more advanced content-specific applications are less strongly demonstrated than general digital resource selection. Although both were presented with Very High interpretations in the source material, their numerical values show that these areas may require further support, especially in relation to simulation-based and subject-specific digital instruction.

The findings suggest that while respondents are confident in using general digital resources and selecting technologies for subject teaching, their use of more advanced applications such as subject-specific software, digital simulations, and virtual labs may still be developing. Shang (2021) argued that true digital transformation involves using technology to enable learning experiences that may not be possible through traditional methods, such as

simulations and virtual environments. From Lin's (2022) perspective, effective instruction involves designing learning experiences that connect content, pedagogy, and learner needs, and the respondents' high technological content knowledge indicates their capacity to align content with appropriate technologies. Timotheou (2022) also explained that digital competence includes the ability to critically evaluate and apply digital resources in subject teaching. Overall, the findings reflect strong technological content integration, with room for further enhancement in advanced digital applications that promote experiential, immersive, and simulation-based learning.

In terms of digital problem-solving and adaptability, the findings revealed that the 109 respondents obtained an overall sub-mean of 4.38 with a standard deviation of 0.63, interpreted as Very High. This indicates that teachers demonstrate strong resilience, flexibility, and adaptive capacity when confronted with technological challenges in instructional settings. The highest-rated indicator, "I have alternative plans ready if technology fails during a lesson," obtained a mean of 4.71 with a standard deviation of 0.46, interpreted as Very High. This suggests that respondents are highly proactive in ensuring instructional continuity despite possible technological disruptions.

The statement "I can find online solutions or tutorials for technical problems" obtained a mean of 4.62 with a standard deviation of 0.51, interpreted as Very High, while "I can quickly learn and adapt to new educational technologies" obtained a mean of 4.59 with a standard deviation of 0.56, also interpreted as Very High. These findings reflect the respondents' strong orientation toward self-directed learning and continuous professional development in digital environments. The statement "I am comfortable experimenting with new digital teaching methods" obtained a mean of 4.57 with a standard deviation of 0.60, interpreted as Very High, showing openness to innovation and flexibility in instructional practice. However, the statement "I can troubleshoot common hardware and software issues independently" obtained the lowest mean of 3.39 with a standard deviation of 1.00 and was reported as High in the source material. This result indicates variability in respondents' confidence in technical troubleshooting and suggests that while many teachers are capable of addressing basic issues, others may still rely on external technical assistance.

The findings align with Timotheou (2022), who emphasized that digital competence includes the ability to navigate complex and evolving technological contexts with confidence. The respondents' ability to prepare alternative plans, search for online solutions, adapt to new tools, and experiment with digital teaching methods reflects strong adaptive competence. Shang (2021) similarly argued that true digital integration requires educators to move beyond routine usage and engage in exploratory and adaptive practices that reshape classroom experiences. However, the lower score in independent troubleshooting suggests that technical autonomy remains an area for improvement. Sellami and Santhosh (2024) emphasized that effective technology integration requires not only the use of digital tools but also autonomy in managing them, particularly in contexts where immediate technical support may not be available. From Lin's (2022) perspective, instructional quality depends on the teacher's ability to sustain learning continuity, and the respondents' high level of preparedness for technology failure reflects strong instructional resilience. Overall, the findings indicate that respondents possess strong adaptive capabilities and digital problem-solving skills, although strengthening technical troubleshooting competencies would further enhance their independence and deepen technology integration in instruction.

In terms of digital safety and ethical awareness, the findings revealed that the 109 respondents obtained an overall sub-mean of 4.77 with a standard deviation of 0.41, interpreted as Very High. This indicates that teachers have a strong understanding of responsible, ethical, and secure use of digital technologies in educational contexts. The highest-rated indicator, "I teach students about 'netiquette' and digital citizenship," obtained a mean of 4.84 with a

standard deviation of 0.36, interpreted as Very High. This highlights the respondents' active role in promoting responsible digital behavior, proper online communication, and digital citizenship among learners.

The statements "I model the responsible and ethical use of technology for students" and "I know how to protect students from inappropriate online content" both obtained a mean of 4.81 with a standard deviation of 0.40, interpreted as Very High. These findings suggest that respondents not only understand digital ethics but also model and enforce ethical technology use in classroom practice. The statement "I understand the importance of data privacy and cybersecurity" obtained a mean of 4.75 with a standard deviation of 0.43, interpreted as Very High, reflecting strong awareness of digital risks and protection strategies. Similarly, "I follow copyright laws when using online resources and images" obtained a mean of 4.63 with a standard deviation of 0.48, interpreted as Very High, demonstrating respect for intellectual property and legal standards in digital content use.

These results are significant because effective technology integration requires not only technical and pedagogical competence but also ethical responsibility. Timotheou (2022) emphasized that digital competence includes safeguarding learners and fostering responsible digital participation. Sellami and Santhosh (2024) likewise argued that effective digital integration must be ethical, ensuring that technology is used in ways that protect learners and uphold academic integrity. From Shang's (2021) perspective, meaningful digital transformation requires a safe and responsible digital ecosystem, and the respondents' Very High scores indicate that they contribute to creating such an environment. Lin (2022) further emphasized that instruction must incorporate values and responsible citizenship. Overall, the findings show that respondents possess a very strong foundation in digital safety and ethical awareness, ensuring that technology integration in their classrooms is not only effective but also responsible, secure, and aligned with ethical standards in education.

In terms of digital creativity and innovation, the findings revealed that the 109 respondents obtained an overall sub-mean of 4.52 with a standard deviation of 0.53, interpreted as Very High. This indicates that teachers actively engage in creative and innovative uses of digital tools to enhance instruction, support learner engagement, and enrich classroom learning experiences. The highest-rated indicator, "I collaborate with other teachers to develop digital resources," obtained a mean of 4.86 with a standard deviation of 0.35, interpreted as Very High. This finding reflects strong professional collaboration among teachers in producing, sharing, and improving digital instructional resources.

The statements "I use technology to design innovative activities for my students" and "I encourage students to use digital tools for creative projects" both obtained a mean of 4.72, with standard deviations of 0.45 and 0.47, respectively, and were interpreted as Very High. These findings demonstrate that respondents are not only users of technology but also facilitators of creativity, enabling learners to use digital tools for expressive, project-based, and meaningful learning activities. The statement "I stay updated on the latest digital trends in education" obtained a mean of 4.59 with a standard deviation of 0.55, interpreted as Very High, suggesting that respondents are engaged in continuous professional learning and remain attentive to emerging digital developments in education. However, the statement "I create my own digital learning materials (videos, infographics)" obtained the lowest mean of 3.72 with a standard deviation of 0.84. Although interpreted as Very High in the source material, this comparatively lower mean suggests that original digital content creation may be less frequent or more challenging for some respondents.

The findings align with Shang (2021), who emphasized that true technology integration transforms classrooms into spaces of active knowledge construction and creativity. The results

indicate that teachers are already applying technology to support innovation in instructional design and learner participation. However, the lower result in the creation of original digital learning materials reflects the observation of Sellami and Santhosh (2024) that deeper levels of digital integration require not only the consumption and adaptation of digital resources but also the production of original digital content. From Lin's (2022) perspective, instruction should foster creativity and adaptability in both teachers and learners, and the high levels of innovation observed in the findings suggest that respondents are incorporating these principles into classroom practice. Timotheou (2022) further emphasized that digital competence includes creativity as a core dimension because it enables educators to design engaging, meaningful, and relevant learning experiences. Overall, the results indicate that respondents demonstrate strong creativity and innovation in digital teaching, although further development in producing original digital content would strengthen their role as digital content creators and enhance the transformative quality of classroom technology integration.

The summary results on the digital competence of the respondents revealed a grand mean of 4.53 with a standard deviation of 0.53, interpreted as Very High. This indicates that respondents consistently demonstrate strong proficiency across all dimensions of digital competence, including technological knowledge, technological pedagogical knowledge, technological content knowledge, digital problem-solving and adaptability, digital safety and ethical awareness, and digital creativity and innovation. Among all domains, digital safety and ethical awareness obtained the highest mean of 4.77 with a standard deviation of 0.41, interpreted as Very High, indicating that respondents place strong emphasis on responsible, ethical, and secure use of technology. This was followed by technological knowledge with a mean of 4.66 and a standard deviation of 0.47, and technological pedagogical knowledge with a mean of 4.59 and a standard deviation of 0.52, both interpreted as Very High. These findings show that teachers possess highly developed foundational digital skills and strong instructional integration competence.

Digital creativity and innovation obtained a mean of 4.52 with a standard deviation of 0.53, while digital problem-solving and adaptability recorded a mean of 4.38 with a standard deviation of 0.63, both interpreted as Very High. These results demonstrate that respondents are capable of designing innovative learning experiences and responding effectively to technological challenges. Meanwhile, technological content knowledge obtained the lowest mean of 4.27 with a standard deviation of 0.63, though still interpreted as Very High. This suggests that content-specific digital integration may require further strengthening compared to other digital competence domains, particularly in the use of subject-specific software, simulations, and virtual learning environments.

These findings strongly support the conceptual framework of digital integration proposed by Sellami and Santhosh (2024), which emphasizes that effective technology use in education must be intentional, structured, and aligned with instructional goals. The consistently Very High scores across all domains indicate that respondents have successfully integrated technology into their teaching practices rather than using it merely as a supplementary tool. Shang (2021) further explained that true integration transforms the classroom into a dynamic environment of active learning and collaboration, and the results of the present study suggest that respondents are moving toward this level of transformation, particularly in the areas of pedagogical application, creativity, and safety awareness. From Lin's (2022) perspective, effective classroom instruction requires the integration of curriculum, pedagogy, and learner engagement strategies, and the high overall competence level suggests that teachers are successfully aligning these elements through digital tools. Timotheou (2022) emphasized that digital competence is multidimensional, requiring technical, pedagogical, ethical, adaptive, and creative skills. Overall, the findings confirm that respondents demonstrate a Very High level of digital competence in classroom instruction, indicating that digital competence is well

established among teachers and that they are capable of delivering modern, technology-enhanced instruction that supports 21st-century learning outcomes.

The next set of findings presents the challenges encountered by the respondents in integrating technology in classroom instruction in terms of access to digital devices and ICT infrastructure, access to internet connectivity, training and professional development opportunities, time allocation for lesson planning and instructional delivery, student-related factors, and administrative and institutional support. In terms of access to digital devices and ICT infrastructure, the findings revealed that the 109 respondents obtained an overall sub-mean of 4.78 with a standard deviation of 0.41, interpreted as Very High. This indicates that inadequate technological resources remain a persistent and serious barrier to effective technology integration in classroom instruction.

The highest-rated concern, “I do not always have access to functional computers or tablets when needed,” obtained a mean of 4.84 with a standard deviation of 0.36, interpreted as Very High. This was followed closely by “I find that outdated equipment limits my ability to integrate technology,” which obtained a mean of 4.82 with a standard deviation of 0.39, and “I lack access to sufficient digital devices for classroom instruction,” which obtained a mean of 4.81 with a standard deviation of 0.40, both interpreted as Very High. These findings indicate that even when teachers possess strong technological knowledge and instructional competence, insufficient access to functional, updated, and adequate devices significantly limits the practical application of technology in classroom instruction.

The statements “I encounter problems using technology because of unreliable internet connectivity” and “I experience difficulty integrating technology due to limited ICT facilities in my school” obtained means of 4.73 with a standard deviation of 0.44 and 4.68 with a standard deviation of 0.47, respectively, both interpreted as Very High. These results further reinforce the continuing presence of infrastructural inadequacies that hinder the smooth implementation of digital instruction. The findings highlight a disconnect between teacher competence and institutional readiness. While technological knowledge provides teachers with the foundational ability to operate digital tools, its effectiveness depends heavily on the availability of functional devices, reliable internet, and adequate ICT facilities. Without sufficient infrastructure, teachers may be forced to modify, reduce, or abandon planned digital activities, limiting the full realization of technological pedagogical knowledge and technological content knowledge in actual classroom practice.

The findings support Clark-Wilson (2020), who emphasized that effective digital integration requires both technical skill and enabling environments. Even if teachers possess the competence to operate and apply digital tools, infrastructure gaps weaken the full expression of their technological capacity. The results therefore suggest that successful technology integration is not solely dependent on teacher capability but also on systemic investment in ICT resources that enable sustained and meaningful classroom use. Overall, despite the respondents’ Very High digital competence levels, access to digital devices and ICT infrastructure remains a major challenge, underscoring the need for greater institutional investment, equitable resource allocation, and sustained infrastructure improvement.

In terms of access to internet connectivity, the findings revealed that the 109 respondents obtained an overall sub-mean of 4.76 with a standard deviation of 0.35, interpreted as Very High. This indicates that internet connectivity is one of the most severe challenges encountered by respondents in integrating technology into classroom instruction. The highest-rated indicator, “Frequent internet downtime disrupts my planned digital lessons,” obtained a mean of 4.97 with a standard deviation of 0.16, interpreted as Very High, showing that instructional disruptions caused by internet downtime are nearly constant. This was followed

by “Unreliable internet connectivity hinders technology use,” which obtained a mean of 4.95 with a standard deviation of 0.21, and “The internet speed in school is slow for classroom activities,” which obtained a mean of 4.80 with a standard deviation of 0.40, both interpreted as Very High. These findings indicate that unstable and slow internet access directly interferes with real-time digital instruction, online learning activities, multimedia use, and technology-supported assessment.

The findings further showed that “Internet access is only limited to specific school offices” obtained a mean of 4.62 with a standard deviation of 0.49, while “I often have to use my personal mobile data to teach” obtained a mean of 4.43 with a standard deviation of 0.50, both interpreted as Very High. These results suggest that internet access is not consistently available for classroom use and that teachers may be compelled to rely on their own personal resources to deliver technology-supported instruction. The need to use personal mobile data emphasizes inequity in institutional support and places additional financial and logistical burdens on teachers.

These findings highlight that connectivity is not merely an inconvenience but a structural barrier that affects lesson continuity, instructional delivery, learner engagement, and the feasibility of technology-enhanced learning. In relation to technological pedagogical knowledge, unstable connectivity restricts teachers’ ability to implement interactive, student-centered strategies even when they possess strong pedagogical understanding of digital tools. Platforms for online assessment, collaborative learning, multimedia presentations, and resource sharing depend on stable internet access, and without it, their instructional value cannot be fully realized. Clark-Wilson (2020) emphasized that technology integration requires enabling environments that support the use of digital tools in practice. Likewise, the findings reinforce the importance of digital problem-solving and adaptability, as teachers must constantly modify instructional plans when connectivity fails. However, as the near-perfect mean scores suggest, these disruptions are frequent enough that adaptation becomes reactive rather than strategic. Karakose (2021) argued that adaptability is essential, but excessive reliance on adaptation indicates systemic failure rather than individual deficiency. Overall, the uniformity of high means across all indicators suggests that connectivity issues are widespread and not isolated to specific schools. Without stable and equitable internet access, even well-designed digital instruction cannot be implemented effectively, limiting the full potential of technology-enhanced education.

In terms of training and professional development opportunities, the findings revealed that the 109 respondents obtained an overall sub-mean of 4.81 with a standard deviation of 0.38, interpreted as Very High. This indicates that the lack of adequate training and professional development is a major challenge in technology integration. The highest-rated indicator, “I have not received enough training on integrating digital technology into teaching,” obtained a mean of 4.93 with a standard deviation of 0.26, interpreted as Very High. This finding shows that respondents strongly perceive their training exposure as insufficient in relation to the demands of effective digital technology integration. This was followed by “I do not receive regular updates on new educational technologies,” which obtained a mean of 4.83 with a standard deviation of 0.37, and “I lack opportunities to attend technology-related training programs,” which obtained a mean of 4.81 with a standard deviation of 0.40, both interpreted as Very High. These results demonstrate that teachers are not adequately supported in developing advanced digital competencies through sustained and updated professional learning opportunities.

The statements “I find it challenging to integrate technology because of insufficient technical training” and “I feel unprepared to use new digital tools due to limited professional development” obtained means of 4.79 with a standard deviation of 0.41 and 4.72 with a standard deviation of 0.45, respectively, both interpreted as Very High. These findings indicate

that limited technical training directly affects teachers' preparedness, confidence, and ability to integrate digital tools meaningfully into instruction. The results reveal a systemic gap in institutional capacity-building programs, where available professional development does not appear to keep pace with technological advancement and classroom demands.

This finding is directly connected to technological pedagogical knowledge, which requires continuous professional development to effectively align technology with pedagogy. Clark-Wilson (2020) emphasized that teachers need sustained support in developing the ability to integrate digital tools into pedagogically meaningful practices. Without continuous training, teachers may default to basic or repetitive technology use instead of developing innovative instructional applications. The lack of professional development also affects technological knowledge because even teachers who are familiar with basic operations require continuous upskilling as digital tools evolve. It also influences digital creativity and innovation because teachers with limited training may be less likely to design original digital materials or experiment with new instructional approaches, leading them instead to rely on pre-existing content. Karakose (2021) emphasized that adaptability depends on exposure and learning opportunities. Therefore, insufficient professional development weakens teachers' capacity to adapt effectively to technological change. Overall, the findings indicate that professional development is not optional but essential for sustaining digital transformation. Without structured, continuous, and technology-focused training, teachers remain constrained in their ability to fully integrate technology into meaningful pedagogy.

In terms of time allocation in lesson planning and instructional delivery, the findings revealed that the 109 respondents obtained an overall sub-mean of 4.68 with a standard deviation of 0.45, interpreted as Very High. This indicates that time constraints constitute a significant challenge in integrating technology into classroom instruction. The highest-rated indicator, "I find it challenging to use digital tools within limited class time," obtained a mean of 4.83 with a standard deviation of 0.38, interpreted as Very High. This suggests that teachers experience difficulty maximizing digital tools within the limited duration of actual classroom instruction. The statements "I do not have enough time to plan technology-based lessons" and "I feel pressured to cover the curriculum, leaving little time for technology integration" both obtained a mean of 4.75 with a standard deviation of 0.43, also interpreted as Very High. These results indicate that the demands of lesson planning and curriculum coverage create instructional pressure that may reduce opportunities for meaningful technology use.

The findings further show that "I find that setting up digital tools consumes valuable instructional time" obtained a mean of 4.59 with a standard deviation of 0.49, while "I find that integrating technology requires additional preparation time" obtained a mean of 4.49 with a standard deviation of 0.50, both interpreted as Very High. These findings suggest that teachers experience a dual burden in covering curriculum requirements while also attempting to incorporate digital tools into instruction. As a result, teachers may be compelled to prioritize content delivery over innovation, especially when technology setup and preparation reduce available instructional time. In relation to technological pedagogical knowledge, time constraints limit teachers' ability to design and implement interactive digital strategies. Clark-Wilson (2020) emphasized that effective technological pedagogical knowledge requires deliberate instructional planning, which becomes difficult under time pressure. Thus, although teachers may possess the competence and willingness to integrate technology, inadequate time allocation may restrict the depth and quality of digital learning experiences.

In terms of student-related factors, the findings revealed that the 109 respondents obtained an overall sub-mean of 4.88 with a standard deviation of 0.33, interpreted as Very High. This represents the highest overall challenge among the categories presented, indicating

that student behavior, readiness, access, and digital competence strongly hinder technology integration. The indicators “I experience challenges when students misuse technology during lessons” and “I find it difficult to integrate technology when students have limited access to devices at home” both obtained the highest mean of 4.90 with a standard deviation of 0.30, interpreted as Very High. These findings suggest that technology misuse and unequal access to devices significantly affect the success of digital instruction.

The statement “I encounter problems when students have varying levels of technological competence” obtained a mean of 4.88 with a standard deviation of 0.33, while “I find that some students are easily distracted when using digital devices” obtained a mean of 4.87 with a standard deviation of 0.34, both interpreted as Very High. The statement “I encounter difficulties when students lack basic digital skills” obtained a mean of 4.83 with a standard deviation of 0.38, also interpreted as Very High. These findings indicate that teachers must manage not only academic differences but also unequal levels of learner digital literacy, access, discipline, and readiness. In relation to technological pedagogical knowledge, these student-related factors require teachers to balance engagement and control when using digital tools. Clark-Wilson (2020) emphasized the importance of managing classroom dynamics through technology, yet the findings show that external student-related constraints may limit effective implementation. The results further imply that technological content knowledge becomes less effective when learners lack the foundational digital skills needed to use subject-specific tools efficiently. Thus, student-related factors emerge as major structural barriers that require both classroom-level strategies and broader equity-focused interventions.

In terms of administrative and institutional support limitations, the findings revealed that the 109 respondents obtained an overall sub-mean of 4.70 with a standard deviation of 0.49, interpreted as Very High. This indicates that respondents perceive administrative and institutional support as insufficient for sustaining effective technology integration. The highest-rated indicator, “I feel that school leadership does not prioritize digital technology integration,” obtained a mean of 4.85 with a standard deviation of 0.36, interpreted as Very High. This was followed by “I experience challenges due to lack of clear policies on technology integration,” which obtained a mean of 4.83 with a standard deviation of 0.37, and “I feel that there is limited encouragement from administrators to use technology,” which obtained a mean of 4.79 with a standard deviation of 0.47, both interpreted as Very High. These findings suggest systemic gaps in leadership direction, policy clarity, and administrative encouragement.

The statement “I encounter difficulties due to insufficient funding for educational technology” obtained a mean of 4.57 with a standard deviation of 0.60, while the repeated indicator “I experience challenges due to lack of clear policies on technology integration” obtained a mean of 4.44 with a standard deviation of 0.64, both interpreted as Very High. The repeated policy-related indicator suggests organizational inconsistency, which may affect long-term planning and classroom-level implementation of digital instruction. From the perspective of technological knowledge, administrative support is necessary to provide the resources needed for teachers to apply their technical skills. Similarly, technological pedagogical knowledge is weakened when schools do not provide structured guidance on how digital tools should be integrated into teaching. The findings therefore indicate that teacher competence alone cannot ensure effective digital transformation without strong leadership, clear policies, adequate funding, and sustained institutional support.

The summary results on the challenges encountered by the respondents in integrating technology in classroom instruction revealed a grand mean of 4.77 with a standard deviation of 0.40, interpreted as Very High. This indicates that respondents consistently experience multiple and overlapping barriers in technology integration. Among the challenge domains, student-related factors obtained the highest mean of 4.88 with a standard deviation of 0.33, followed by training and professional development opportunities with a mean of 4.81 and a

standard deviation of 0.38, access to digital devices and ICT infrastructure with a mean of 4.78 and a standard deviation of 0.41, access to internet connectivity with a mean of 4.76 and a standard deviation of 0.35, administrative and institutional support limitations with a mean of 4.70 and a standard deviation of 0.49, and time allocation in lesson planning and instructional delivery with a mean of 4.68 and a standard deviation of 0.45. All domains were interpreted as Very High, showing that the challenges are persistent, systemic, and interconnected.

These findings indicate that technology integration challenges are both structural and pedagogical in nature. The high rating for training and professional development shows that teacher preparedness remains a critical concern, while access-related constraints demonstrate that teachers cannot consistently apply their technical skills when devices, infrastructure, and connectivity are inadequate. Time allocation and administrative support also highlight systemic constraints that affect implementation efficiency. The findings align with the TPACK framework discussed by Clark-Wilson (2020), which emphasizes that effective technology integration requires the simultaneous development of technological knowledge, technological pedagogical knowledge, and technological content knowledge. However, the Very High challenge levels across all domains indicate that these competencies are constrained by external factors. Although teachers demonstrate digital problem-solving and adaptability, the consistently high means suggest that adaptation is being used as a coping mechanism rather than a sustainable solution. Therefore, addressing these challenges requires coordinated interventions involving infrastructure improvement, continuous professional development, policy support, learner readiness programs, and stronger administrative systems.

The multiple regression analysis examined the relationship between the respondents' profile variables and their technology integration in classroom instruction. The model summary showed an R value of .581, indicating a moderate positive relationship between the combined predictor variables and technology integration. This suggests that the respondents' demographic and institutional profile variables collectively have a meaningful association with the extent to which teachers integrate technology into instructional practices. The R Square value of .337 indicates that 33.7% of the variance in technology integration is explained by the predictor variables included in the model. This means that approximately one-third of the differences in teachers' technology integration practices may be attributed to their profile characteristics and school-related conditions.

The Adjusted R Square value of .270 provides a more conservative estimate by accounting for the number of predictors included in the model. This indicates that after adjustment, 27% of the variation in technology integration remains explained by the independent variables. The decrease from the R Square value of .337 to the Adjusted R Square value of .270 suggests that some predictors may have weaker explanatory power when considered simultaneously, indicating that not all profile variables contribute equally to technology integration outcomes. The Standard Error of the Estimate of .38732 indicates the average deviation of observed values from the regression line. This relatively low value suggests that the model has acceptable predictive accuracy, meaning that the predicted values of technology integration are reasonably close to the actual responses.

The findings may be interpreted within the framework of instructional readiness, which emphasizes the combined influence of technical skill, psychological preparedness, and institutional support (Vargo, 2020). The moderate explanatory power of the model suggests that readiness for technology integration is shaped not only by individual characteristics but also by contextual and systemic factors. The model also relates to digital creativity and innovation as discussed by Asio and Bayucca (2021), which emphasizes that teachers' ability to integrate technology is influenced by both personal capacity and environmental support.

Overall, the findings confirm that teacher profile variables play a significant but partial role in explaining technology integration, highlighting the complexity of digital adoption in educational settings and suggesting that other unmeasured factors such as attitudes, pedagogical beliefs, self-efficacy, access, motivation, and institutional conditions may also influence technology integration practices.

The ANOVA results for the multiple regression model examining the relationship between the respondents' profile variables and technology integration in classroom instruction showed that the regression sum of squares was 7.482, the residual sum of squares was 14.701, and the total sum of squares was 22.183. With df values of 10 for regression, 98 for residual, and 108 for total, the model produced a mean square of .748 for regression and .150 for residual. The computed F-value of 4.988 with a significance value of .000 indicates that the overall regression model is statistically significant at the 0.05 level. Therefore, the null hypothesis stating that there is no significant relationship between the profile of the respondents and their technology integration in classroom instruction is rejected. This means that the combined profile variables significantly explain variation in teachers' technology integration practices.

The significance of the model suggests that technology adoption among respondents is not random but is shaped by the combined influence of demographic, professional, and institutional factors. The regression sum of squares of 7.482 indicates that a meaningful portion of the total variance in technology integration is accounted for by the predictors, while the residual sum of squares of 14.701 shows that a substantial portion remains unexplained by the model. This reinforces the interpretation that technology integration is influenced by measurable profile characteristics but is also affected by other factors not included in the regression analysis. The findings support the concept of instructional readiness (Vargo, 2020), which emphasizes that effective technology integration depends on the interaction of skills, attitudes, and environmental support. They also align with Nikolopoulou's (2020) Technology Usefulness framework, which suggests that perceived benefits and contextual conditions influence technology adoption. Since the overall model is statistically significant, the results provide a valid basis for examining the individual predictors of technology integration.

The multiple regression coefficients showed that among the profile variables examined, age and digital tools available at school were the only statistically significant predictors of technology integration in classroom instruction. Age obtained a beta value of $-.399$ with a p-value of .005, indicating a significant negative relationship with technology integration at the 0.05 level. This means that as age increases, technology integration tends to decrease, suggesting that younger teachers are more likely to integrate technology effectively compared with older teachers. This pattern may reflect generational differences in digital exposure, adaptability, and familiarity with emerging technologies. Digital tools available at school obtained a beta value of $.407$ with a p-value of .000, indicating a significant positive relationship with technology integration at the 0.05 level. This means that greater availability of digital tools is associated with higher levels of technology integration, making resource availability the strongest positive predictor in the model.

Other profile variables were not statistically significant predictors of technology integration. Sex obtained a beta value of $.165$ with a p-value of .080, civil status obtained a beta value of $.082$ with a p-value of .402, highest educational attainment obtained a beta value of $-.041$ with a p-value of .643, position obtained a beta value of $.088$ with a p-value of .420, school obtained a beta value of $-.155$ with a p-value of .097, grade level handled obtained a beta value of $.096$ with a p-value of .260, number of years in teaching obtained a beta value of $-.199$ with a p-value of .196, and number of relevant seminars/trainings attended obtained a beta value of $.164$ with a p-value of .086. Since all these p-values are greater than 0.05, the null hypothesis is not rejected for these individual predictors. This indicates that these variables do not

significantly influence technology integration when considered simultaneously with the other profile variables in the model.

The results suggest that technology integration is primarily driven by resource availability and generational factors rather than by demographic or professional characteristics alone. The significant positive influence of digital tools available at school supports the TPACK framework discussed by Clark-Wilson (2020), which emphasizes that technological knowledge can only be meaningfully applied when teachers have access to functional tools and enabling environments. The findings also relate to Nikolopoulou's (2020) perspective on digital usefulness and ease of use, as teachers may be more influenced by practical accessibility than by theoretical qualifications or professional experience. Although seminar attendance showed a positive beta value of .164, its p-value of .086 indicates that training alone did not significantly predict technology integration, suggesting that professional development must be accompanied by adequate resources, institutional reinforcement, and practical opportunities for application. Overall, the findings demonstrate that meaningful digital transformation depends heavily on infrastructure, equitable access, and support systems that allow teachers to translate competence into actual classroom practice.

The model summary for the multiple regression analysis examining the relationship between the respondents' profile variables and their digital competence showed an R value of .469, indicating a moderate relationship between the combined set of profile variables and digital competence. The R Square value of .220 indicates that 22% of the variance in digital competence is explained by the selected profile variables, while the remaining 78% may be attributed to other unmeasured factors such as institutional environment, ICT infrastructure, access to resources, personal motivation, school leadership support, and prior training experiences. The Adjusted R Square value of .140 provides a more conservative estimate, indicating that after accounting for the number of predictors in the model, 14% of the variation in digital competence is explained by the independent variables. The standard error of the estimate of .22833 suggests a relatively low level of prediction error and indicates that the model's estimates are moderately precise.

These findings indicate that respondent profile variables have a meaningful but limited explanatory role in predicting digital competence. The reduction from the R Square value of .220 to the Adjusted R Square value of .140 suggests that some variables contribute minimally when considered together with other predictors. This supports the view that digital competence is a multifaceted construct shaped not only by demographic and professional characteristics but also by broader systemic and contextual enablers. Thus, while teacher profile variables help explain some differences in digital competence, the majority of variation remains influenced by factors beyond the profile variables included in the regression model.

The ANOVA results for the regression model examining the relationship between respondents' profile variables and digital competence showed a regression sum of squares of 1.441, a residual sum of squares of 5.109, and a total sum of squares of 6.550. With df values of 10 for regression, 98 for residual, and 108 for total, the model yielded a mean square of .144 for regression and .052 for residual. The computed F-value of 2.764 with a significance value of .005 indicates that the regression model is statistically significant at the 0.05 level. Therefore, the null hypothesis stating that there is no significant relationship between the profile of the respondents and their digital competence is rejected. This means that the profile variables collectively influence the respondents' digital competence.

Although the model is statistically significant, the modest level of explained variance indicates that digital competence is not fully determined by respondent profile variables. The significant F-value confirms that the predictors collectively improve the explanation of

variations in digital competence compared with a model without predictors. However, the remaining unexplained variance suggests that other factors, including technological environment, continuous professional development, administrative support, access to digital tools, and personal motivation, may also contribute significantly to digital competence. The ANOVA results therefore validate the model as statistically meaningful while also highlighting the complexity of digital competence as an educational construct influenced by both personal and contextual determinants.

The multiple regression coefficients identifying predictors of digital competence showed that sex and digital tools available at school were statistically significant predictors. Sex obtained a beta value of .269 with a p-value of .009, indicating a significant relationship with digital competence at the 0.05 level. This means that differences in digital competence exist between male and female respondents, although the direction of the difference depends on the coding used in the dataset. Digital tools available at school obtained a beta value of .267 with a p-value of .010, also indicating a significant positive relationship with digital competence at the 0.05 level. This means that teachers with greater access to digital tools in school are more likely to develop and demonstrate higher digital competence.

Other variables were not statistically significant predictors of digital competence. Age obtained a beta value of .029 with a p-value of .846, civil status obtained a beta value of .196 with a p-value of .067, highest educational attainment obtained a beta value of .006 with a p-value of .953, position obtained a beta value of -.049 with a p-value of .681, school obtained a beta value of -.194 with a p-value of .057, grade level handled obtained a beta value of .078 with a p-value of .398, number of years in teaching obtained a beta value of -.110 with a p-value of .511, and number of relevant seminars/trainings attended obtained a beta value of .064 with a p-value of .531. Since these p-values are greater than 0.05, the null hypothesis is not rejected for these individual predictors. However, civil status with $p = .067$ and school with $p = .057$ approached marginal significance, suggesting possible weak associations that may become more evident in larger samples or different contexts.

The findings emphasize that digital competence is more strongly influenced by access to technological resources and certain demographic factors than by traditional professional variables alone. The significant effect of digital tools available at school reinforces the importance of exposure and practice in building technological proficiency. Teachers who regularly access and use digital tools are more likely to develop operational skills, confidence, adaptability, and instructional competence in digital environments. The result also suggests that educational attainment, position, years of teaching, and seminar attendance do not automatically translate into higher digital competence unless supported by accessible resources and opportunities for practical application. Overall, the findings support the broader theoretical perspective that digital competence develops through the interaction of individual characteristics and enabling technological environments.

The model summary for the regression analysis examining the relationship between the profile of the respondents and the challenges encountered in integrating technology in classroom instruction showed an R value of .518, indicating a moderate positive relationship between the combined profile variables and the level of challenges experienced by the respondents. The R Square value of .268 indicates that 26.8% of the variance in the challenges encountered is explained by the profile variables included in the model. This means that more than one-fourth of the differences in technology integration challenges may be attributed to measurable profile-related factors. However, the remaining 73.2% of the variance is explained by other external or situational factors not included in the model, such as infrastructure quality, administrative policies, school-level support systems, learner readiness, and access to resources.

The Adjusted R Square value of .194 provides a more conservative estimate and indicates that after adjustment, 19.4% of the variance in the challenges encountered is explained by the independent variables. The reduction from R Square to Adjusted R Square suggests that not all predictors contribute equally to explaining the challenges and that some may have minimal or overlapping explanatory power. The standard error of the estimate of .42104 indicates a moderate level of dispersion between observed and predicted values, suggesting that the model provides a reasonably acceptable fit but still leaves variability in predicting the challenges experienced by respondents.

The findings demonstrate that teacher profile variables have a statistically relevant but partial role in explaining challenges in technology integration. This reinforces the idea that while individual and professional characteristics matter, technology integration challenges are multidimensional and strongly influenced by broader systemic, institutional, and environmental factors. Therefore, addressing these challenges requires not only attention to teacher attributes but also improvement of structural conditions within the educational system.

The ANOVA results for the regression model examining the relationship between respondents' profile variables and the challenges they encounter in integrating technology in classroom instruction showed a regression sum of squares of 6.370, a residual sum of squares of 17.373, and a total sum of squares of 23.743. With df values of 10 for regression, 98 for residual, and 108 for total, the model produced a mean square of .637 for regression and .177 for residual. The computed F-value of 3.593 with a significance value of .000 indicates that the overall regression model is statistically significant at the 0.05 level. Therefore, the null hypothesis stating that there is no significant relationship between the respondents' profile and the challenges encountered in technology integration is rejected.

The significance value of .000 indicates that the probability of the observed relationship occurring by chance is extremely low. This means that the independent variables collectively improve the prediction of technology integration challenges compared with a model without predictors. The mean square regression value of .637 compared with the mean square residual value of .177 further supports the conclusion that the predictors collectively account for meaningful variation in the dependent variable. Although the explanatory power is moderate, the model is statistically meaningful and confirms that teacher-related demographic and professional characteristics significantly influence the challenges encountered in technology integration. At the same time, the findings highlight that these profile variables do not fully account for all variations in challenges, reinforcing the broader interpretation that technology integration difficulties are multifactorial and shaped by infrastructure, institutional policies, administrative support, learner-related factors, and access to resources.

The ANOVA results for the multiple regression model examining the relationship between the respondents' profile variables and technology integration in classroom instruction showed a regression sum of squares of 7.482, a residual sum of squares of 14.701, and a total sum of squares of 22.183. With df values of 10 for regression, 98 for residual, and 108 for total, the model produced a mean square of .748 for regression and .150 for residual. The computed F-value of 4.988 with a significance value of .000 indicates that the overall regression model is statistically significant at the 0.05 level. Therefore, the null hypothesis stating that there is no significant relationship between the profile of the respondents and their technology integration in classroom instruction is rejected. This means that the combined profile variables significantly explain variation in teachers' technology integration practices.

The significance of the model suggests that technology adoption among the respondents is not random but is shaped by the combined influence of demographic, professional, and institutional factors. The regression sum of squares of 7.482 indicates that a meaningful portion

of the total variance in technology integration is accounted for by the predictors, while the residual sum of squares of 14.701 shows that a substantial portion remains unexplained by the model. This reinforces the interpretation that technology integration is influenced by measurable profile characteristics but is also affected by other factors not included in the regression analysis. The findings support the concept of Instructional Readiness (Vargo, 2020), which emphasizes that effective technology integration depends on the interaction of skills, attitudes, and environmental support. They also align with Nikolopoulou's (2020) Technology Usefulness framework, which suggests that perceived benefits and contextual conditions influence technology adoption. Since the overall model is statistically significant, the results provide a valid basis for examining the individual predictors of technology integration.

The multiple regression coefficients showed that among the profile variables examined, age and digital tools available at school were the only statistically significant predictors of technology integration in classroom instruction. Age obtained a beta value of $-.399$ with a p -value of $.005$, indicating a significant negative relationship with technology integration at the 0.05 level. Thus, the null hypothesis is rejected for age. This means that as age increases, technology integration tends to decrease, suggesting that younger teachers are more likely to integrate technology effectively compared with older teachers. This pattern may reflect generational differences in digital exposure, adaptability, and familiarity with emerging technologies. Digital tools available at school obtained a beta value of $.407$ with a p -value of $.000$, indicating a significant positive relationship with technology integration at the 0.05 level. Thus, the null hypothesis is also rejected for this variable. This means that greater availability of digital tools is associated with higher levels of technology integration, making resource availability the strongest positive predictor in the model.

Other profile variables were not statistically significant predictors of technology integration. Sex obtained a beta value of $.165$ with a p -value of $.080$, civil status obtained a beta value of $.082$ with a p -value of $.402$, highest educational attainment obtained a beta value of $-.041$ with a p -value of $.643$, position obtained a beta value of $.088$ with a p -value of $.420$, school obtained a beta value of $-.155$ with a p -value of $.097$, grade level handled obtained a beta value of $.096$ with a p -value of $.260$, number of years in teaching obtained a beta value of $-.199$ with a p -value of $.196$, and number of relevant seminars/trainings attended obtained a beta value of $.164$ with a p -value of $.086$. Since all these p -values are greater than 0.05 , the null hypothesis is not rejected for these individual predictors. This indicates that these variables do not significantly influence technology integration when considered simultaneously with the other profile variables in the model.

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The model summary for the multiple regression analysis examining the relationship between the respondents' profile variables and their digital competence showed an R value of

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The ANOVA results for the regression model examining the relationship between respondents' profile variables and digital competence showed a regression sum of squares of 1.441, a residual sum of squares of 5.109, and a total sum of squares of 6.550. With df values of 10 for regression, 98 for residual, and 108 for total, the model yielded a mean square of .144 for regression and .052 for residual. The computed F-value of 2.764 with a significance value of .005 indicates that the regression model is statistically significant at the 0.05 level. Therefore, the null hypothesis stating that there is no significant relationship between the profile of the respondents and their digital competence is rejected. This means that the profile variables collectively influence the respondents' digital competence.

Although the model is statistically significant, the modest level of explained variance indicates that digital competence is not fully determined by respondent profile variables. The significant F-value confirms that the predictors collectively improve the explanation of variations in digital competence compared with a model without predictors. However, the remaining unexplained variance suggests that other factors, including technological environment, continuous professional development, administrative support, access to digital tools, and personal motivation, may also contribute significantly to digital competence. The ANOVA results therefore validate the model as statistically meaningful while also highlighting the complexity of digital competence as an educational construct influenced by both personal and contextual determinants.

The multiple regression coefficients identifying predictors of digital competence showed that sex and digital tools available at school were statistically significant predictors. Sex obtained a beta value of .269 with a p-value of .009, indicating a significant relationship with digital competence at the 0.05 level. Thus, the null hypothesis is rejected for sex. This means that differences in digital competence exist between male and female respondents, although the direction of the difference depends on the coding used in the dataset. Digital tools available at school obtained a beta value of .267 with a p-value of .010, also indicating a significant positive relationship with digital competence at the 0.05 level. Thus, the null hypothesis is rejected for this variable. This means that teachers with greater access to digital tools in school are more likely to develop and demonstrate higher digital competence.

Other variables were not statistically significant predictors of digital competence. Age obtained a beta value of .029 with a p-value of .846, civil status obtained a beta value of .196 with a p-value of .067, highest educational attainment obtained a beta value of .006 with a p-value of .953, position obtained a beta value of -.049 with a p-value of .681, school obtained a beta value of -.194 with a p-value of .057, grade level handled obtained a beta value of .078 with a p-value of .398, number of years in teaching obtained a beta value of -.110 with a p-value of .511, and number of relevant seminars/trainings attended obtained a beta value of .064 with a p-value of .531. Since these p-values are greater than 0.05, the null hypothesis is not rejected for these individual predictors. However, civil status with $p = .067$ and school with $p = .057$ approached marginal significance, suggesting possible weak associations that may become more evident in larger samples or different contexts.

The findings emphasize that digital competence is more strongly influenced by access to technological resources and certain demographic factors than by traditional professional variables alone. The significant effect of digital tools available at school reinforces the importance of exposure and practice in building technological proficiency. Teachers who regularly access and use digital tools are more likely to develop operational skills, confidence, adaptability, and instructional competence in digital environments. The result also suggests that educational attainment, position, years of teaching, and seminar attendance do not automatically translate into higher digital competence unless supported by accessible resources and opportunities for practical application. Overall, the findings support the broader theoretical perspective that digital competence develops through the interaction of individual characteristics and enabling technological environments.

The model summary for the regression analysis examining the relationship between the profile of the respondents and the challenges encountered in integrating technology in classroom instruction showed an R value of .518, indicating a moderate positive relationship between the combined profile variables and the level of challenges experienced by the respondents. The R Square value of .268 indicates that 26.8% of the variance in the challenges encountered is explained by the profile variables included in the model. This means that more than one-fourth of the differences in technology integration challenges may be attributed to measurable profile-related factors. However, the remaining 73.2% of the variance is explained by other external or situational factors not included in the model, such as infrastructure quality, administrative policies, school-level support systems, learner readiness, and access to resources.

The Adjusted R Square value of .194 provides a more conservative estimate and indicates that after adjustment, 19.4% of the variance in the challenges encountered is explained by the independent variables. The reduction from R Square to Adjusted R Square suggests that not all predictors contribute equally to explaining the challenges and that some may have minimal or overlapping explanatory power. The standard error of the estimate of .42104 indicates a moderate level of dispersion between observed and predicted values, suggesting that the model provides a reasonably acceptable fit but still leaves variability in predicting the challenges experienced by respondents.

The findings demonstrate that teacher profile variables have a statistically relevant but partial role in explaining challenges in technology integration. This reinforces the idea that while individual and professional characteristics matter, technology integration challenges are multidimensional and strongly influenced by broader systemic, institutional, and environmental factors. Therefore, addressing these challenges requires not only attention to teacher attributes but also improvement of structural conditions within the educational system.

The ANOVA results for the regression model examining the relationship between respondents' profile variables and the challenges they encounter in integrating technology in classroom instruction showed a regression sum of squares of 6.370, a residual sum of squares

of 17.373, and a total sum of squares of 23.743. With df values of 10 for regression, 98 for residual, and 108 for total, the model produced a mean square of .637 for regression and .177 for residual. The computed F-value of 3.593 with a significance value of .000 indicates that the overall regression model is statistically significant at the 0.05 level. Therefore, the null hypothesis stating that there is no significant relationship between the respondents' profile and the challenges encountered in technology integration is rejected.

The significance value of .000 indicates that the probability of the observed relationship occurring by chance is extremely low. This means that the independent variables collectively improve the prediction of technology integration challenges compared with a model without predictors. The mean square regression value of .637 compared with the mean square residual value of .177 further supports the conclusion that the predictors collectively account for meaningful variation in the dependent variable. Although the explanatory power is moderate, the model is statistically meaningful and confirms that teacher-related demographic and professional characteristics significantly influence the challenges encountered in technology integration. At the same time, the findings highlight that these profile variables do not fully account for all variations in challenges, reinforcing the broader interpretation that technology integration difficulties are multifactorial and shaped by infrastructure, institutional policies, administrative support, learner-related factors, and access to resources.

The multiple regression coefficients for the relationship between the respondents' profile and the challenges encountered in integrating technology in classroom instruction showed that civil status and digital tools available at school were statistically significant predictors. Civil status obtained a beta value of .221 with a p-value of .034, indicating a significant positive relationship with the challenges encountered at the 0.05 level. Thus, the null hypothesis is rejected for civil status. This suggests that variations in marital or family conditions may influence the level of challenges experienced by teachers in technology integration. This may be associated with differences in time availability, family responsibilities, access to professional development opportunities, and the capacity to respond to the demands of digital instruction. The significance of this variable highlights the importance of considering teachers' personal life context when examining professional challenges in technology-enhanced teaching.

Digital tools available at school obtained a beta value of .332 with a p-value of .001, indicating a significant positive relationship with the challenges encountered at the 0.05 level. Thus, the null hypothesis is also rejected for this variable. This result shows that the availability of digital tools at school significantly predicts the level of challenges experienced by teachers in integrating technology into classroom instruction. Since this variable obtained the strongest significant beta coefficient in the model, the finding reinforces the central role of technological resources in shaping the practical realities of digital instruction. It indicates that access to, adequacy of, and functionality of digital tools remain critical factors in determining whether teachers can implement technology effectively or continue to experience barriers in doing so.

Other profile variables were not statistically significant predictors of the challenges encountered in technology integration. Age obtained a beta value of -.261 with a p-value of .079, sex obtained a beta value of .131 with a p-value of .186, highest educational attainment obtained a beta value of .090 with a p-value of .330, position obtained a beta value of .104 with a p-value of .368, school obtained a beta value of -.158 with a p-value of .107, grade level handled obtained a beta value of .130 with a p-value of .150, number of years in teaching obtained a beta value of -.251 with a p-value of .122, and number of relevant seminars/trainings attended obtained a beta value of .025 with a p-value of .805. Since these p-values are greater than 0.05, the null hypothesis is not rejected for these variables. Although age and number of

years in teaching showed negative beta values, their non-significant p-values indicate that teaching experience alone does not meaningfully reduce challenges in technology integration when considered alongside other profile variables.

The findings suggest that the challenges encountered in technology integration are influenced more by institutional resource availability and certain personal demographic conditions than by formal qualifications, teaching rank, grade level handled, or years of service. The non-significant result for number of relevant seminars/trainings attended, with a beta value of .025 and a p-value of .805, suggests that existing professional development experiences may not be sufficient to reduce teachers' perceived challenges unless they are directly aligned with practical classroom needs and supported by adequate resources. Overall, the results emphasize that reducing barriers to technology integration requires stronger ICT infrastructure, equitable access to digital tools, and support systems that recognize both institutional limitations and teachers' personal circumstances.

The Pearson r correlation analysis examining the relationship among technology integration in classroom instruction, digital competence, and challenges encountered revealed several statistically significant associations. The frequency of use of digital tools and resources showed a strong positive correlation with usefulness of technology in enhancing teaching and learning, with $r = .791$ and $p < 0.01$. It also showed significant positive correlations with ease of use in applying technology in instructional practices, with $r = .663$ and $p < 0.01$, and digital competence, with $r = .687$ and $p < 0.01$. These findings indicate that teachers who frequently use digital tools are more likely to perceive technology as useful, easier to apply, and closely associated with higher digital competence. This supports Tondeur et al. (2021), who emphasized that regular exposure to digital technologies enhances teachers' confidence, competence, and pedagogical integration skills. It also aligns with Falloon (2022), who explained that continuous use of digital resources strengthens teachers' adaptability and instructional innovation in technology-supported learning environments.

The correlation results further showed that ease of use in applying technology significantly correlated with training and professional development opportunities, with $r = .685$ and $p < 0.01$, administrative and institutional support, with $r = .709$ and $p < 0.01$, and challenges encountered in integrating technology, with $r = .670$ and $p < 0.01$. These results suggest that when teachers perceive technology as easier to use, they are also more likely to recognize the role of professional development and institutional support in sustaining technology integration. However, the significant association with challenges indicates that positive perceptions of ease of use do not eliminate difficulties related to infrastructure, time allocation, student-related factors, and support systems. This aligns with Ertmer and Ottenbreit-Leftwich (2021), who noted that both first-order barriers, such as infrastructure and resources, and second-order barriers, such as teacher beliefs and competence, continue to influence successful technology integration in schools.

The findings also revealed that technology integration in classroom instruction significantly correlated with technological knowledge, with $r = .522$ and $p < 0.01$, technological pedagogical knowledge, with $r = .522$ and $p < 0.01$, and technological content knowledge, with $r = .413$ and $p < 0.01$. These results indicate that teachers with stronger technological, pedagogical, and content-related competencies are more capable of integrating digital tools effectively into instruction. This strongly supports the Technological Pedagogical Content Knowledge framework proposed by Mishra and Koehler, which remains a widely recognized foundation for effective digital instruction. UNESCO (2023) similarly emphasized that teachers' mastery of technological, pedagogical, and content knowledge improves learner engagement and instructional effectiveness in digital classrooms.

Another important result was the very strong relationship between digital competence and access to digital devices and ICT infrastructure, with $r = .979$ and $p < 0.01$, as well as

access to internet connectivity, with $r = .940$ and $p < 0.01$. These findings suggest that digital competence is strongly associated with the availability of technological resources and stable internet access. Teachers with sufficient access to ICT infrastructure are more likely to demonstrate higher levels of creativity, innovation, problem-solving, and ethical awareness in technology use. This supports the Organisation for Economic Co-operation and Development (2021), which reported that adequate infrastructure and connectivity are essential determinants of successful digital transformation in education.

Furthermore, the challenges encountered in integrating technology in classroom instruction showed significant positive relationships with administrative and institutional support, with $r = .966$ and $p < 0.01$, student-related factors, with $r = .950$ and $p < 0.01$, and time allocation for lesson planning and instructional delivery, with $r = .908$ and $p < 0.01$. These results indicate that teachers continue to experience substantial challenges despite existing support mechanisms. Time constraints, varying student readiness, learner access disparities, and institutional limitations remain critical concerns in technology integration. UNICEF (2022) similarly identified insufficient training time, unequal student access to devices, and inadequate institutional preparedness as major barriers to sustainable technology integration in developing educational systems.

The correlation findings demonstrate that technology integration in classroom instruction is significantly associated with teachers' digital competence, technological knowledge, institutional support, access to ICT resources, and the challenges they encounter. While respondents exhibit positive perceptions and strong competencies in technology use, persistent challenges related to infrastructure, training, administrative support, learner readiness, and instructional demands continue to affect implementation. These findings highlight the need for sustained professional development programs, improved ICT infrastructure, stronger school-level support systems, and learner readiness interventions to enhance teachers' digital competence and promote meaningful technology integration in education.

Taken together, the findings provide a comprehensive understanding of technology integration in classroom instruction, digital competence, and the challenges encountered by teachers, as well as the influence of respondents' profiles on these variables. The results reveal a consistent pattern in which teachers demonstrate very high levels of digital competence and technology integration, yet continue to face significant systemic and contextual barriers that hinder the full optimization of digital instruction. The regression analyses further show that both individual and institutional factors contribute to technology-related outcomes, although their influence varies across technology integration, digital competence, and challenges encountered.

In terms of technology integration, the descriptive results showed very high levels of frequency of use, perceived usefulness, ease of application, confidence and competency, and support and resources. These findings suggest that teachers have already embraced digital tools as part of their instructional practice. The high mean scores for frequency of use and usefulness indicate that technology is no longer merely supplementary but is already embedded in teaching processes. This supports Sellami and Santhosh (2024), who emphasized that technology integration extends beyond access and should be understood as an intentional pedagogical strategy. Teachers in the present study demonstrate this intentionality through their consistent use of digital tools for instruction, assessment, lesson preparation, and resource supplementation.

The high level of ease of use indicates that respondents perceive digital tools as manageable and not overly complex. This finding is consistent with the Technology

Acceptance Model, which emphasizes perceived ease of use as a critical determinant of technology adoption. When teachers find digital tools easy to use, they are more likely to integrate them regularly into their teaching practice, reduce resistance to change, and enhance instructional efficiency. The high level of confidence and competency also reflects strong technological self-efficacy among teachers, which is significant because teacher self-efficacy is closely linked to classroom innovation and learner engagement. However, administrative and institutional support received a comparatively lower rating than the other dimensions, although it remained positively interpreted. This suggests that while schools provide basic support, gaps remain in training, technical assistance, and resource availability, consistent with Attaran (2020), who noted that infrastructure and institutional support remain major constraints in developing educational systems.

In terms of digital competence, the results showed very high levels across technological knowledge, technological pedagogical knowledge, technological content knowledge, digital problem-solving and adaptability, digital safety and ethical awareness, and digital creativity and innovation. The high level of technological knowledge indicates that teachers are competent in operating hardware, using software, managing files, and handling basic ICT tools, confirming that foundational digital skills are well developed. This aligns with Clark-Wilson (2020), who emphasized technological knowledge as a foundational component of the TPACK framework. The results on technological pedagogical knowledge further indicate that teachers are capable of aligning technology with teaching strategies in meaningful ways, showing that they are not merely users of digital tools but educators who can connect technology with pedagogical goals.

Technological content knowledge also showed strong results, indicating that teachers understand how digital tools may be used in subject-specific instruction, although the relatively lower result for digital simulations and virtual labs suggests that advanced instructional tools remain an area for development. Digital problem-solving and adaptability revealed strong resilience among teachers in responding to technical issues, although the lower result on independent troubleshooting suggests a need for stronger technical support and capacity-building. Digital safety and ethical awareness obtained the strongest results, showing that teachers are highly aware of copyright, cybersecurity, netiquette, digital citizenship, and responsible technology use. Digital creativity and innovation also remained very high, although the lower score for creating original digital learning materials suggests that teachers may still rely more on existing resources than on producing their own digital content, consistent with Asio and Bayucca (2021).

The regression analysis on digital competence showed that only sex and digital tools available at school significantly predicted competence. This indicates that access to digital resources is a critical determinant of competence development, while most traditional demographic and professional variables do not directly predict digital skills. This finding supports the view that environmental factors, especially access and practice opportunities, are more influential than formal profile characteristics in shaping digital competence. Thus, teachers' digital competence is strengthened not only by their individual traits but also by the technological environments in which they work.

In terms of challenges, the findings revealed very high levels of difficulty across all domains. Access to ICT infrastructure and internet connectivity remained major barriers, confirming the findings of Attaran (2020) and Berisha and Bytyqi (2020), who emphasized infrastructure as a foundational requirement for successful technology integration. Despite the teachers' high competence levels, inadequate devices, outdated equipment, limited ICT facilities, unstable connectivity, and reliance on personal mobile data continue to limit implementation. Training and professional development also emerged as a significant challenge, indicating that teachers still feel insufficiently supported in terms of continuous

learning opportunities. This suggests a gap between existing competence and sustained professional growth.

Time allocation further highlighted workload-related constraints, as teachers struggle to balance curriculum coverage, lesson preparation, classroom time, and technology integration. Student-related factors obtained the highest challenge level among all domains, indicating that learner behavior, unequal access to devices, varied digital competence, distractions, and lack of basic digital skills significantly affect instructional effectiveness. Administrative and institutional support limitations also contributed to the challenges, particularly in relation to leadership prioritization, policy clarity, encouragement, and funding. These results show that technology integration challenges are systemic rather than merely individual.

The regression analysis on challenges showed that civil status and digital tools available at school significantly predicted the challenges encountered. This suggests that personal circumstances may influence how teachers experience technology-related barriers, while resource availability remains a critical factor in determining the extent of challenges. However, most variables were not statistically significant, indicating that challenges are shaped more by systemic and institutional conditions than by professional experience, rank, educational attainment, or seminar attendance alone. The correlation analysis further clarified the interdependence of technology integration, digital competence, and challenges. Frequent use of digital tools was strongly associated with perceived usefulness, ease of use, and digital competence, while digital competence was strongly linked with ICT infrastructure and internet connectivity. At the same time, challenges were strongly associated with administrative support, student-related factors, and time allocation, showing that successful technology integration requires alignment among teacher competence, student readiness, institutional support, and resource availability.

Overall, the findings reveal a complex relationship among competence, integration, and challenges. Teachers are highly competent and actively integrating technology into instruction, but systemic limitations involving infrastructure, connectivity, training, time, administrative support, and student readiness continue to hinder full optimization. The results affirm that successful digital transformation requires more than teacher readiness alone. It requires sustained institutional investment, continuous professional development, equitable resource distribution, clear policies, learner support, and administrative commitment to ensure that teachers' strong digital competence can be translated into meaningful and sustainable technology-enhanced instruction.

CONCLUSION

This chapter synthesized the major findings of the study by examining the extent of teachers' technology integration, their level of digital competence, the challenges encountered in integrating technology in classroom instruction, and the relationship between selected profile variables and technology integration outcomes. Anchored on the objectives of the study, the conclusion highlights the interplay between teacher readiness, institutional conditions, and technological resources in shaping effective digital instruction and technology integration practices within the educational setting.

The study concludes that teachers demonstrate very high levels of technology integration and digital competence across all dimensions, indicating strong readiness for digital instruction and an evident capacity to adapt to technology-driven teaching environments. The findings suggest that teachers possess the necessary knowledge, skills, and confidence to

integrate digital tools effectively into classroom instruction. Despite these strengths, the study also establishes that significant challenges continue to persist, particularly in relation to ICT infrastructure, internet connectivity, limited training opportunities, time constraints, student-related factors, and institutional support systems. These barriers indicate that while teachers may be digitally capable, the successful implementation of technology integration is still constrained by environmental and systemic limitations that affect the consistency and effectiveness of digital instruction.

Furthermore, the regression analyses reveal that demographic and professional profiles have limited influence on teachers' digital competence and technology integration practices. Instead, the findings emphasize that the availability of digital tools and institutional conditions significantly affect both digital competence and the challenges encountered in integrating technology in classroom instruction. This implies that technology integration in education is not solely dependent on individual teacher capability or professional characteristics, but is heavily shaped by the quality of institutional support, accessibility of technological resources, and the broader educational environment. The study therefore underscores the importance of creating supportive and resource-equipped learning environments to maximize teachers' digital potential and sustain effective technology integration practices.

In view of these findings, the study further concludes that sustainable improvement in digital education requires a balanced approach that strengthens both teacher competence and institutional capacity. School administration should prioritize the upgrading of ICT infrastructure, including the provision of computers, tablets, and classroom digital equipment, while ensuring stronger and more stable internet connectivity across all school areas to support uninterrupted digital instruction. Continuous and hands-on professional development programs should also be implemented to enhance teachers' advanced digital skills and keep them responsive to emerging educational technologies. Likewise, schools should allocate dedicated time for teachers to prepare, design, and test technology-based lessons in order to improve the quality and effectiveness of digital instruction.

The findings also highlight the necessity of strengthening institutional support mechanisms through the assignment of technical support personnel who can assist teachers during classroom instruction involving digital tools. The institutionalization of a structured District-based Learning Action Cell (DLAC) is likewise essential in promoting peer learning, collaboration, and the sharing of effective technology integration practices among teachers. In addition, policies related to technology integration should be clearly defined and consistently implemented across all schools to ensure uniformity in digital education initiatives and instructional expectations. Teachers should also be encouraged and supported in developing original digital instructional materials to further enhance digital creativity and innovation in classroom teaching. Moreover, strengthening student digital literacy programs is necessary to reduce technology-related classroom challenges and improve students' capacity to participate effectively in digitally supported learning activities. Finally, future research should further explore contextual variables such as leadership style, funding allocation, and community support to provide a deeper understanding of the factors influencing technology integration dynamics and to contribute to the continuous improvement of digital education practices.

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