

Teachers' Proficiency in Information and Communication Technology

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Abstract

This study explored the level of teachers' proficiency in Information and Communication Technology in a public secondary school within a medium-sized Schools Division in Central Philippines for the School Year 2025-2026 as a basis for a capability-building plan. Using a quantitative descriptive research design, data were collected from 126 public secondary school teachers using purposive sampling techniques. Teachers' proficiency in Information and Communication Technology was evaluated across four key areas: digital Literacy, educational technology tools, and digital communication and collaboration. The researcher also examined how demographic factors, such as age, sex, and the number of trainings attended in ICT, influenced the results. The demographic analysis revealed that the respondents consist of a relatively balanced mix of younger and older teachers, with a slight predominance of younger ones. Most of the respondents are female. However, many teachers have attended only a limited number of ICT-related trainings. Results showed that teachers generally possess a high level of proficiency in ICT, particularly in digital literacy, educational technology tools, and digital communication and collaboration. Slightly lower confidence was observed in troubleshooting basic computer issues, proficient use of emerging technologies such as Artificial Intelligence (AI), Virtual Reality (VR), and Augmented Reality (AR) in instructions, and in designing and delivering online courses. In the comparative analysis, significant differences in ICT proficiency were found based on age and number of ICT trainings attended, but not by sex. Younger teachers and those with more ICT training scored higher in digital literacy, educational technology tools, and digital communication and collaboration. This emphasizes that age and training exposure are key factors influencing ICT proficiency, while sex does not significantly affect it. Overall, the results indicate that teachers are highly capable of incorporating ICT into their professional practice. However, continuous training and support programs are essential to ensure that all teachers—especially those who are older or have limited exposure—can effectively integrate modern technologies into teaching and learning.

Keywords: Information and communication technology, proficiency, digital literacy, educational technology tools, and digital communication and collaboration

Bio-Profile:

Nico Paolo N. Arboleda is a licensed public secondary teacher under the Schools Division of Negros Occidental. His research interests include education, human resource



development, and related fields, where he aims to produce evidence that can inform the design of capacity-building programs and policy interventions.

Introduction

Rationale

Information and Communication Technology (ICT) has been incorporated into daily life, work, and education systems. ICT is considered an essential factor to be taken into account in educational institutions worldwide (Abed & Mohamed, 2018). ICT is a crucial factor in the educational industry, driving the development of new needs and initiating transformations that have a profound impact on teachers, creating a continuous need to train and develop professionally (Martinez-Rico et al., 2022). Nonetheless, as a report by the United Nations Educational, Scientific and Cultural Organization (UNESCO) indicates, in 2019, only half of the teachers worldwide possess basic Information and Communication Technology (ICT) knowledge.

The researcher, as a teacher, observes that there are differences in the proficiency of information and communication technology between older and younger teachers. Information and communication technology (ICT) competence among teachers is crucial in teaching and learning, as it enables teachers to incorporate technology into their teaching to facilitate a successful learning process.

The proposed quantitative, descriptive, and comparative study assesses the level of Information and Communication Technology (ICT) competence among teachers in public secondary schools. Additionally, it aims to identify any significant difference in Information and Communication Technology (ICT) proficiency among teachers grouped by age, gender, and the number of training sessions they have undertaken in ICT. The study's results are used to formulate a proposed capability-building plan that aims to increase digital literacy, the use of educational technology tools, and digital communication and collaboration among teachers.

Therefore, the researcher is encouraged to conduct this study in their practice and among their peers due to the ongoing difficulties in using digital tools in teaching and learning. Despite the growing availability of computers, learning management systems, and online resources, not all teachers are confident and skilled enough to utilize these technologies in lesson planning, teaching, and evaluation. The sudden transition to online learning further highlights these gaps and the challenges of blended learning during the pandemic, resulting in uneven quality of instruction and varying degrees of learner engagement. Such conditions prompt the researcher to study the ICT proficiency of teachers more systematically, in order to produce evidence that can inform the design of capacity-building programs and policy interventions.

Literature Review



This section provides an overview of the knowledge surrounding teachers' proficiency in Information and Communication Technology (ICT). It draws on insights from local and international researchers who have made significant contributions to the factors of the study. Teachers' proficiency in information is commonly understood as the ability to locate, evaluate, interpret, and apply information effectively in planning, instruction, and assessment. Conceptually, this proficiency is aligned with "information literacy," a set of skills and dispositions through which credible sources are discerned, knowledge is synthesized, and information is presented ethically. In a knowledge-driven society, critical information practices are expected to be modelled by teachers so that students are guided in navigating diverse and sometimes conflicting data. This proficiency is also seen to include the use of digital databases, academic resources, and educational content management systems through which evidence-based teaching is supported.

Communication technology is defined as the tools, systems, and processes used for transmitting information electronically between individuals or groups. Conceptually, it is understood to encompass both traditional media (television, radio, telephone) and digital innovations such as email, social media, videoconferencing, and instant messaging. Communication technology is described in the literature as a driving force of globalization because time and space are compressed, and the rapid exchange of ideas across distances is enabled. In educational, business, and governance contexts, these technologies are reported to enhance coordination, information sharing, and decision-making, thereby positioning communication technology as an essential infrastructure for participation in contemporary society.

Several local studies have examined the level of teachers' ICT proficiency in Philippine public schools and found varying degrees of competence across instructional and professional tasks. A study conducted among public school teachers in Tudela District, Cebu Province, revealed that teachers generally possessed adequate ICT skills in using basic productivity tools and communication technologies; however, their proficiency in integrating ICT into pedagogy varied. The study emphasized the need for sustained and structured professional development programs to enhance teachers' ability to use technology meaningfully in instruction rather than merely for administrative purposes (Villegas & Buquia, 2024).

Similarly, a correlational study conducted in Laguindingan District, Misamis Oriental, investigated the relationship between teachers' ICT proficiency and quality of teaching. The findings indicated that teachers demonstrated high levels of ICT proficiency, particularly in lesson preparation, presentation, and classroom management. Moreover, a significant positive relationship was found between ICT proficiency and teaching quality, suggesting that teachers who are more digitally competent tend to deliver more effective instruction. The study also noted that professional exposure to ICT training contributed significantly to higher proficiency levels (Sutacio & Ubaybay, 2025).



Finally, from a policy-to-practice perspective, UNESCO's ICT Competency Framework for Teachers (ICT-CFT) conceptualizes ICT proficiency as more than technical ability. Instead, it frames digital competence as a policy-aligned capacity that integrates pedagogy, curriculum standards, digital safety, and distance learning modalities (UNESCO, 2018; UNESCO, 2023). Furthermore, UNESCO emphasizes the alignment of national education policies, teacher education programs, and school-level leadership in supporting effective ICT integration. In the case of foreign secondary teachers, this framework highlights how institutional support and national policy environments significantly influence teachers' ability to apply ICT skills effectively in classroom instruction.

Theoretical Underpinnings

This study is grounded in the Technological Pedagogical Content Knowledge (TPACK) model, initially formulated by Mishra and Koehler (2006). The model explains how teachers can effectively utilize technology in their classroom teaching. Drawing on the concept of Pedagogical Content Knowledge (PCK) by Shulman, TPACK incorporates technology as one of the most significant factors in teaching in modern times. The model posits that effective technology-enhanced pedagogy necessitates the intersection of three domains: Content Knowledge (CK), Pedagogical Knowledge (PK), and Technological Knowledge (TK). Technological Knowledge refers to an educator's ability to use, evaluate, and apply digital tools, such as computers, learning management systems, presentation software, and emerging instructional technologies, pedagogically.

Accordingly, the TPACK model explains that the ICT proficiency of teachers goes beyond technical competency to form a determinant of effective teaching. It highlights the fact that effective technology integration is determined by an educator's ability to coordinate what is being taught (content), how it is taught (pedagogy), and the tools used (technology). Following the TPACK paradigm, the present research is situated in its context, recognizing ICT proficiency as a key component to facilitate the growth of instruction and foster a high-quality teaching process in digitally transforming learning environments.

Objectives

This study aimed to determine the level of teachers' proficiency in Information and Communication Technology (ICT) in a public Secondary School in a medium-sized School Division in Central Philippines for the School Year 2025-2026, as a Basis for a capability-building plan. Specifically, it seeks to determine: 1) the profile of respondents in terms of age, sex, and number of trainings attended in ICT; 2) the level of teachers' proficiency in Information and Communication Technology according to digital literacy, educational technology tools, and digital communication and collaboration; 3) the level of teachers' proficiency in Information and Communication Technology when grouped according to the aforementioned variables; and 4) if there is a significant difference in the level of teachers' proficiency in Information and



Communication Technology when grouped and compared according to the aforementioned variables.

Methodology

This section discusses the methods used to gather and analyze the data based on the specific predetermined objectives. This outline includes the research design, subject-respondents, research instruments, data collection procedures, ethical considerations, data analysis, and statistical methods.

Research Design

This study employed a quantitative-descriptive research design to determine the ICT proficiency level of public secondary teachers in one of the districts of a medium-sized Division in the Central Philippines.

According to McCombes (2020), descriptive research design is a type of research design that aims to systematically gather information to depict a phenomenon, situation, or population. In addition, it assists in providing answers to the research problem's what, when, where, and how inquiries, rather than its why. Numerous research techniques, such as the descriptive research method, can be employed to examine the variables. Although qualitative data can be used for descriptive purposes, quantitative data can occasionally add to the description of the phenomenon.

In this study, the researcher evaluated the ICT proficiency of public secondary school teachers in one of the districts of a medium-sized Division in Central Philippines for the School Year 2025-2026. Therefore, the descriptive method is the appropriate design for this study.

Respondents

The respondents of this study were one hundred twenty-six (126) permanent public secondary school teachers from different subject areas in a medium-sized school division in Central Philippines during School Year 2025–2026. The researcher used purposive sampling to choose the participants. Purposive sampling is a type of non-probability sampling where the researcher uses their judgment to select individuals who can provide the most helpful information (Memona et al., 2025). This method was chosen because the study aimed to understand ICT proficiency in real teaching situations, rather than just in theory.

Instrument

This study employed a researcher-designed questionnaire to collect data from the teacher respondents. The instrument had two main parts. Part I was used to gather personal information, including age, sex, civil status, highest educational attainment, and average monthly family



income. Part II measured the respondents' level of ICT proficiency. Part II was organized into three areas: (1) digital literacy, (2) use of educational technology tools, and (3) digital communication and collaboration. Each area contained ten (10) items, for a total of thirty (30) questions. Each item of the survey was measured on a standard Likert scale, a continuum of 1 to 5 with "1" representing "almost never," "2" representing "rarely," "3" representing "sometimes," "4" representing "often," and "5" representing "always."

Procedure for Data Collection

The researcher secured the necessary approval from the Schools Division Office. Informed consent was also obtained from all 126 teacher-participants, who were provided with an explanation of the study's purpose.

During data collection, printed copies of the questionnaire were given to the 126 teachers. The researcher coordinated with the school heads to set a suitable date and time, usually during teachers' free periods or after classes. A brief orientation was provided before the teachers completed the form, and the researcher remained to answer questions and ensure everyone understood the instructions. Respondents were reminded that their answers would remain confidential and that no names would appear in the final report. All questionnaires were collected on the same day or within the agreed schedule, resulting in a 100% response rate.

After collection, each form was checked for completeness. Blank or unclear items were followed up on right away, if possible. The answers were then encoded into SPSS for analysis. Descriptive statistics (such as frequencies, percentages, and mean scores) were used to summarize the data. In contrast, inferential statistics (such as t-tests and correlations) were used to answer the research questions. For the open-ended questions, responses were read carefully, grouped by common ideas, and summarized into key themes.

Finally, a simple one-page summary of the findings was shared with the school heads and the division office. It is not just a courtesy, but to help them see how the results could support future teacher training or ICT planning.

Data Analysis and Statistical Treatment

Objective 1 utilized the descriptive-analytical scheme, frequency, and percentage as statistical tool to determine the profile of the respondents in terms of age, sex, and number of ICT trainings attended. Objective 2 employed a descriptive analytical scheme and used the mean to determine the level of teachers' proficiency in Information and Communication Technology



across the areas of digital literacy, educational technology tools, and digital communication and collaboration. Objective 3 utilized a descriptive analytical scheme and meant to determine the level of teachers' proficiency in Information and Communication Technology when grouped according to the aforementioned variables. Objective 4 applied a comparative analytical scheme and employed a Mann-Whitney U test to determine whether a significant difference exists in the level of teachers' ICT proficiency when the respondents were grouped and compared according to the specified variables.

Ethical Considerations

In conducting this study, the researcher followed basic ethical guidelines to protect the rights and well-being of the teacher-participants. Before data gathering, a letter of request was submitted to the Schools Division Office, and approval was secured. Each participant was given an informed consent form that clearly explained the purpose of the study, what was expected of them, how their answers would be used, and their right to refuse or withdraw at any time without penalty. Confidentiality was strictly observed. No names or identifying details were written on the questionnaires, and all data were kept in a locked cabinet and on a password-protected computer. Only the researcher and the thesis adviser had access to the raw responses. The final report presents only grouped findings (e.g., percentages, average scores), so no individual can be identified.

Results and Discussions

This section summarizes the study's findings, which come from careful data gathering, in-depth analysis, and thoughtful interpretation. After this, meaningful conclusions were drawn from the initial phase, offering valuable insights.

Level of Teachers' Proficiency in Information and Communication Technology in the Areas of Digital Literacy, Educational Technology Tools, and Digital Communication and Collaboration

Table 1

Level of Teachers' Proficiency in Information and Communication Technology in the area of Digital Literacy

Items	Mean	Interpretation
As a teacher, I...		
1. can effectively use digital devices (laptops, tablets, smartphones) for educational purposes.	4.46	High Level
2. proficiently use basic computer software like Microsoft Office or Google Apps.	4.31	High Level



3. can troubleshoot basic computer issues (password reset, connectivity problems).	3.86	High Level
4. can comfortably use a computer for tasks like creating emails, word processing, and browsing the internet.	4.33	High Level
5. use advanced search features for educational research.	4.13	High Level
6. understand the importance of digital etiquette and netiquette.	4.36	High Level
7. use digital tools for data analysis and interpretation.	4.03	High Level
8. can effectively search for and evaluate online information.	4.25	High Level
		Very High
9. can upload and download files online.	4.49	Level
10. provide guidance and support on digital literacy to others.	4.07	High Level
Overall Mean	4.23	High Level

Table 1 presents the degree of proficiency that teachers demonstrate in Information and Communication Technology (ICT) within the field of Digital Literacy. The calculated overall average of 4.23, which is represented as a High Level, shows that the teachers are highly competent in using digital tools and resources to teach.

The least rated indicator was "I can troubleshoot simple computer problems" (3.86), which still fell within the High-level range. This implies that although teachers are not only informed users of technology, they may be constrained when it comes to addressing technical challenges. This finding is similar to the observations of Bernardo et al. (2022), who found that a significant number of Filipino teachers are highly ICT literate but require further training in the technical and problem-solving aspects of ICT use. Therefore, it remains crucial to provide ongoing professional training in technical troubleshooting and the use of advanced software.

Table 2

Level of Teachers' Proficiency in Information and Communication Technology in the area of Educational Technology tools

Items	Mean	Interpretation
As a teacher, I...		
1. can effectively use search engines for educational purposes.	4.36	High Level
2. integrate internet-based resources into my lesson plans.	4.38	High Level
3. can navigate websites efficiently for educational resources	4.17	High Level
4. am familiar with Learning Management Systems (LMS)	4.17	High Level



5. can effectively use educational technology tools (online quizzes, discussion boards, multimedia resources) in teaching/instruction.	4.14	High Level
6. can confidently use educational technology tools to support diverse learning needs.	4.21	High Level
7. use instant messaging and video conferencing tools for teaching.	4.15	High Level
8. can proficiently use emerging technology such as Artificial Intelligence (AI), Augmented Reality (AR), and Virtual Reality (VR) in my instructions.	3.79	High Level
9. can integrate emerging technologies into my teaching practices.	4.22	High Level
10. can create digital content like videos, podcasts, or infographics.	3.87	High Level
Overall Mean	4.15	High Level

Table 2 presents the proficiency of teachers in Information and Communication Technology (ICT) and educational technology tools. The statistics show a total average of 4.15, which is represented as a High Level of proficiency.

The minimum of the mean score was observed in "I can effectively apply emerging technologies like Artificial Intelligence (AI), Augmented Reality (AR), and Virtual Reality (VR) in my instructions" (3.79), which, nevertheless, is still in the High-level category. This suggests that, although teachers have no doubts about the use of traditional and widely accessible digital tools, they often lack exposure and experience with more sophisticated or new technologies in the teaching process. This finding is consistent with the results of De Guzman and Espinosa (2021), who noted that Filipino teachers are highly competent with basic ICT tools but are moderately familiar with innovative technologies, primarily due to a lack of access, inadequate infrastructure, and limited training opportunities.

Table 3

Level of Teachers' Proficiency in Information and Communication Technology in the area of Digital Communication and Collaboration

Items	Mean	Interpretation
As a teacher, I...		
1. understand email etiquette and protocols.	4.37	High Level
2. can access digital communication and collaboration tools for work-related and academic purposes.	4.29	High Level
3. can effectively use email or online messaging platforms for communication with colleagues and students	4.40	High Level



4. can participate in online discussions and forums related to ICT education.	4.19	High Level
5. can effectively use online tools for project management and organization.	4.15	High Level
6. can proficiently use cloud-based tools such as Google Drive, Microsoft Teams, and Dropbox for file sharing and collaboration.	4.02	High Level
7. use social media platforms for educational purposes.	4.28	High Level
8. use collaborative document editing tools (e.g. Google Docs, Microsoft Word Online) for real-time co-authoring.	4.09	High Level
9. can confidently use video conferencing tools (e.g., Zoom, Google Meet) for virtual meetings and classes.	4.10	High Level
10. can design and deliver online courses or training programs.	3.79	High Level
Overall Mean	4.17	High Level

Table 3 presents the proficiency of teachers in Information and Communication Technology (ICT) for digital communication and Collaboration. The obtained total mean of 4.17, construed as a High Level, shows that the teachers are very well skilled in utilizing digital tools and platforms that support communication, collaboration, and professional interaction in educational environments.

The poorest item was identified in item no. 10, which states, 'I can design and deliver online courses or training programs' (3.79), and yet it was still considered a High Level. It shows that although educators can easily apply everyday communication and collaboration tools like Google Meet, Microsoft Teams, and Google Drive, they may lack experience in developing a fully online or asynchronous learning environment. Bernardo et al. (2022) state that currently, a significant number of Filipino teachers demonstrate practical digital communication skills but require additional training on how to create online instructional courses and operate virtual learning environments, not only in emergency remote teaching situations.

Comparative Analysis in the Level of Teachers' Proficiency in Information and Communication Technology in the Areas of Digital Literacy, Educational Technology Tools, and Digital Communication and Collaboration when grouped and compared according to Age, Sex, and Number of Trainings attended in ICT

Table 4

Difference in the level of Teachers' Proficiency in Information and Communication Technology in the area of Digital Literacy when grouped and compared according to variables



Variable	Category	N	Mean Rank	Mann-Whitney U test	p-value	Sig. level	Interpretation
Age	Younger	72	79.94	760.000	0.000	0.05	Significant
	Older	54	41.57				
Sex	Male	35	67.26	1461.000	0.471	0.05	Not Significant
	Female	91	62.05				
Number of Trainings attended in ICT	Few	86	56.41	1110.000	0.001	0.05	Significant
	Many	40	78.75				

Table 4 presents a comparison of teachers' proficiency in Information and Communication Technology (ICT), specifically in the area of Digital Literacy, when grouped according to selected demographic variables. The Mann–Whitney U test revealed significant differences in ICT proficiency when participants were grouped by age and the number of ICT training sessions attended. At the same time, no significant differences were found when the data were grouped by sex or grade level.

The results indicate that younger teachers demonstrated higher proficiency in digital literacy (79.94) than their older counterparts (41.57), suggesting that age plays a significant role in ICT competency. This finding supports the idea that younger educators, often referred to as digital natives, are more adept at integrating technology due to their greater exposure and comfort with digital tools (Prensky, 2001; Khlaisang & Songkram, 2019). Conversely, older teachers may face barriers such as limited technological experience, anxiety toward digital innovations, or a lack of continuous professional development (Teo, 2020).

In terms of the number of ICT trainings attended, the data show that teachers who had attended many trainings (78.75) exhibited significantly higher proficiency than those who had attended few trainings (56.41). This underscores the crucial role of professional development and continuous ICT training in enhancing teachers' digital competence (Instefjord & Munthe, 2017; Ghavifekr & Rosdy, 2019). Frequent participation in ICT-related training provides teachers with opportunities to update their skills, learn new digital tools, and effectively apply innovative teaching strategies.

Meanwhile, no significant difference was observed when grouped by sex, implying that both male and female teachers have similar levels of digital literacy. This finding aligns with prior studies indicating that gender is no longer a strong determinant of ICT proficiency among teachers, as access to technology and digital training has become more equitable (Kay & Lauricella, 2019; Nistor et al., 2021).

Table 5



Difference in the level of Teachers' Proficiency in Information and Communication Technology in the area of Educational technology tools when grouped and compared according to variables

Variable	Category	N	Mean Rank	Mann-Whitney U	p-value	Sig. level	Interpretation
Age	Younger	72	80.94	688.500	0.000		Significant
	Older	54	40.25				
Sex	Male	35	66.83	1476.000	0.524	0.05	Not Significant
	Female	91	62.22				
Number of Trainings attended in ICT	Few	86	57.16	1174.500	0.004		Significant
	Many	40	77.14				

Table 5 presents the difference in the level of teachers' proficiency in Information and Communication Technology (ICT) in the area of Educational Technology Tools when grouped according to age, sex, grade level handled, and number of ICT trainings attended. The Mann–Whitney U test results revealed significant differences in proficiency when participants were grouped by age and the number of ICT trainings they had attended. In contrast, no significant differences were found when the data were grouped by sex and grade level.

The data show that younger teachers obtained a higher mean rank (80.94) compared to older teachers (40.25), indicating that younger educators are generally more proficient in using educational technology tools. This finding is consistent with prior studies suggesting that younger teachers, often classified as digital natives, exhibit stronger familiarity and confidence in utilizing digital platforms and technology-based instructional tools (Prensky, 2001; Tondeur et al., 2018). Older teachers, in contrast, may experience greater challenges adapting to new technologies due to generational differences, limited exposure, or resistance to change (Teo, 2020).

Furthermore, the results demonstrate a significant difference in ICT proficiency based on the number of trainings attended, where teachers with many ICT trainings (77.14) outperformed those with few trainings (57.16). This finding underscores the vital role of continuous professional development in enhancing teachers' digital competence and instructional innovation (Instefjord & Munthe, 2017; Ghavifekr & Rosdy, 2019). Frequent participation in training provides teachers with opportunities to explore emerging educational technologies, such as learning management systems, interactive media, and digital assessment tools, thereby enhancing their teaching effectiveness and learner engagement.



On the other hand, no significant differences were found when grouped according to sex, suggesting that both male and female teachers demonstrate comparable proficiency in educational technology tools. This result aligns with studies that report narrowing gender gaps in ICT competence, as technology access and training opportunities have become more balanced across demographic groups (Kay & Lauricella, 2019; Nistor et al., 2021).

Table 6

Difference in the level of Teachers' Proficiency in Information and Communication Technology in the area of Digital Communication and Collaboration when grouped and compared according to variables

Variable	Category	N	Mean Rank	Mann-Whitney U	p-value	Sig. level	Interpretation
Age	Younger	72	79.85	767.000	0.000		Significant
	Older	54	41.70				
Sex	Male	35	67.80	1442.000	0.411	0.05	Not Significant
	Female	91	61.85				
Number of Trainings attended in ICT	Few	86	57.38	1194.000	0.006		Significant
	Many	40	76.65				

Table 6 results reveal significant differences in teachers' proficiency in digital communication and collaboration when grouped by age and the number of ICT trainings attended. In contrast, no significant differences were observed in terms of sex.

The younger teachers demonstrated higher proficiency (79.85) than their older counterparts (41.70), suggesting that younger educators are generally more adept at using digital communication tools such as email platforms, learning management systems, and video conferencing software. This aligns with the findings of Tondeur et al. (2021), who emphasized that digital natives tend to exhibit higher levels of confidence and competence in applying ICT for collaborative teaching and communication. Similarly, Ghavifekr and Rosdy (2022) found that younger teachers are more likely to integrate online collaboration tools into instruction due to greater exposure and comfort with digital environments.

In terms of the number of ICT trainings attended, teachers who participated in more trainings (76.65) showed significantly higher proficiency compared to those with fewer training experiences (57.38). This result confirms that professional development initiatives and ICT training programs play a critical role in enhancing teachers' digital communication and collaboration skills. According to König et al. (2020) and Trust et al. (2021), continuous participation in ICT-related training enhances teachers' capacity to use digital tools effectively,



fostering improved online engagement, information sharing, and collaborative teaching practices. These trainings not only build technical competence but also improve pedagogical confidence in digital learning contexts.

Conversely, the results indicate that sex and grade level handled did not produce significant differences in teachers' proficiency levels. This suggests that both male and female teachers, regardless of whether they teach lower or higher grade levels, exhibit comparable abilities in digital communication and collaboration. Supporting this, Alvarez (2021) observed that gender does not significantly influence teachers' ICT skills, as technology use in education has become universally accessible and integrated across all teaching contexts.

Conclusion

Based on the study's findings, the following conclusions are drawn: Digital literacy skills are strongly influenced by age and the frequency of ICT training that teachers attend. Older teachers and those with less training tend to be less proficient, which explains why special professional development programs are required. In the meantime, the effect of sex is not substantial, which means that male and female teachers are equally digital literate.

Moreover, the skills of teachers in educational technology tools mainly depend on the age factor and the amount of ICT training. Older teachers and those with fewer training opportunities are more likely to demonstrate a lack of proficiency, underscoring the need to continue ICT capacity-building efforts. On the other hand, sex does not have a significant impact on proficiency, which implies that gender is not a significant factor in teachers' use of educational technology. Overall, age and engagement in ICT training are also essential factors that affect the digital communication and collaboration skills of teachers. Either older teachers or those with less training experience are less effective in their work; hence, there is a need for an ICT training program that is constantly updated. Nevertheless, sex does not have a significant influence on these skills, which suggests that there is no significant difference in the competence of educators in digital communication and collaboration associated with gender differences.

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Conflict of Interest



The author declares no conflict of interest that may have influenced the content or conclusions of this study. No financial, personal, or professional relationships affected the research's objectivity, integrity, or impartiality. Furthermore, no external parties were involved in the study's design, data collection, analysis, or interpretation.

References

- Abed, M. G. (2018). Teachers' perspectives surrounding ICT use amongst SEN students in the mainstream educational setting. *World Journal of Education*, 8(1), 6-16. <https://www.sciedupress.com/journal/index.php/wje/article/view/12966>
- Aldahdouh, T. Z., Nokelainen, P., & Korhonen, V. (2023). Teachers' digital competence and technology integration in education: A systematic review of gender-related differences. *Computers & Education*, 194, 104690. <https://doi.org/10.1016/j.compedu.2023.104690>
- Alvarez, I. (2021). Teachers' digital literacy and ICT integration in education: Gender and experience considerations. *Education and Information Technologies*, 26(4), 4253–4271.
- Alvarez-Risco, A., Del-Aguila-Arcentales, S., & Yáñez, J. A. (2023). Digital communication competence and gender differences among educators during remote teaching. *Education and Information Technologies*, 28(1), 1223–1241. <https://doi.org/10.1007/s10639-022-11388-y>
- Bernardo, A. B. I., Gonzales, K. P., & Mateo, N. J. (2022). Digital competence of Filipino teachers: Challenges and implications for continuing professional development. *Philippine Journal of Educational Measurement*, 59(2), 45–61.
- Consumer Financial Protection Bureau. (2017). *Financial well-being: Theoretical framework and research*. Washington, DC: Consumer Financial Protection Bureau. Retrieved from <https://www.consumerfinance.gov>
- De Guzman, M. F., & Espinosa, M. C. (2021). Teachers' digital competence and challenges in the integration of emerging technologies in Philippine classrooms. *Philippine Journal of Educational Technology*, 6(1), 45–60.
- Gabriel, J., Santos, L., & Cruz, P. (2021). *ICT proficiency and instructional quality among secondary school teachers*. *Asian Journal of Education and Training*, 7(3), 150–160.
- Ghavifekr, S., & Rosdy, W. A. W. (2019). Teaching with technology: Effectiveness of ICT integration in schools. *International Journal of Research in Education and Science*, 5(2), 239–245.
- Ghavifekr, S., & Rosdy, W. A. W. (2022). Teaching with technology: Enhancing teachers' ICT integration in classrooms. *Computers & Education*, 178, 104382.
- Instefjord, E. J., & Munthe, E. (2017). Educating digitally competent teachers: A study of integration of professional digital competence in teacher education. *Teaching and Teacher Education*, 67, 37–45.
- Kay, R., & Lauricella, S. (2019). Gender differences in the use of technology in higher education: A review of recent research. *International Journal of Educational Technology in Higher Education*, 16(1), 1–22.



- Khlaisang, J., & Songkram, N. (2019). Designing a virtual learning environment system for teaching 21st century skills. *International Journal of Emerging Technologies in Learning*, 14(3), 70–90.
- Koehler, M. J., & Mishra, P. (2020). What is technological pedagogical content knowledge (TPACK)? *Contemporary Issues in Technology and Teacher Education*, 9(1), 60–70.
- König, J., Jäger-Biela, D. J., & Glutsch, N. (2020). Adapting to online teaching during COVID-19 school closure: Teacher education and ICT competence. *European Journal of Teacher Education*, 43(4), 608–622.
- Martínez-Rico, G., Alberola-Albors, M., & Pérez-Campos, M. (2022). Physical education teachers' perceived digital competences: Are they prepared for the challenges of the new digital age? *Sustainability*, 14(1), 321. <https://www.mdpi.com/2071-1050/14/1/321>
- Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record*, 108(6), 1017–1054. <https://doi.org/10.1111/j.1467-9620.2006.00684.x>
- Nistor, N., Lerche, T., & Weinberger, A. (2021). Digital literacy and teachers' professional development: Gender equality in the digital age. *Computers & Education*, 173, 104287.
- Prensky, M. (2001). Digital natives, digital immigrants. *On the Horizon*, 9(5), 1–6.
- Prensky, M. (2022). Digital natives, digital immigrants revisited: From digital immigrants and digital natives to digital wisdom. *International Journal of Digital Literacy and Digital Competence*, 13(1), 1–12.
- Sahito, Z., & Vaisanen, P. (2017). Effect of ICT skills on the job satisfaction of teacher educators: Evidence from the universities of the Sindh Province of Pakistan. *International Journal of Higher Education*, 6(4), 122-136.
- Sutacio, R. L., & Ubayubay, M. C. (2025). Teachers' ICT proficiency and quality of teaching in public elementary and secondary schools. *International Journal of Multidisciplinary Research and Analysis*, 8(5), 1980–1987. <https://www.ijmra.in/v8i5/11.php>
- Teo, T. (2020). Factors influencing teachers' intention to use technology: Model development and test. *Computers & Education*, 148, 103734.
- Tondeur, J., Aesaert, K., Pynoo, B., van Braak, J., Fraeyman, N., & Erstad, O. (2021). Developing a validated instrument to measure teachers' educational technology competencies. *Computers & Education*, 173(2), 104–116. <https://doi.org/10.1016/j.compedu.2021.104294>
- Tondeur, J., Roblin, N. P., & van Braak, J. (2021). Teachers' professional knowledge for integrating ICT: A review of the literature on TPACK. *Educational Technology Research and Development*, 69(1), 99–115. <https://doi.org/10.1007/s11423-020-09813-w>
- Trust, T., Krutka, D. G., & Carpenter, J. P. (2021). Fostering professional learning networks for teachers' digital collaboration. *Computers & Education*, 166, 104–117.
- UNESCO. (2023). *ICT Competency Framework for Teachers (Version 4)*. United Nations Educational, Scientific and Cultural Organization.
- UNESCO. (2023). *Technology in education: A tool on whose terms? Global Education Monitoring Report 2023*. UNESCO Publishing.





UNESCO. (2023). UNESCO ICT Competency Framework for Teachers (ICT CFT) Version 3.

UNESCO. <https://www.unesco.org/en/digital-competencies-skills/ict-cft>

Vicencio, M., & Villanueva, R. (2022). *Teachers' digital competence and classroom technology integration in Philippine public schools. Philippine Journal of Educational Technology*, 5(2), 45–62.

Villegas, J. R., & Buquia, R. B. (2024). Teachers' level of information and communication technology (ICT) competence in public schools. *Philippine Graduate Journal of Science, Research and Technology*, 2(1), 1–12.

<https://pgjsrt.com/pgjsrt/index.php/qaj/article/view/93>

