



TECHNOLOGICAL COMPETENCE OF HIGHLY PROFICIENT TEACHERS IN CUYAPO DISTRICT, NUEVA ECIJA

Pearl Joy M. Grado, Rowena D. Walican, Lea Lyn S. Credo

Institute of Graduate and Professional Studies, Lyceum-Northwestern University, Dagupan City, Pangasinan, Philippines

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ABSTRACT

This study aimed to assess the technological competence of highly proficient teachers in Cuyapo District, SDO Nueva Ecija, focusing on key areas such as computerization and information literacy, communication, content creation, security, and problem-solving. The study used a descriptive method, employing frequency, percentage, mean, t-test, and Pearson product-moment correlation coefficient to analyze the data. The respondents included school heads, highly proficient teachers, and learners from various schools within the district. Data were gathered through surveys that assessed teachers' digital competencies and their ability to use technology in classroom and administrative tasks. Salient findings revealed that most highly proficient teachers were middle-aged with relatively fewer years of teaching experience. Despite this, their participation in technology-related training significantly enhanced their digital competencies. All three respondent groups—school heads, teachers, and learners—rated the teachers positively in computerization and information literacy, suggesting strong competence in handling digital tools and performing research tasks. Additionally, teachers were highly rated for their competence in security and problem-solving, reflecting their ability to manage digital security and troubleshoot technology issues. However, differences were found in ratings for communication and content creation. Teachers and learners rated the teachers highly in communication, while school heads gave more moderate ratings. In content creation, teachers rated themselves highly, but school heads and learners were more critical, suggesting that teachers may have underestimated the complexity of creating quality digital content. The study concluded that ongoing professional development and feedback

were essential for enhancing teachers' technological competence to meet the evolving expectations of school leadership and learners.

Keywords: *Competence, Computerization, Education, Technology, Training*

INTRODUCTION

The integration of technology in education has ushered in a transformative era, fundamentally shifting traditional teaching and learning practices. With the advent of digital tools and resources, educators are increasingly tasked with adapting instructional methods to keep pace with technological advancements. Highly proficient teachers—those recognized for their expertise and instructional skills—play a pivotal role in leading this educational transformation. However, while their mastery of teaching techniques is invaluable, it is no longer sufficient in a modern educational landscape that heavily incorporates technology. Technological competence has emerged as equally crucial for these educators, enabling them to effectively leverage digital tools to foster student engagement and maximize learning outcomes (Beetham and Sharpe, 2019). In this context, understanding and assessing the technological competence of highly proficient teachers in public schools is essential for developing targeted training interventions. Such interventions not only enhance teachers' capacity to use technology effectively but also support them in creating enriched learning environments that meet the demands of 21st-century education.

In public elementary schools, the demand for teachers skilled in technological practices has extended well beyond basic digital literacy. Teachers are now expected to demonstrate proficiency in content creation, collaborative tools, troubleshooting, and other technological applications relevant to digital teaching environments (Koehler and Mishra, 2009). These competencies are crucial as they equip teachers to navigate the complex technical and pedagogical challenges of contemporary classrooms, where digital learning has become central. Studies indicate, however, that even highly proficient teachers may experience gaps in technological competence. These gaps can hinder the effective use of technology, which in turn affects students' access to dynamic, technology-enhanced learning experiences (Gupta and Wulf, 2020). Addressing this gap in competence among highly proficient teachers is therefore essential to ensuring that the use of technology in education is not only widespread but also impactful and sustainable.

The shift toward digital education in the Philippines has made the enhancement of technological competence a national priority. Educational policies, such as the Philippine Professional Standards for Teachers (PPST), underscore the integration of information and communications technology (ICT) in teaching as fundamental to achieving 21st-century learning objectives (Department of Education, 2020). These policies support not only the acquisition of digital resources but also encourage educators to become proficient in their use. While initiatives such as the Department of Education's ICT policies have increased access to digital tools in schools, challenges remain. Teachers across the country still report feeling underprepared to utilize these tools effectively, particularly in

more advanced areas like digital content creation, cybersecurity, and troubleshooting (Scherer et al., 2021). These findings indicate that many teachers lack the comprehensive training required to fully implement technology in their classrooms. While highly proficient teachers are known for their excellence in traditional teaching methods, they are not immune to these challenges, underscoring the need for training programs tailored to their unique profiles and responsibilities.

In this context, the highly proficient teachers of Cuyapo District serve as key figures. These educators, recognized for their excellence in traditional teaching methods, often emerge as leaders within their schools. By advancing their digital literacy and technological skills, they can set a powerful example for their peers, encouraging wider adoption of innovative teaching practices across the district (Ertmer and Ottenbreit-Leftwich, 2010; Martin et al, 2023). The rationale for this study is based on the need to systematically evaluate and address the specific technological training needs of these teachers. While the district has made strides in general teacher development, there is a lack of specialized programs that focus exclusively on advanced technological competencies for highly proficient teachers. By identifying the specific competencies that these teachers lack, the research will lay the groundwork for a training program that aligns with both their current abilities and the evolving demands of digital education.

The design of this technology-driven training program will be informed by research on digital competence frameworks and will focus on practical, hands-on learning to address the identified skill gaps. The goal is to ensure that highly proficient teachers can confidently and competently integrate digital tools into their teaching practices, from designing digital content to troubleshooting technical issues. Furthermore, these teachers' leadership positions make them ideal candidates to serve as mentors and role models for other educators in the district, fostering a culture of technological proficiency and innovation. By enhancing their skills, the district not only supports these teachers' professional growth but also advances its broader goal of achieving excellence in digital learning.

The potential benefits of this research are substantial. A well-designed, technology-driven training program for highly proficient teachers in Cuyapo District could serve as a model for similar initiatives nationwide. As the educational landscape in the Philippines and beyond continues to evolve in response to digital innovation, the importance of equipping teachers with the competencies they need to thrive in technology-driven environments cannot be overstated. When highly proficient teachers are empowered with strong technological competencies, they are better positioned to create learning environments that are interactive, student-centered, and conducive to the development of digital skills among students (Scherer et al., 2021). The training program proposed in this research, therefore, has implications not only for the professional development of teachers in Cuyapo District but also for the advancement of digital literacy and competency in Philippine education as a whole.

Ultimately, this study aimed to bridge the gap between existing levels of technological competence and the demands of digital education. By providing a structured assessment

of teachers' technological competencies and developing a tailored training design, this research seeks to empower highly proficient teachers to embrace and utilize technology effectively. In doing so, it supports a future-ready education system that meets the needs of both educators and students, fostering a learning environment that fully embraces the potential of digital tools.

This research focused on the technological competence of highly proficient teachers in Cuyapo District, SDO Nueva Ecija, seeking to develop a training design specifically geared toward enhancing their digital capabilities. Cuyapo District has a long-standing commitment to educational excellence, with numerous development programs already in place to support teachers' professional growth. However, while these programs address general teaching proficiency, the unique technological training needs of highly proficient teachers remain under-addressed. By assessing these teachers' current technological competencies and identifying specific areas for improvement, this research aims to design a targeted, technology-driven training program. This approach aligns with the broader goal of building a highly capable teaching workforce equipped to lead in the integration of digital tools and practices in public elementary schools.

Research Questions

This study aimed to assess the technological competence of highly proficient teachers in Cuyapo District, Schools Division Office Nueva Ecija as basis for training design.

Specifically, it sought to answer the following sub-problems:

1. What is the profile of the highly proficient teachers in terms of the following variables:
 - a. age;
 - b. length of service; and
 - c. number of relevant training attended?
2. What is the level of technological competence of highly proficient teachers as perceived by their school heads, highly proficient teachers themselves, and learners in terms of the following:
 - a. computerization and information literacy;
 - b. communication and elaboration skills;
 - c. creation of digital content; and
 - d. security and problem-solving skills?
3. What significant difference exists among the ratings of school heads, highly proficient teachers themselves, and learners?
4. What significant relationship exists between the levels of technological competence of highly proficient teachers across profile variables?
5. Based on the findings, what technology-driven training design can be proposed to improve the level of technological competence of highly proficient teachers?

METHODOLOGY

Presented in this section are the sampling and data collection to be utilized in the study.

Sampling

This study utilized a descriptive correlation research design to examine the relationship between teacher proficiency, school leadership, and learner outcomes in the 10 elementary schools of Cuyapo District, SDO Nueva Ecija. A purposive sampling method was employed, selecting 22 highly proficient teachers as participants based on their expertise. Additionally, school heads, highly proficient teachers, and learners from the district were involved. A questionnaire was distributed to these participants via Google Forms to gather data. The study aimed to identify patterns and correlations between teacher proficiency, school leadership, and the academic performance of learners, providing insights into the effectiveness of educational programs within the district.

Data Collection

The researcher-made questionnaire used in this study underwent a thorough validation process to ensure its accuracy and reliability. Initially, the questionnaire was reviewed and validated by key stakeholders: the District Supervisor, the District ICT Coordinator, and the Division IT Officer. Their feedback contributed to refining the instrument to ensure it was appropriate for the research context.

After validation, the questionnaire was distributed to the target respondents in the elementary schools of Cuyapo District, SDO Nueva Ecija through purposive sampling. The distribution process was conducted over the course of a week, with the questionnaire made available both physically and digitally through Google Forms. The respondents, who were selected based on specific criteria, were given three days to complete the questionnaire and return it to the researcher for subsequent data analysis.

For the analysis, various statistical methods were employed, including frequency and percentage calculations, the mean for profile variables, T-tests, and Pearson's Product Moment Correlation Coefficient to analyze the data. The validity and reliability of the questionnaire were assessed rigorously. The instrument was rated as highly valid, receiving a score of 5, indicating excellent content validity as determined by the experts who reviewed it. Furthermore, the reliability of the questionnaire was confirmed through Cronbach's Alpha (α), which yielded a value of ≥ 0.9 , classified as "Excellent," indicating a very high level of internal consistency in the responses.

RESULTS

This section presents the results and interpretation of data collected on the technological competence of highly proficient teachers in Cuyapo District, SDO Nueva Ecija, as perceived by the school head, highly proficient teachers themselves and learners.

Findings are structured according to each research question, with supporting statistical analysis, tables, and interpretations.

Profile of Highly Proficient Teachers

The profile of highly proficient teachers includes age, length of service, and number of relevant training attended. These factors provide context for understanding their potential influence on technological competence.

Table 1
Profile of Highly Proficient Teachers
(N=22)

Age	Frequency	Percentage
25-35 years old	2	9.09
36-45 years old	8	36.36
46 years old and above	12	54.54
Total	22	100
Length of Service		
5-10 years	5	22.73
11-15 years	9	40.91
16 years and above	8	36.36
Total	22	100
Number of Relevant Training Attended		
1 Training	1	4.45
2 Training	3	13.64
3 Training	3	13.64
4 Training	6	27.27
5 Training	3	13.64
6 Training	5	22.73
7 Training	1	4.55
Total	22	100

Table 2.1
Level of Technological Competence in Terms of Computerization
and Information Literacy
(N=22)

Indicators	School Heads		Highly Proficient Teachers		Learners	
	Mean	DE	Mean	DE	Mean	DE
1. Basic knowledge of computers	4.20	C	4.30	VC	4.10	C
2. Avoidance of computers due to unfamiliarity	2.40	SC	2.50	SC	2.30	SC

3. Understanding of computer terminologies	3.90	C	4.00	C	3.70	C
4. Evaluation of website quality and reliability	3.70	C	3.90	C	3.60	C
5. Awareness of media subjectivity	3.60	C	3.80	C	3.50	C
6. Ability to identify context using keywords	4.00	C	4.20	C	3.80	C
7. Usage of search engines like Google	4.50	VC	4.40	VC	4.30	VC
8. Proficiency in office software	4.20	C	4.30	VC	4.00	C
Average Weighted Mean	3.81	C	3.92	C	3.66	C

Legend:

Range	Descriptive	Equivalent
4.21 – 5.00	Very Competent	(VC)
3.41 – 4.20	Competent	(C)
2.61 – 3.40	Moderately Competent	(MC)
1.81 – 2.60	Slightly Competent	(SC)
1.00 – 1.80	Not Competent	(NC)

Table 2.2
Level of Technological Competence in Terms of Communication and Elaboration Skills
(N=22)

Indicators	School Heads		Highly Proficient Teachers		Learners	
	Mean	DE	Mean	DE	Mean	DE
1. Basic features of communication tools	4.20	C	4.50	VC	4.30	VC
2. Advanced features of communication tools	3.90	C	4.20	C	4.10	C
3. Availability of a wide range of communication tools	3.80	C	4.30	VC	4.20	C
4. Ability to share files and content online	4.10	C	4.40	VC	4.30	VC
5. Knowledge of collaboration tools for file sharing	3.90	C	4.30	VC	4.20	C
6. Participation in online meetings and webinars	4.20	C	4.60	VC	4.50	VC
7. Awareness of social networking sites	4.40	VC	4.70	VC	4.60	VC
Average Weighted Mean	4.07	C	4.43	VC	4.31	VC

Legend:

Range	Descriptive	Equivalent
4.21 – 5.00	Very Competent	(VC)
3.41 – 4.20	Competent	(C)
2.61 – 3.40	Moderately Competent	(MC)
1.81 – 2.60	Slightly Competent	(SC)
1.00 – 1.80	Not Competent	(NC)

Table 2.3
Level of Technological Competence in Terms of Creation of Digital Content
(N=22)

Indicators	School Heads		Highly Proficient Teachers		Learners	
	Mean	DE	Mean	DE	Mean	DE
1. Production of simple digital content	3.80	C	4.00	C	3.90	C
2. Basic editing of existing content	3.60	C	3.90	C	3.80	C
3. Basic formatting of content	3.70	C	4.00	C	3.90	C
4. Knowledge of copyright referencing	3.20	MC	3.40	MC	3.30	MC
5. Ability to create audio, blogs, or videos	3.50	C	3.80	C	3.70	C
6. Web page design skills	2.80	MC	3.00	MC	2.90	MC
7. Website creation for digital content	2.50	SC	2.80	MC	2.60	SC
8. Animation for presentations	2.70	MC	3.10	C	2.90	MC
Average Weighted Mean	3.25	MC	3.50	C	3.40	MC

Legend:

Range	Descriptive	Equivalent
4.21 – 5.00	Very Competent	(VC)
3.41 – 4.20	Competent	(C)
2.61 – 3.40	Moderately Competent	(MC)
1.81 – 2.60	Slightly Competent	(SC)
1.00 – 1.80	Not Competent	(NC)

Table 2.4
Level of Technological Competence in Terms of Security and Problem-Solving Skills
(N=22)

Indicators	School Heads		Highly Proficient Teachers		Learners	
	Mean	DE	Mean	DE	Mean	DE
1. Awareness of secure passwords and data	4.10	C	4.00	C	3.80	C
2. Knowledge of antivirus and malware	3.90	C	3.80	C	3.70	C
3. Recognizing phishing attempts	4.00	C	3.90	C	3.80	C
4. Understanding of data privacy policies	3.80	C	3.70	C	3.50	C
5. Problem-solving with technology	3.90	C	3.80	C	3.70	C
6. Troubleshooting technical issues	3.70	C	3.60	C	3.40	MC
7. Managing security breaches in classrooms	3.60	C	3.50	C	3.30	MC
Average Weighted Mean	3.86	C	3.76	C	3.60	C

Legend:

Range	Descriptive	Equivalent
4.21 – 5.00	Strongly Competent	(SC)
3.41 – 4.20	Competent	(C)
2.61 – 3.40	Moderately Competent	(MC)
1.81 – 2.60	Slightly Competent	(SLC)
1.00 – 1.80	Not Competent	(NC)

Table 3
Significant Relationship between the Profile of Highly Proficient Teachers and their Level of Technological Competence (N=22)

Indicators of Technological Competence	School Head Rating (Mean)	Highly Proficient Teacher Rating (Mean)	Learner Rating (Mean)	t-value	p-value
Computerization and Information Literacy	3.81	3.92	3.66	1.34	0.28
Communication and Elaboration Skills	4.07	4.43	4.31	5.12	<0.01*
Creation of Digital Content	3.25	3.50	3.40	1.65	0.20
Security and Problem Solving	3.86	3.76	3.60	1.22	0.31

Legend:

- * Significant at 0.01 (2-tail)
- ** Significant at 0.05 (1-tail)

Table 4
Correlation Between Technological Competence and Profile Variables of Highly Proficient Teachers (N=22)

Profile Variable	Technological Competence		
	Statistics	level	p-value
Age	9.91	weak	0.0071**
Length of Service as Principal	725	weak	0.001**
Relevant Training Attended	0.369	weak	0.091**

Legend:

- * Significant at 0.01 (2-tail)
- ** Significant at 0.05 (1-tail)

DISCUSSION

This section presents the discussion and interpretation of data collected on the technological competence of highly proficient teachers in Cuyapo District, as perceived by the school head, highly proficient teachers themselves and learners. Findings are structured according to each research question, with supporting statistical analysis, tables, and interpretations.

Table 1 presents the profile of highly proficient teachers includes age, length of service, and number of relevant training attended. These factors provide context for understanding their potential influence on technological competence.

Age. The table above presents the age distribution of highly proficient teachers, showing that the majority with 12 or 54.54 percent are aged 46 years and above. Highly proficient teachers aged 36-45 make up 8 or 36.36 percent, while those aged 25-35 comprise of 2 or 9.09 percent. Younger teachers, particularly those aged 25-35, are generally more familiar with digital tools due to their upbringing in a technology-driven world. This familiarity enhances their ability to integrate technology into teaching practices, aligning with findings that younger educators are more adept at using technology (Blazquez et al, 2020). Older teachers, though initially less exposed to technology, often leverage their experience to effectively incorporate digital tools into their teaching.

Length of Service. Regarding years of service, the majority of highly proficient teachers with or 40.91 percent have 11-15 years of experience, which corresponds to a time when technology began playing a significant role in education. This group has had the opportunity to gradually integrate digital tools and refine their teaching methods. Teachers with 16 or more years of service with 8 or 36.36 percent may have faced more challenges initially but have accumulated experience to effectively balance traditional methods with technological tools. Meanwhile, highly proficient teachers with 5-10 years of service with 5 or 22.73 percent likely entered the profession when technology integration was already more established, giving them an advantage in adapting to digital tools.

Number of Relevant Training Attended. The table presents the distribution of relevant training sessions attended by the highly proficient teachers and their associated technological competence. Out of the total 22 teachers, the majority attended between 4 to 6 training sessions, with the highest number with 6 or 27.27 percent attending four sessions, followed by 5 or 22.73 percent of highly proficient teachers attending six sessions. This distribution indicates a relatively balanced spread of training attendance across the sample. The data also suggests that highly proficient teachers who attended more training sessions generally exhibited higher technological competence, as reflected in the ratings provided in the competence column. Highly proficient teachers with fewer training sessions tended to show slightly lower competence levels.

Related studies reinforce this finding, with Gikandi et al, (2011) demonstrating that teachers who participate in frequent and relevant technology training programs tend to improve their technological skills, which positively impacts their ability to integrate digital

tools into teaching. Koehler and Mishra's (2009) *TPACK framework* further emphasizes that consistent and comprehensive training allows teachers to better navigate the integration of technology, pedagogy, and content, resulting in more effective and engaging educational experiences. These studies highlight the importance of continuous professional development in enhancing teachers' technological competence, enabling them to better meet the demands of modern education.

Table 2.1 reveals notable differences in how school heads, highly proficient teachers, and learners perceive the highly proficient teachers' competence. School heads rated the highly proficient teachers as competent, with an average weighted mean of 3.81, indicating that administrators believe highly proficient teachers have a solid foundation in using digital tools for tasks such as record-keeping and communication. However, this rating suggests there is room for improvement, particularly in advancing beyond basic digital skills to more innovative and complex technology applications in education.

In contrast, highly proficient teachers rated themselves higher, with an average weighted mean of 3.92, also categorized as competent. This self-assessment reflects their confidence in their ability to integrate technology, based on their experience preparing digital materials, utilizing technology-driven teaching methods, and staying updated through professional development. However, their higher self-rating may not fully align with the perceptions of others, suggesting a potential gap between their self-perception and how their technological competence is viewed by others.

Learners provided the lowest rating, with an average weighted mean of 3.66, still considered competent but lower than the ratings from school heads and highly proficient teachers. This discrepancy may indicate that learners, who are more accustomed to digital environments, expect more engaging and dynamic uses of technology, such as interactive platforms or gamified lessons. The lower rating from learners highlights the need for teachers to adapt their technological integration to better meet learners' expectations and learning experiences, a concern echoed in studies emphasizing the importance of aligning technology use with learners' preferences to enhance engagement and educational outcomes (Blazquez et al, 2020).

Table 2.2 reveals varying perceptions of highly proficient teachers' communication and collaboration skills, particularly in relation to their technological competence. The highly proficient teachers rated themselves the highest, with an average weighted mean of 4.43, described as "very competent." This self-assessment reflects their confidence in using technology to enhance communication and collaboration, such as through digital platforms for sharing resources, coordinating with colleagues, and engaging with learners. Their strong self-perception likely stems from their ability to integrate communication tools like email, chat apps, and collaborative software into their daily practices. A study by Avidov-Ungar (2021) found that teachers who actively integrate digital communication tools report higher levels of competence and confidence in their roles.

Learners also rated the highly proficient teachers highly, with an average weighted mean of 4.31, categorizing them as "very competent" communicators and collaborators. This rating suggests that learners view their teachers as effective in using technology to create interactive and engaging learning experiences. Tools like online discussion boards, video conferencing, and collaborative project platforms likely enhance learner engagement, aligning with their digital literacy and expectations. The strong rating from learners underscores the critical role of technological competence in fostering productive teacher-learner interactions in modern educational environments. Research by Eickelmann and Drossel (2020) emphasizes that students often value technology-enhanced teaching methods that promote collaboration and active learning.

In contrast, school heads gave the lowest rating, with an average weighted mean of 4.07, described as "competent." While still reflecting a high level of skill, this rating suggests that school heads may expect a more advanced or strategic use of technology, such as taking leadership roles in school-wide digital initiatives or using technology for data-driven decision-making and cross-departmental collaboration. The gap between the school heads' ratings and those of the highly proficient teachers and learners highlights areas for growth, particularly in leveraging technology for broader organizational efficiency and innovation. Continuous professional development is crucial for teachers to meet the evolving expectations of all stakeholders. According to Liu et al. (2019), school leadership plays a crucial role in fostering an environment that encourages continuous development of teachers' technological competencies.

The results from Table 2.3 reveal differences in the evaluation of highly proficient teachers' competence in creating digital content among school heads, the highly proficient teachers themselves, and learners. School heads rated the highly proficient teachers the lowest, with an average weighted mean of 3.25, describing them as "moderately competent." This suggests that administrators see room for improvement in how highly proficient teachers create and utilize digital content, particularly in alignment with institutional goals and advanced content creation. In contrast, the highly proficient teachers rated themselves the highest, with an average mean of 3.50, indicating their confidence in creating digital content that supports teaching practices, such as multimedia presentations and educational videos.

Learners provided an intermediate rating, with a mean of 3.40, also categorized as "moderately competent." This suggests that while learners acknowledge highly proficient teachers' efforts in digital content creation, they may have higher expectations for quality, creativity, and relevance. The ratings indicate the need to align content creation more closely with the technological familiarity and preferences of digitally native learners. Additionally, the indicator "Website creation for digital content" received the lowest ratings from all groups, highlighting a gap in proficiency in more technical tasks like website design, which may require advanced training.

On the other hand, the "Production of simple digital content" received the highest ratings from all groups, indicating that highly proficient teachers are skilled in creating basic digital materials such as presentations and educational videos. The results suggest that while

highly proficient teachers excel in creating basic digital content, there is a need for further training in more advanced areas like interactive digital design and website creation. This aligns with recent studies that emphasize the importance of teachers' digital proficiency in enhancing ICT integration in schools (Cabero-Almenara, et. al. (2023)

The results in Table 2.4 highlight the evaluation of highly proficient teachers' competence in digital security and problem-solving skills by school heads, the highly proficient teachers themselves, and learners. Among the indicators, "Awareness of secure passwords and data" received the highest ratings, with school heads rating it at 4.10, highly proficient teachers at 4.00, and learners at 3.80. These ratings suggest that highly proficient teachers are generally competent in basic digital security measures, such as creating strong passwords and protecting sensitive data, which is essential in today's digital education environment.

However, the indicator "Managing security breaches in classrooms" received the lowest ratings across all groups, with school heads at 3.60, highly proficient teachers at 3.50, and learners at 3.30. These means indicate that while highly proficient teachers are aware of preventive security measures, they face challenges in managing security breaches, such as unauthorized access to devices or cyber threats within classrooms. This gap highlights the need for targeted professional development to enhance highly proficient teachers' problem-solving capabilities and response strategies in addressing complex security issues.

Overall, the ratings suggest a consistent level of competence in digital security and problem-solving, with room for improvement in handling more advanced security challenges. The findings underscore the importance of professional development in strengthening these skills to protect digital assets and create a safer learning environment. Research supports the need for enhancing educators' problem-solving skills in cybersecurity, as teachers play a crucial role in fostering a secure digital culture in schools (Li et al., 2023; Nguyen et al., 2023).

Table 3 presented in the table highlight the significant differences in ratings for various indicators of technological competence between school heads, highly proficient teachers, and learners. For communication and elaboration skills, a significant difference was found with a t-value of 5.12 and a p-value of less than 0.01. This indicates that the three groups had differing perceptions of how well the teachers communicated and elaborated on lessons using technology. Specifically, highly proficient teachers rated themselves the highest in this area, followed by learners, while school heads gave the lowest ratings. This disparity suggests that while teachers and learners may feel that technological tools are effectively enhancing communication and engagement, administrators might expect a more strategic or advanced application of these skills.

On the other hand, no significant differences were found in the ratings for computerization and information literacy, creation of digital content, and security and problem-solving. The p-values for these indicators were 0.28, 0.20, and 0.31, respectively, all of which are greater than the 0.05 significance level, suggesting that the perceptions of technological

competence in these areas are largely aligned across the three groups. While teachers and learners may recognize the competence of teachers in these areas, school heads may have slightly more critical expectations, particularly when it comes to areas that support institutional goals or advanced technology applications.

These findings are consistent with studies that explore the varying perceptions of educators' technological competence across different stakeholder groups. For instance, a study by Cabero-Almenara, et. al. (2023) found that teachers often rate their own technological abilities higher than administrators or students do, especially in areas like communication and digital content creation. Similarly, studies indicate that while teachers view their digital competence as adequate, there is often a gap between their self-assessment and the expectations of school leadership, highlighting the need for ongoing professional development to bridge these differences and align practices with institutional and learner needs.

A similar study by Hsieh et al. (2020) explored the differing perceptions of teachers, administrators, and students regarding teachers' technological competence. The study revealed that teachers often rated their technological skills highly, particularly in areas like content creation and communication through digital platforms. However, administrators and students tended to rate the teachers lower, especially in skills related to problem-solving and digital security. This pattern aligns with the current study's findings, where highly proficient teachers rated themselves higher than both school heads and learners. Hsieh et al. (2019) highlighted the importance of addressing these perception gaps through targeted professional development, which is consistent with the current study's conclusion that ongoing training is essential to align teachers' self-assessments with the expectations of both administrators and students.

Table 4 presents the results of the Pearson's r test examining the relationship between teachers' age and the distribution of those classified as highly proficient. The computed test statistic is 9.91, with a p -value of 0.0071. Since the p -value is lower than the standard significance level of 0.05, the result indicates a statistically significant relationship between age and technological competence. This means that the distribution of highly proficient teachers varies across age groups and is not uniform.

A study by Ingle et al. (2016) emphasizes that younger teachers are generally more comfortable with technology, as they have grown up in a more digitally integrated environment. This aligns with the finding that teachers in the 25-35 age range, though a small percentage, may be more adept at using technology compared to older teachers. In contrast, teachers in the 46 and above age group might face more challenges when adapting to new technological tools, as noted in studies by Thompson and O'Rourke (2017), which highlighted that older educators may struggle with technology due to limited exposure during their formative years.

Furthermore, Ballantine and Spade (2022) argue that as teachers age, they may acquire technological competence over time through professional development and exposure, but their initial adaptation may be slower compared to younger generations. This supports the finding that the majority of highly proficient teachers in the study fall within the 46

years and above age bracket, reflecting the broader trend of technology adoption in older educators, albeit with potential gaps in advanced technological integration.

The correlation analysis between the length of service and technological competence of teachers produced a Pearson correlation coefficient of 0.725, indicating a moderate positive relationship. The p-value associated with this correlation is 0.001, which is less than the significance level of 0.05. This means that the relationship between length of service and technological competence is statistically significant, and the positive correlation is unlikely to have occurred by chance. The moderate correlation suggests that as teachers gain more years of experience, their technological competence tends to improve. This may be due to increased exposure to professional development, evolving teaching practices, and greater familiarity with digital tools over time. However, the relationship is not perfect, meaning other factors may also contribute to technological competence. Therefore, while length of service plays a significant role, it is only one of several factors influencing teachers' ability to integrate technology effectively in their teaching practices.

The Pearson correlation coefficient (r) between the number of training sessions attended and the technological competence of highly proficient teachers is $r=0.369$, indicating a moderate positive relationship. The p-value is $p=0.091$, which suggests that the relationship is not statistically significant at the standard $\alpha=0.05$.

This implies that while there is a trend indicating that more training may relate to higher technological competence, this relationship is not strong enough to be considered statistically significant based on the given data.

The results align with studies that highlight the importance of professional development in enhancing teachers' technological competence, although the extent of the impact may vary. For instance, Koehler and Mishra (2009) in their Technological Pedagogical Content Knowledge (TPACK) framework emphasize that effective integration of technology in teaching depends on continuous training and development. However, the study also suggests that the quality and relevance of the training play a more critical role than the sheer quantity.

Similarly, Lawless and Pellegrino (2007) found that professional development programs tailored to specific technological applications had a significant positive impact on teachers' competency. However, their findings note diminishing returns when training lacks direct application to classroom practices, which may explain the moderate correlation observed in this data.

Conclusions

The profile variables of highly proficient teachers reveal key trends in age, length of service, and number of relevant training. The majority of these highly proficient teachers are aged 46 years and above, followed by those aged 36-45, with fewer in the 25-35 age range. In terms of length of service, the largest group has 11-15 years of experience,

followed by those with 16 or more years. Many teachers attended between 4-6 relevant training sessions, which contributed to their development of technological competence. These profile variables suggest that age and experience are closely linked to technological proficiency, with ongoing training playing a vital role. The levels of technological competence among highly proficient teachers show strong proficiency across various indicators. Teachers are rated as competent in computerization and information literacy, communication and elaboration skills, digital content creation, and security and problem-solving. While teachers rate themselves very competent in communication and elaboration, and somewhat competent in digital content creation, school heads and learners generally align in their ratings of competence in most areas. This reflects the teachers' ability to effectively use digital tools in their teaching practices. A significant difference was found in the ratings for communication and elaboration skills, with school heads rating teachers lower than the teachers themselves and learners. The ratings for other indicators, such as computerization and information literacy, digital content creation, and security and problem-solving, did not show significant differences among the groups. This suggests that while teachers and learners perceive high levels of competence, school heads may expect more advanced applications of technology, especially in areas such as communication and content creation. The analysis of the significant relationship between technological competence and the profile variables of highly proficient teachers highlights that both age and years of service play a key role in shaping their technological skills. Younger teachers tend to have higher technological competence due to early exposure to digital tools, while older teachers leverage their experience to effectively integrate technology. The positive relationship between years of service and technological competence suggests that more experienced teachers are more competent, though other factors, such as the quality of training, may also contribute to their proficiency. These findings emphasize the need for ongoing professional development to enhance teachers' technological capabilities across various stages of their careers.

Recommendations

To effectively enhance the technological competence of highly proficient teachers, it is essential to tailor professional development programs that take into account their individual profile variables, such as age, years of service, and relevant training. Younger teachers, who are generally more familiar with technology, could benefit from advanced training on emerging digital tools, multimedia content creation, and integrating these technologies across various subject areas. For teachers with more years of service, particularly those aged 46 and above, training can focus on refreshing their skills and ensuring they are up to date with the latest technological advancements, while also leveraging their experience to adapt and incorporate new tools effectively into their teaching. Teachers with fewer years of service may need more foundational training to ensure a solid grasp of the basics, providing a strong starting point for more advanced technology integration. Additionally, offering mentorship and peer collaboration opportunities will allow highly proficient teachers to share their expertise, fostering a collaborative learning environment that benefits teachers of all experience levels. Regularly scheduled professional development sessions, alongside access to external

conferences and webinars, can help teachers stay informed about global trends in educational technology. By addressing these factors in a comprehensive and targeted way, schools can significantly enhance the technological competence of their teaching staff, empowering them to meet the demands of a technology-driven educational environment.

Compliance with Ethical Standards

This study strictly adhered to ethical research standards to ensure the protection, rights, and dignity of all participants involved. In conducting the research, the following ethical principles were observed:

All participants—both department heads and teachers—were provided with a clear explanation of the study's objectives, scope, and procedures. Participation was voluntary, and no individual was forced or coerced to take part. Written informed consent was secured prior to data collection to ensure that participants fully understood their role in the study and the use of the data they provided.

Participant identities and school affiliations remained confidential. No identifying information appeared in the study's results or publication. Codes or pseudonyms were used to protect identities, and all data were stored securely and accessed only by the researcher.

Participants were informed of their right to withdraw from the study at any point without fear of penalty or consequence. This ensured that participation was completely voluntary and respectful of individual autonomy.

The study avoided any procedures that might have caused physical, emotional, or psychological harm to participants. Survey and interview questions were carefully constructed to avoid sensitive or offensive content.

Data were reported accurately and objectively. No information was fabricated, misrepresented, or altered. The researcher committed to honest and transparent analysis and reporting of results, regardless of the outcomes.

Prior to data collection, written permission was obtained from the Department of Education – Cuyapo District, SDO Nueva Ecija, as well as from the respective school principals. The study was also subjected to the approval of a research ethics review committee, when required by the academic institution.

By upholding these ethical principles, the study aimed to promote academic integrity, protect participant welfare, and contribute responsibly to the field of educational leadership and instructional improvement.

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Corresponding author: pearljoy.grado20@yahoo.com