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Pre-service Teachers' Competence on Utilization of Digital Instructional Tools

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Abstract

The rapid integration of digital technology into education has underscored the necessity for pre-service teachers to develop competence in utilizing digital instructional tools. This study assesed the level of competence of Bachelor of Secondary Education pre-service teachers major in Social Studies in using digital tools, specifically focusing on presentation, image-editing, and video-editing applications. Employing a descriptive research design, data were gathered from 75 pre-service teachers and their cooperating teachers in partner secondary schools in Cagayan for the academic year 2024-2025. The study utilized self-assessment questionnaire and analytic rubrics to evaluate competence, while also considering profile variables such as sex, gadget ownership, weekly allowance, internet access, and academic performance. Results indicated that pre-service teachers generally demonstrated very high competence in using digital instructional tools, while proficient on the use of digital tools during their demonstration teaching. The findings also revealed no significant difference in competence levels when grouped according to profile variables except for academic performance. These results highlight the need for enhanced training and targeted support in teacher education programs to bridge the gap between theoretical knowledge and practical digital skills.

***Keywords**: Digital Competence, Digital Instructional Tools, Pre-service Teachers, Teacher Education, Technology Integration*

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Introduction

The rise of digital technology has completely transformed various industries, including education. Incorporating digital tools into teaching methods has become a crucial part of modern pedagogy. The modern world places a strong emphasis on developing an educational environment that enhances learners' academic aptitude at all levels (Samiha et al., 2022). Most developed countries have aligned their educational infrastructure with modern technologies, benefiting from these advancements to improve academic outcomes. With the rapid advancement of technology, the landscape of education has evolved, requiring educators to adapt and integrate digital tools into their teaching practices.

In today's educational landscape, pre-service teachers serve a dual role as learners and future educators. They are expected to gain proficiency in digital skills and teaching techniques to effectively integrate into a digital society. However, a noticeable gap exists between the theoretical knowledge they acquire and the practical skills needed to effectively use digital instructional tools. According to Highland and Fedtke (2023) and Onu et al. (2023), the Philippines has yet to fully implement digital literacy programs to bridge this digital divide. Their studies found that teachers, students, and administrators show moderate readiness for e-learning, but the utilization and capacity with online learning platforms and teachers' competencies in digital technology remain underexplored. This gap in understanding inspired the present study to investigate digital literacy and competence among teachers and the factors influencing the development of these abilities in public and private schools. Furthermore, limited resources are available on this current phenomenon, underscoring the importance of this research.

Several policy frameworks emphasize the importance of digital competence in Philippine education. DepEd Order No. 21, series of 2019, particularly paragraphs 32 and 36 of Section 4, highlights digital competence within the Philippine Professional Standards for Teachers (PPST), aligning it with the development of teachers' digital skills. It also stresses the need for teachers to understand diverse learners and adapt their practices accordingly, which includes digital learning and the use of digital instructional tools. Additionally, CHED Memorandum Order No. 75, series of 2017, mandates the integration of technology-related competencies in teacher education curricula. Alonzo et al. (2020) found that this memorandum has led to a more structured approach to incorporating digital literacy and technology in teacher education programs. A study by Javier (2020) focusing on Filipino language teachers revealed that while teachers' attitudes toward digital teaching modalities are generally positive, there is a need for continuous upskilling, especially in response to shifts like the pandemic-driven transition to digital platforms.

Thus, this assessed the level of competence of pre-service teachers in utilizing digital instructional tools. The goal is to establish baseline data on their competence and identify significant factors influencing the appropriate use of these tools to enhance the teaching-learning process. This research addresses a critical gap in understanding how future educators in the Philippines can be better prepared to meet the demands of a digitalized educational environment and contribute meaningfully to the improvement of teaching practices.

Methodology

This study used the descriptive research design to gather comprehensive data from the 4th Year BSED Major in Social Studies pre-service teachers of CSU Andrews as assessed by themselves and their cooperating teachers. The quantitative method was used to determine the profile of the pre-service teachers according to sex, gadgets owned, weekly allowance, internet access, academic performance, and the level of competence of the pre-service teachers on their digital instructional tools utilization as assessed by themselves and their cooperating teachers.

The respondents of this study were the 4th Year BSED pre-service teachers Major in Social Studies of the College of Teacher Education Andrews Campus and their cooperating teachers. The study utilized total enumeration to provide the best and unbiased validation of data. There were 75 cooperating teachers of the 75 4th Year BSED pre-service teachers Major in Social Studies of the College of Teacher Education for the Academic Year 2024-2025.

The questionnaire used for this study was made by the researchers based from the review of related literature and studies, and had undergone content and face validation by the experts in the field. The survey questionnaire has a total of 35 items to analyze the competence of the BSED 4th year pre-service teachers Major in Social Studies on digital instructional tools utilization as assessed by themselves and their cooperating teachers.

The frequency count and percentage distribution were used to describe the demographic profile of the respondents in terms of sex, gadget owned, weekly allowance, internet access, and academic performance). The weighted mean was used to determine the level of digital instructional tool competence as assessed by pre-service teachers themselves and their cooperating teachers. The Paired Sample t-test was used to compare the significant differences between the pre-service teachers' self-assessments and cooperating teachers' assessments on each competency domain which are the powerpoint presentation, image editing, and video editing. The Mann-Whitney U Test was applied for testing differences across dichotomous profile variables like sex. The Kruskal-Wallis H Test was applied for ordinal and categorical variables with more than two groups like gadgets owned, weekly allowance, internet access, and academic performance. The interpretation of mean scores followed two different criteria: (1) a Likert-type scale for self-assessment and (2) an analytic rubric for cooperating teachers' assessment. For the academic performance of the respondents, the grading system of the Cagayan State University as it appears in the official Transcript of Records was used.

Results/Findings

Table 1. Demographic Profile of the Respondents

Profile Variable	Category	Frequency	Percentage
Sex	Male	16	21.33
	Female	59	78.67
Gadgets Owned	Laptop	12	16.00
	Smartphone	10	13.33
	Laptop & Smartphone	46	61.33
	Others	7	9.33
Weekly Allowance	₱0–₱500	29	38.67
	₱501–₱1000	23	30.67
	₱1001–₱1500	16	21.33
	₱1501 and above	7	9.33
Internet Access	Wi-Fi	33	44.00
	Mobile Data	23	30.67
	Wi-Fi & Mobile Data	19	25.33
Academic Performance	Outstanding (91–93)	9	12.00

Very Satisfactory (88–90)	42	56.00
Very Good (85–87)	20	26.67
Good (82–84)	1	1.33
Total	**75**	**100.00**

Table 1 shows the demographic profile of the 75 respondents which reveals that the majority are female (78.67%), with only a small proportion being male (21.33%). Most respondents (61.33%) own both a laptop and a smartphone, indicating good access to digital technology, while smaller groups own only a laptop (16%), only a smartphone (13.33%), or other gadgets (9.33%). In terms of weekly allowance, a significant portion (38.67%) receive ₱0–₱500, followed by 30.67% who receive ₱501–₱1000, suggesting that most students have modest financial resources. Regarding internet access, 44% use Wi-Fi, 30.67% rely on mobile data, and 25.33% have access to both, reflecting varied but generally reliable connectivity. Academically, the respondents perform well, with the majority (56%) achieving "Very Satisfactory" marks, 26.67% rated as "Very Good" and 12% as "Outstanding" while only a small fraction (1.33%) fall into the "Good" category.

Gender disparity in education programs, particularly in teacher training, has been a consistent trend observed in various studies globally and within the Philippine context. Research by Santiago and Morales (2021) highlights that the field of education in the Philippines is predominantly female-dominated, reflecting societal norms and cultural perceptions that associate teaching with caregiving and nurturing roles traditionally linked to women. Their study found that education programs across Philippine universities often have a higher female enrollment, with males constituting a significantly smaller proportion.

Additionally, according to a study by Rosyidi, A., and Indasari, N. L. (2023), the Technology Acceptance Model (TAM) has been utilized to explore pre-service teachers' perceptions regarding digital technology wherein the findings revealed that most pre-service teachers, including a majority of females, view digital technology as beneficial for enhancing teaching and learning processes.

The result of the data aligns with the study conducted by Alonzo and Gatchalian (2022) where pre-service teachers who own both laptops and smartphones are better equipped to engage in various academic activities, including research, collaboration, and content creation. This aligns with the current findings that highlight the importance of these devices in supporting respondents' academic activities.

In similarity, the study of De Guzman and Reyes (2021) found that access to laptops and smartphones allows pre-service teachers to efficiently gather information, access online resources, and stay updated with educational trends. This capability is essential for developing lesson plans that are relevant and aligned with current pedagogical practices. However, the minimal percentages recorded for those owning only a tablet (1.33%) or a combination of a laptop and tablet (1.33%) suggest that these devices may not be as central to the academic activities of pre-service teachers compared to laptops and smartphones. The findings of the data also align with research by Santos and Lim (2022) indicates that while tablets can be useful for certain educational tasks, they often do not replace the functionality provided by laptops or smartphones in terms of comprehensive academic work.

Research consistently shows that financial limitations can adversely affect students' academic outcomes. According to Santos and Lim (2022), pre-service teachers with limited financial resources often struggle to purchase essential educational materials and digital tools, which can hinder their academic performance and preparedness for teaching roles. The current

findings align with this literature, suggesting that many respondents may face challenges in acquiring necessary resources due to their weekly allowances.

On the other hand, De Guzman and Reyes (2021) emphasize that students who lack access to reliable internet services or digital tools may find it challenging to meet the demands of their coursework. The findings from this study suggest that financial constraints could limit respondents' ability to invest in additional resources or services.

Research by Alonzo and Gatchalian (2022) indicates that Wi-Fi networks are often more accessible in homes, public spaces, and educational institutions, making them the preferred option for students. This aligns with the current findings that suggest a significant reliance on Wi-Fi for academic purposes. On the other hand, while a significant portion of respondents relies on mobile data (30.67%), this mode of access can present challenges due to data limitations and costs.

Research by Santos and Lim (2022) highlights that students who depend solely on mobile data may face restrictions in accessing large files or streaming educational content, which can hinder their learning experience. The current study's findings indicate that nearly one-third of respondents rely exclusively on mobile data, suggesting potential barriers to effective learning. Lastly, the 25.33% of respondents who have access to both Wi-Fi and mobile data represent a flexible approach to internet connectivity.

According to a study by Akaadom, B.W. (2020), pre-service teachers have expressed a strong inclination to incorporate technology into their lessons, wherein 56.8% of the respondents reported using the internet to enhance their teaching practices.

In a study by Santos and Reyes (2021), pre-service teachers demonstrated "Very Satisfactory" performance in courses involving educational technology, with mean scores in the range of 87-90. This was attributed to structured curricula, hands-on activities, and accessible resources that support skill development in using technology for teaching. The study highlighted that practical applications, such as creating digital instructional materials and integrating multimedia in lesson plans, contributed to their high performance.

Research also indicates that courses focused on technology in education significantly enhance the digital competence of pre-service teachers. A systematic review by Alshammari et al. (2020) highlighted the importance of technology-focused courses in fostering digital literacy among pre-service teachers. The review indicated that participants who engaged in "Technology of Teaching and Learning" courses reported higher levels of digital competence, particularly in areas such as content creation, digital communication, and information management. This suggests that these courses play a critical role in preparing pre-service teachers for the demands of a technology-rich educational environment.

Table 2. Summary Table on the Level of Competence of the Pre-Service Teachers in Utilizing Digital Instructional Tools when Assessed by the Two Groups of Respondents

Digital Instructional Tools	**Pre-service Teachers**		**Cooperating Teachers**	
	Mean	Data Interpretation	Mean	Data Interpretation
Presentation	3.68	Very High Competence	3.68	Very High Competence
Image-editing Applications	3.51	Very High Competence	3.58	Very High Competence
Video-editing Applications	3.46	Very High Competence	3.46	Very High Competence
Overall Mean	**3.55**	**Very High Competence**	**3.57**	**Very High Competence**

The results in table 2 present the level of competence of the pre-service teachers in utilizing digital instructional tools as assessed by themselves and their cooperating teachers. The overall mean corresponds to very high competence

The data for presentation tools with a mean score of 3.68 for both groups shows that pre-service teachers and cooperating teachers received the rating very high competence. This suggests that presentation tools are a strong skill area for pre-service teachers, and their ability to utilize them effectively is recognized by both themselves and their cooperating teachers.

The alignment between self-assessment by pre-service teachers and evaluations from cooperating teachers suggests a shared recognition of competence. According to Smith et al., (2021), this phenomenon is supported by research highlighting that peer evaluations often validate self-assessments, reinforcing the notion that both groups perceive the importance of these skills in educational settings.

A study by Ertmer and Ottenbreit-Leftwich (2023), focused on the development of digital teaching competence identified content creation, including image editing, as a key skill area. Advanced training courses such as "Digital Pedagogy" emphasizes tools like infographics and animations, which are critical for modern teaching methods and align with recognition of pre-service teachers' skills by cooperating teachers.

The research of Alsharif and Alzaharani (2023), shows the perceptions of pre-service teachers regarding their skills in video editing applications highlights that while they feel competent, many express a desire for further training and development in this area to enhance their teaching effectiveness.

Table 3. Summary Table on the Level of Competence of the Pre-Service Teachers in Utilizing Digital Instructional Tools as Assessed by their Cooperating Teachers through the use of Analytic Rubrics

Digital Tool/Area	Category Mean	Interpretation
PowerPoint Presentation	3.58	Exemplary
Image-Editing Applications	3.41	Proficient
Video-Editing Applications	3.38	Proficient
Overall Category Mean	**3.45**	**Proficient**

Table 3 reveals that pre-service teachers demonstrated a high level of digital competence in their teaching demonstrations, particularly in the use of PowerPoint presentations, which received an exemplary rating with a category mean of 3.58. This indicates that they are highly skilled in utilizing presentation tools effectively in instructional settings. Meanwhile, their competence in image-editing applications and video-editing applications was rated as proficient, with means of 3.41 and 3.38 respectively, suggesting solid but not yet exemplary skills in these more complex digital tools.

Overall, the combined category mean of 3.45 reflects a proficient level of digital competence among the respondents. This suggests that while pre-service teachers are generally capable of integrating digital tools into their teaching, there is still room for growth, especially in multimedia editing skills.

Alonzo et al. (2020) examined the impact of CHED Memorandum Order No. 75, which mandates technology-related competencies in teacher education curricula. Their study revealed that structured exposure to digital tools and platforms significantly improved pre-service teachers' digital competence. This aligns with the results, suggesting that curricular reforms and targeted training can elevate digital proficiency, particularly in commonly used tools like PowerPoint.

Furthermore, research by Almutairi, Almodaires, and Zeyab (2020) demonstrated that instructional strategies such as flipped learning can effectively improve pre-service teachers' abilities in digital content creation, including video production and editing, which often involve

image-editing components. Their findings suggest that experiential and constructivist approaches to digital media training increase both the skill levels and confidence of pre-service teachers in using these tools, aligning with the proficient competence observed in the study for image-editing applications.

A large-scale study by the University of Phayao (2022) revealed that most pre-service teachers could competently produce instructional videos, though skill levels varied depending on demographic and academic factors. This aligns with your finding of proficient competence, suggesting that while many pre-service teachers achieve solid video editing skills, there is variability influenced by background and experience.

Table 4. Test Results for Significant Differences in the Level of Competence of the Respondents Across Profile Variables

Profile Variable	Test	p-value	Interpretation
Sex	Mann-Whitney U Test	0.83	Accept Ho
Gadget Owned	Kruskal-Wallis H Test	0.75	Accept Ho
Weekly Allowance	Kruskal-Wallis H Test	0.65	Accept Ho
Internet Access	Kruskal-Wallis H Test	0.97	Accept Ho
Academic Performance	Kruskal-Wallis H Test	0.04	Reject Ho

Table 4 shows the test results for the significant differences in the level of competence of the respondents across profile variables.

As shown in the table, the p-values of 0.83, 0.75, 0.65, and 0.97 for sex, gadgets owned, weekly allowance, and internet access are greater than the 0.05 level of significance; hence, the null hypotheses are accepted. This indicates that there are no significant differences in the level of competence of the respondents across profile variables. However, the p-value of academic performance is less than the 0.05 level of significance, therefore the hypothesis is rejected. This means that the there is a significant difference in the Level of Competence of the Respondents when grouped according to academic performance.

The finding suggests that regardless of the type of gadgets owned (e.g., laptop, smartphone, tablet), sex, weekly allowance range, or the type of internet connection used (Wi-Fi, modem, or both), the competence levels in utilizing digital instructional tools remained relatively consistent among the respondents. However, the finding for the academic performance suggests that the higher the academic performance, the better is the use of digital tools.

Overall, the results indicate that the level of competence in utilizing digital instructional tools among pre-service Social Science education students is not significantly influenced by their sex, type of gadgets owned, weekly allowance, or mode of internet access.

Research indicates that courses focused on technology in education significantly enhance the digital competence of pre-service teachers. A systematic review by Alshammari et al. (2020) highlighted the importance of technology-focused courses in fostering digital literacy among pre-service teachers. The review indicated that participants who engaged in "Technology of Teaching and Learning" courses reported higher levels of digital competence, particularly in areas such as content creation, digital communication, and information management. This suggests that these courses play a critical role in preparing pre-service teachers for the demands of a technology-rich educational environment.

Conclusion

The BSED Social Studies pre-service students possess very high competence in utilizing digital instructional tools, demonstrating proficiency in presentation, image-editing, and video-editing applications. This suggests that the training and educational experiences provided to these pre-service teachers effectively equipped them with the necessary skills to utilize digital tools in their teaching practices. Furthermore, the high academic performance ratings reflect their dedication and foundational knowledge in their field.

Despite variations in their profiles, such as sex, on gadget ownership, financial capacity, and internet access, the respondents' competence remains consistent, indicating that these factors do not significantly influence their ability to utilize digital tools, except for academic performance. This highlights the effectiveness of their training and adaptability in leveraging available resources to meet the demands of 21st-century teaching. Overall, the findings underscore the preparedness of these pre-service teachers to deliver engaging and technology-enhanced learning experiences.

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Conflict of Interest

The author declares no conflict of interest.

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