



From Chalkboards to Keyboards: Exploring the Digital Competence of Educators Rural in Classrooms

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Abstract

This research explored the digital competence of secondary school teachers working in rural areas within the New Lucena District, Iloilo Province, focusing on how they acquire, apply, share, and communicate digital knowledge. A descriptive research design was used, involving 82 teachers with both permanent and contractual employment status. Data were gathered using an online survey administered through Google Forms. The tool assessed four key areas of digital competence: Development, Application, Sharing, Knowledge and Communication. Results indicated that these teachers generally possess a moderate level of digital skills. Many expressed confidence in using digital tools for basic tasks, though some aspects, particularly those involving interactive or collaborative applications, remain challenging for them. Descriptive statistics like mean and standard deviation were used to measure both overall digital competence and performance in each specific area. The data suggested that teachers performed best in acquiring and developing digital knowledge, while their weakest point involved using digital platforms for effective communication and teamwork. To check if the differences across these four areas were meaningful, the study made use of the Friedman test, which revealed notable variations. This points to the need for better support in certain aspects of digital skills. In view of these results, the study recommends that professional development initiatives be designed to provide teachers with more practical and hands-on opportunities for digital skills enhancement. Programs that promote peer mentoring, encourage collaborative digital projects, and improve access to up-to-date technological tools and resources could significantly help in bridging the competence gaps.

Keywords: Digital competence, rural teachers, knowledge application, professional development, educational technology

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Introduction

In today's rapidly advancing, technology-oriented world, developing digital competence has become an essential skill for all individuals, particularly for educators who play a vital role in shaping future generations. Digital skills now encompass far more than operating devices or navigating software. More importantly, these skills involve using technology in thoughtful, purposeful ways to enhance learning, build meaningful connections, and improve both personal and professional experiences. For teachers, acquiring and refining these competencies is critical to guiding students in becoming capable and responsible digital citizens. As primary facilitators of learning, educators need well-grounded strategies that enable them to effectively incorporate digital tools into their classrooms, promote active student engagement, and foster digital literacy (Lucas et al., 2020).

Limited infrastructure, a lack of sufficient digital tools, and fewer accessible training opportunities continue to hinder both teachers and students from fully benefiting from the advantages technology can offer. These circumstances contribute to an ongoing digital gap that places rural schools in a less favorable position compared to those in urban locations (Kormos and Wisdom, 2021). In response to these ongoing concerns, programs like UNICEF's Educators' Digital Competence Framework have been introduced. These initiatives provide adaptable and practical guidelines intended to improve teachers' digital skills while encouraging creativity in teaching and learning. More importantly, they are built to adjust to the particular conditions of different school environments, especially in areas where educational resources are limited (UNICEF, 2022). Even so, educators working in rural communities continue to encounter distinct obstacles, such as unreliable internet access, aging equipment, and fewer professional development opportunities. Because of this, it remains valuable to take a closer look at the digital competence of teachers in these areas and consider realistic, context-specific strategies to help them manage the expectations of modern education more effectively (Schmidt, 2021).

Nevertheless, teaching in rural communities continues to present distinct difficulties, including inconsistent internet connectivity, outdated equipment, and limited opportunities for professional growth. This makes it increasingly important to carefully examine rural teachers' digital competence and identify practical ways to better support them as they navigate the demands of contemporary education (Schmidt, 2021). This study seeks to assess the rural teachers' digital competence working in New Lucena District in Iloilo Province. It aims to understand their current abilities in using digital tools for teaching, identify areas that need further development, and recommend possible interventions that would help strengthen their digital literacy. The study also intends to contribute to broader efforts in promoting educational equity by addressing the specific challenges faced by rural educators in adapting to digital demands. By examining how well teachers in these areas are equipped to integrate technology into their work, this research hopes to provide valuable insights that can inform future professional development programs and digital education initiatives. Specifically, this study seeks to address the following questions: (1) What is the overall level of digital competence among rural teachers? (2) How do rural teachers rate in terms of digital competence across the areas of knowledge development, knowledge application, knowledge sharing, and knowledge and communication? and (3) Is there a significant difference in the digital competence dimensions among rural teachers?

Methods

Research design

This study utilized a descriptive research design to evaluate the digital competence of rural teachers in New Lucena District, Iloilo Province. This design was selected to offer a clear and detailed account of the teachers' existing knowledge, skills, and practices related to the use of

digital tools in classroom instruction. Descriptive research serves as an effective method for providing thorough accounts of the characteristics, behaviors, or attributes of a specific group or phenomenon (Shinija, 2024). It enables researchers to gather data on current conditions and observable trends, making it an appropriate choice for capturing a comprehensive overview of digital competence among rural educators while generating insights that can inform future interventions and policy development in education.

Participants

The participants of this study were permanent and contractual teachers assigned to secondary schools in the rural areas of New Lucena District, Iloilo Province, whose insights provided valuable perspectives on the state of digital competence in rural education. Out of a total population of 103 teachers, a sample size of 82 was determined using Slovin's formula to ensure a representative group for the study. A simple random sampling method (Noor et al., 2022) was employed, selecting participants based on their teaching location and employment status, with proportional representation from each school.

Instrument

This study utilized a duly-validated questionnaire crafted by the researcher to assess the digital competence of rural teachers, focusing on four key areas: 1) Development, Application, Sharing, Knowledge and Communication. To gauge the teachers' level of digital competence, a four-point Likert scale was used. The Likert scale consisted of the following response options:

- 4 – Strongly Agree
- 3 – Agree
- 2 – Disagree
- 1 – Strongly Disagree

This scale allowed teachers to evaluate their digital competence in each of the four areas based on their self-perceptions. By eliminating the neutral option, the scale encouraged respondents to express a clear stance on their level of competence. Prior to its full implementation, the instrument underwent a pilot test to determine its reliability. With the utilization of Cronbach's Alpha, the results showed that the questionnaire demonstrated good to strong internal consistency, with reliability scores of 0.87 for Development, 0.84 for Application, 0.86 for Sharing, and 0.82 for Knowledge and Communication. The results reflected above confirmed that the researcher-made instrument was a reliable tool for obtaining the rural teachers' digital competence within the specified context of the study.

Data Gathering Procedure

To facilitate data collection, the researchers coordinated with the principals and designated coordinators of the participating schools to reach out to the selected teachers. Teachers from secondary schools in the rural areas of New Lucena District, Iloilo Province were made aware of the study's purpose, procedures, and ethical guidelines prior to participation. With the approval and signed consent of the school heads, the online survey questionnaire was administered using Google Forms. The survey link was distributed to the teachers through their respective principals or coordinators, ensuring smooth and organized dissemination of the instrument. This approach provided a practical, safe, and efficient means of gathering information on the teachers' digital competence, including their skills, knowledge, and practices in integrating digital tools into their teaching.

Data Analysis Procedure

Both descriptive and inferential statistical methods were utilized in order to interpret the

data gathered from the questionnaires, which examined teachers' digital competence and their self-assessment of intercultural education. The descriptive analysis involved organizing and interpreting survey responses through statistical measures, notably the mean and standard deviation. These values provided a comprehensive overview of the participating rural teachers' overall digital competence. The calculated means indicated the average competence level across the four areas evaluated: Development, Application, Sharing, and Knowledge and Communication. At the same time, the standard deviation revealed the consistency or variability in the participants' responses within each dimension, offering a clearer understanding of how uniformly or differently the teachers perceived their digital skills in each category. Responses measured through a Likert scale were interpreted using mean scores, guided by predetermined thresholds.

Table 1 outlines the range of mean scores and their corresponding descriptive interpretations, which served as the reference for classifying the respondents' digital competence levels in this study.

Table 1. Scale of Means and their Corresponding Interpretation

Scale of Means	Interpretation
3.50 - 4.00	High Level
2.50 - 3.49	Moderate Level
1.50 - 2.49	Low Level
1.00 - 1.49	Very Low Level

The standard deviation was used to gauge how widely participants' responses varied. When the standard deviation was close to zero, it suggested that the teachers' ratings of their digital skills in a given category were fairly similar. On the other hand, a higher value signaled noticeable differences in how participants perceived their abilities within that area. For the inferential part of the study, the Friedman test was chosen to check if there were meaningful differences in digital competence levels across the different skill areas measured. This particular non-parametric test was considered appropriate since it works well when comparing three or more related sets of data drawn from the same group of respondents. It was particularly appropriate for this research context, as it accommodates data that may not follow a normal distribution, a common characteristic in educational studies (Liu and Xu, 2022). Through this procedure, the researchers were able to identify which aspects of digital competence appeared comparatively stronger or weaker within the same group of rural teachers.

Ethical Considerations

The implementation of this study was made in accordance with established ethical considerations to safeguard the rights of participants and to align with the guidelines set by the APA 7th edition (American Psychological Association, 2017). Before data collection began, teachers were provided with a clear explanation of the study's objectives, procedures, and scope. Informed consent was secured from both the participating teachers and the school heads of the identified institutions. The consent process emphasized the voluntary nature of participation, noting that individuals could withdraw from the study at any point without facing any unfavorable outcomes. Confidentiality and privacy were carefully maintained throughout the research process. All data collected were anonymized, and any personal details were stored separately from survey responses to ensure participant privacy. The gathered information was used exclusively for research purposes, and participants were assured that no data would be disclosed to unauthorized parties.

Results

This section outlines the quantitative results concerning the digital competence of rural

teachers, addressing both the overarching and specific research inquiries. It includes measurements of overall digital competence alongside its individual dimensions: Development, Application, Sharing, and Knowledge and Communication. The results presented offer detailed data on scores and response variability for each dimension, forming the basis for the succeeding analysis and recommendations. For the descriptive statistical tools, the mean and standard deviation were employed to evaluate the gathered data. The mean represents the general level of digital capability among the respondents, while the standard deviation reflects the degree of variation in their responses. The dataset consists of inputs from 82 rural teachers, providing insights into their digital competence across multiple areas of classroom practice. Table 2 illustrates the overall assessment of rural teachers' digital competence. The data reflects the teachers' self-reported ability to integrate digital tools and technologies into their teaching practices.

Table 2. Overall digital competence level of rural teachers

Category	N	Mean	SD	Interpretation
Entire Group	82	3.47	0.40	Moderate Level of Digital Competence

The table revealed that the calculated mean score for the entire group is 3.47, and the standard deviation was 0.40 ($M = 3.47$, $SD = 0.40$). Based on the scale of means, this falls within the *Moderate Level of Digital Competence* range. This implies that while teachers are generally proficient in digital tools and technologies, there may still be areas for improvement, particularly in advanced digital literacy and integration of technology into their teaching practices. The table also revealed that the standard deviation of 0.40 reflects some variation in digital competence among respondents. While many teachers demonstrated a moderate grasp of digital skills, some may have shown higher proficiency, while others may still struggle with certain aspects of technology. Table 3 presents the level of digital competence of rural teachers across four key dimensions such as Development, Application, Sharing, and Knowledge and Communication. Mean and standard deviation, were used to measure the digital competence of rural teachers across four categories: Development, Application, Sharing, and Knowledge and Communication.

Table 3. Level of digital competence of rural teachers in terms of a) development, b) application, c) sharing, and d) knowledge and communication

Category	N	Mean	SD	Interpretation
Knowledge Development	82	3.67	0.38	High Level
Knowledge Application	82	3.43	0.45	Moderate Level
Knowledge Sharing	82	3.48	0.45	Moderate Level
Knowledge and Communication	and 82	3.33	0.53	Moderate Level

Based on the results, it appears that among the four dimensions, Knowledge Development obtained the highest average score ($M = 3.67$, $SD = 0.38$), which falls under the High Level of Digital Competence. This might imply that many teachers are relatively active in exploring digital tools, utilizing learning resources online, and broadening their familiarity with digital education approaches. The small standard deviation suggests there was not much variation in how teachers rated themselves, hinting that their competence levels in this domain are fairly aligned. In contrast,

Knowledge Application ($M = 3.43$, $SD = 0.45$), Knowledge Sharing ($M = 3.48$, $SD = 0.45$), and Knowledge and Communication ($M = 3.33$, $SD = 0.53$) each had slightly lower average ratings, placing them within what may be considered a Moderate Level of Digital Competence.

To further examine whether these differences are statistically meaningful, a Friedman test was conducted. This non-parametric method is typically used to compare several related groups. In this case, it assessed whether the distinctions among the four dimensions—Knowledge Development, Application, Sharing, and Communication—were significant in terms of mean ranks, potentially indicating variance in how rural teachers perceive and demonstrate digital competence across these areas.

Table 4. Significant difference in digital competence dimensions: development, application, sharing, and knowledge and communication

Category	Mean Rank	χ^2 Value	df	p-value	Decision
Digital Competence Dimensions		52.275	3	0.000	Significant
Knowledge Development	3.67	0.38			
Knowledge Application	3.43	0.45			
Knowledge Sharing	3.48	0.45			
Knowledge and Communication	3.33	0.53			

** $p < 0.05$, Significant*

The results shows that the Friedman test yielded a chi-square value (χ^2) of 52.275, with 3 degrees of freedom ($df = 3$), and a p-value of 0.000. Since the p-value (0.000) is less than the significance level (0.05), the null hypothesis is rejected. This means that there is a significant difference in the digital competence dimensions of rural teachers. In other words, not all dimensions are at the same level—some areas, such as Knowledge Development, are more advanced, whereas others, like Knowledge and Communication, are relatively weaker. In addition, among the dimensions, Knowledge Development ranks highest ($M = 3.67$, $SD = 0.38$), suggesting that rural teachers are most proficient in seeking digital resources and expanding their technological skills. In contrast, Knowledge and Communication has the lowest mean ($M = 3.33$, $SD = 0.53$), signifying that teacher face more challenges in utilizing digital platforms for communication and collaboration.

Discussion

The results of this investigation shed light on the digital competence levels of rural teachers, bringing to the fore both significant strengths and areas needing further attention. Among the four dimensions examined, educators displayed the highest competence in acquiring and comprehending digital knowledge. This finding is consistent with the study conducted by Abella and Rosa (2023), which highlighted that access to ICT tools and a constructive attitude towards the use of technology are closely linked to elevated levels of digital literacy and competence. Despite this noted strength, the data indicated that teachers' capacities to implement digital knowledge within classroom environments, share it with peers, and communicate effectively through digital channels were comparatively less developed. This suggests that although teachers possess essential foundational digital literacy, obstacles persist in translating these skills into practice-oriented and collaborative teaching methods. Similar

trends were identified in the work of Kunjiapu et al. (2025), who pointed out that both instructors and students encounter difficulties in embracing digital approaches due to insufficient training and a range of personal and institutional barriers. Supporting these observations, the data further showed that rural educators expressed confidence in locating online resources, developing digital instructional materials, and promoting the use of technology among their students.

These outcomes align with the findings of Graciano and Benablo (2023), who also observed notably high levels of digital literacy and proficiency in online information searching among their study participants. However, the findings underscored a continued need for more thorough integration of digital tools into instructional routines and a stronger sense of assurance in conducting technology-supported lessons. This observation parallels the study by Cabiles (2024), who reported that while digital literacy was evident among both rural and urban teachers, the latter demonstrated a greater degree of competitiveness in applying digital capabilities within educational contexts. The gap between acquiring digital knowledge and effectively applying it in real teaching contexts appears to suggest a need for more focused training efforts, peer-to-peer learning, and broader exposure to different digital tools. In a related context, Dacer et al. (2023) looked into how digital governance was being implemented in the Schools Division Office of Camarines Norte and noted ongoing issues such as limited resources, poor infrastructure, and relatively low levels of digital proficiency among staff. These systemic issues mirror the obstacles faced by rural teachers in effectively integrating digital tools into their instructional environments. Addressing these challenges could involve the establishment of structured initiatives such as professional learning communities, mentorship arrangements, and hands-on workshops aimed at cultivating a collaborative culture of digital pedagogy within rural school settings. Similarly, Jung et al. (2024) stressed the necessity of professional development programs that specifically equip teachers with actionable digital teaching techniques, tailored by both academic level and subject matter, to boost their confidence and capability in using technology in classroom instruction.

Moreover, although rural teachers display strong abilities in acquiring digital knowledge, their proficiency in applying, sharing, and communicating that knowledge in educational settings still leaves room for improvement. Concentrated training programs focused on these areas could enhance digital fluency and empower teachers to integrate digital tools meaningfully into both instructional and collaborative practices. Temirkhanova et al. (2024) suggested that teachers who possessed stronger digital abilities tended to be more capable of using tools like virtual reality, mobile apps, and similar technologies. This seemed to contribute to learning settings that were more engaging and may have helped students improve both their technical skills and creativity. Recognizing the possible constraints of this study is also necessary. Since the research was limited to secondary schools in rural parts of New Lucena District, Iloilo Province, the results might not fully reflect conditions in other regions or educational settings. Additionally, the data gathered came from self-reported questionnaires, which could be influenced by individual perceptions or biased responses.

In light of these findings, it is suggested that education authorities place emphasis on the development and delivery of specialized professional development programs aimed at enhancing practical digital teaching skills, collaborative techniques, and efficient communication through technology. Schools should likewise promote the formation of professional learning communities and mentorship programs that encourage peer-to-peer support and the sharing of knowledge among teachers. It appears that enhancing access to dependable digital infrastructure and learning materials in rural areas could help teachers feel more prepared to use digital tools in their classrooms. These efforts might be more effective if they are paired with ongoing support and regular monitoring to possibly support the growth of teachers' digital skills and encourage more engaging and inclusive learning environments for students.

Conclusion

To conclude, the findings of this study indicate that although rural teachers demonstrate a strong foundation in digital knowledge, considerable gaps persist in their capacity to effectively implement, disseminate, and communicate digital skills within their professional practice. These results emphasize the pressing need for focused professional development initiatives, opportunities for collaborative learning, and greater availability of educational technologies to facilitate the comprehensive integration of digital competence in rural educational settings. By responding to these challenges through customized training programs and sustained institutional support, educators can strengthen their digital fluency, create more dynamic and interactive learning environments, and ultimately contribute to better educational outcomes for students in underserved rural areas.

Conflict of interest

No conflict of interest

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