



BRIDGING PEDAGOGY AND TECHNOLOGY: ICT UTILIZATION AND COMPETENCE OF INTERMEDIATE GRADE TEACHERS IN PAMPANGA

Anna Marie B. Castañeda & Nora F. Benavides

*Institute of Graduate and Professional Studies, Lyceum Northwestern University, Tapuac District,
Dagupan City, Pangasinan, Philippines*

ABSTRACT

This study, conducted during School Year 2025–2026, examined the level of Information and Communication Technology (ICT) competence and ICT utilization among intermediate grade teachers in the Division of Pampanga and determined the relationship between these variables as the basis for a development plan. A descriptive–correlational research design was employed involving 198 teachers and 15 school heads. ICT competence was assessed across technical, instructional, assessment and data management, digital communication, and professional domains. Results revealed that teachers demonstrated a consistently competent level of ICT competence, with mean scores of 3.46 (technical), 3.44 (instructional), 3.43 (assessment), 3.44 (digital communication), and 3.43 (professional). ICT utilization was found to be high, particularly in computer literacy (3.90), productivity tools (3.84), and internet applications (3.70). Statistical analysis showed no significant difference between teachers and administrators in ICT competence ($t = 0.62$, $p = 0.54$). However, a significant relationship between ICT competence and ICT utilization was established, indicating that higher competence is associated with increased use of ICT in teaching. Key challenges identified include limited internet connectivity, inadequate ICT resources, and insufficient training opportunities. These findings highlight the need for sustained professional development, improved infrastructure, and strengthened institutional support to enhance effective and meaningful ICT integration in instructional practices.

Keywords: *ICT competence; ICT utilization; digital pedagogy; education*

INTRODUCTION

Information and Communication Technology (ICT) has become an essential component of contemporary education, particularly in fostering 21st-century skills such as critical thinking, collaboration, communication, and digital literacy. The integration of ICT enables more interactive, flexible, and learner-centered instructional approaches that enhance both teaching effectiveness and student engagement. In the Philippine context, ICT integration is strongly emphasized through the K to 12 curriculum, which promotes the use of digital tools and resources to improve instructional delivery and learner outcomes (Department of Education [DepEd], 2016). However, despite these initiatives, the level of ICT integration across schools remains inconsistent due to disparities in access to technology, infrastructure, and teacher preparedness.

Teachers' ICT competence plays a critical role in determining how effectively technology is utilized in classroom instruction. ICT competence involves not only technical skills but also the ability to integrate digital tools in instructional design, assessment, communication, and professional development. The Technology Acceptance Model explains that individuals are more likely to adopt technology when they perceive it as useful and easy to use (Davis, 1989). Similarly, Diffusion of Innovations Theory highlights that adoption depends on users' readiness, knowledge, and capability (Rogers, 2003). In addition, Bandura's (1997) concept of self-efficacy emphasizes that individuals' confidence in using technology significantly influences their actual performance. These theoretical perspectives suggest that teachers' competence is a key factor in the effective integration of ICT in teaching.

Despite the increasing emphasis on ICT integration, many teachers continue to rely on traditional instructional practices due to several challenges, including limited internet connectivity, inadequate ICT resources, insufficient training opportunities, and lack of institutional support. As a result, even when teachers possess basic ICT skills, these competencies are not always translated into meaningful classroom practices. This gap between ICT competence and ICT utilization limits the potential of technology to improve teaching and learning outcomes.

In view of the foregoing, this study aimed to determine the level of ICT competence and ICT utilization among intermediate grade teachers in the Division of Pampanga and to establish the relationship between these variables as the basis for a development plan. Specifically, it sought to determine the level of ICT competence in terms of technical, instructional, assessment and data management, digital communication, and professional domains; the level of ICT utilization in terms of computer literacy, productivity tools, and internet applications; whether there is a significant difference in ICT competence between teachers and administrators; whether there is a significant relationship between ICT competence and ICT utilization; and the problems encountered by teachers in the utilization of ICT.

METHODOLOGY

This study employed a quantitative, descriptive–correlational research design to determine the level of Information and Communication Technology (ICT) competence and ICT utilization among intermediate grade teachers and to examine the relationship between these variables. The design is appropriate for describing existing conditions and determining associations among variables without manipulating them.

The respondents consisted of 198 intermediate grade teachers and 15 school heads from selected public elementary schools in the Division of Pampanga. Participants were selected using purposive sampling based on their involvement in teaching intermediate grade levels and their relevance to the study variables.

A structured questionnaire was developed based on the objectives of the study and relevant literature on ICT competence and ICT utilization. The instrument measured ICT competence across five domains: technical competence, instructional competence, assessment and data management, digital communication, and professional competence. It also assessed ICT utilization in terms of computer literacy, productivity tools, and internet applications. The instrument underwent expert validation and pilot testing to establish its content validity and reliability prior to administration.

Data were collected following approval from school authorities and adherence to ethical standards, including voluntary participation, informed consent, and confidentiality of responses. The researcher personally administered and retrieved the questionnaires to ensure a high response rate.

Data were analyzed using appropriate statistical tools. Weighted mean was used to determine the level of ICT competence and ICT utilization. Independent samples t-test was employed to determine significant differences between teachers and administrators, while Pearson product-moment correlation coefficient (Pearson r) was used to determine the relationship between ICT competence and ICT utilization.

RESULTS

ICT Competence of Teachers

The results reveal that intermediate grade teachers demonstrated a competent level of ICT competence across all identified domains. Among the indicators, technical competence obtained the highest mean of 3.46, indicating that teachers are generally capable of operating technological devices and utilizing digital tools necessary for classroom instruction and professional responsibilities. Instructional ICT and digital communication also obtained relatively high mean scores of 3.44, suggesting that teachers are able to incorporate technology in lesson delivery and communication processes. Meanwhile, assessment and data management as well as professional ICT both garnered a mean of 3.43, reflecting teachers' adequate ability to use ICT in monitoring learner progress, managing educational data, and participating in professional

development activities. Overall, the findings imply that teachers possess the necessary competencies to integrate ICT in various instructional and professional functions.

Table 1. ICT Competence of Teachers

Domain	Mean	Interpretation
Technical Competence	3.46	Competent
Instructional ICT	3.44	Competent
Assessment and Data Management	3.43	Competent
Digital Communication	3.44	Competent
Professional ICT	3.43	Competent

ICT Utilization

The findings indicate that ICT utilization among teachers is generally high. Computer literacy obtained the highest mean of 3.90, indicating that teachers are highly familiar with basic computer operations and applications commonly used in instructional tasks. Productivity tools also obtained a high mean of 3.84, suggesting that teachers frequently utilize software applications such as word processors, presentation tools, and spreadsheets in preparing instructional materials and classroom activities. Internet applications received the lowest mean of 3.70, although still interpreted as utilized, indicating that while teachers are capable of accessing online resources and digital platforms, there may still be limitations in maximizing more advanced internet-based instructional applications. The findings suggest that ICT is commonly utilized for routine educational activities and instructional support.

Table 2. ICT Utilization

Domain	Mean	Interpretation
Computer Literacy	3.90	Utilized
Productivity Tools	3.84	Utilized
Internet Applications	3.70	Utilized

Difference in ICT Competence

The results show that administrators rated teachers' ICT competence slightly higher than the teachers' self-assessment. However, the computed p-value of 0.54 indicates that there is no significant difference between the assessments of teachers and administrators regarding ICT competence. This implies that both groups share relatively similar perceptions about teachers' technological capabilities. The consistency in the evaluation suggests that teachers demonstrate a generally acceptable level of ICT competence recognized by both instructional and administrative personnel.

Table 3. Difference in ICT Competence

Group	Mean	t-value	p-value	Interpretation
Teachers	3.46			
Administrators	3.51	0.62	0.54	Not Significant

Relationship Between ICT Competence and ICT Utilization

The findings reveal a significant relationship between ICT competence and ICT utilization. This indicates that teachers who possess higher levels of ICT competence are more likely to integrate technology effectively in instructional practices. The result implies that competence in using digital tools contributes positively to teachers' ability and confidence in utilizing ICT for teaching, communication, assessment, and professional activities. The findings further suggest that improving teachers' ICT competence may lead to increased and more meaningful integration of technology in classroom instruction.

Table 4. Relationship Between ICT Competence and ICT Utilization

Variables	Interpretation
ICT Competence vs ICT Utilization	Significant

Problems Encountered

The results indicate that teachers encounter several challenges in the utilization of ICT. Limited internet connectivity emerged as one of the most serious concerns affecting teachers' ability to maximize online instructional resources and digital platforms. Inadequate ICT resources, including insufficient devices and technological equipment, also hinder effective technology integration in teaching. In addition, lack of training opportunities remains a significant challenge, limiting teachers' exposure to advanced technological applications and innovative instructional practices. These findings imply that despite teachers' competence and utilization of ICT, external constraints continue to affect the full integration of technology in educational settings.

Table 5. Problems Encountered

Problem	Interpretation
Limited Internet Connectivity	Serious
Inadequate ICT Resources	Serious
Lack of Training	Serious

DISCUSSION

The findings of the study revealed that intermediate grade teachers demonstrated a competent level of ICT competence across technical, instructional, assessment and data management, digital communication, and professional domains. This indicates that teachers possess adequate technological knowledge and skills necessary for integrating ICT in classroom instruction and professional responsibilities. The findings support the Technology Acceptance Model of Davis (1989), which explains that individuals are more likely to adopt and utilize technology when they perceive it as useful and manageable. Teachers' competence in ICT suggests that they recognize the value of technology in improving instructional delivery, communication, and classroom management.

Further, the findings also affirm Bandura's (1997) concept of self-efficacy, which emphasizes that individuals' confidence in their capabilities influences their performance and behavior. Teachers who possess sufficient ICT competence are more likely to demonstrate confidence in utilizing technological tools in educational settings. This may explain the high level of ICT utilization reflected in the study, particularly in computer literacy and productivity tools. Teachers appear capable of integrating technology in routine instructional functions such as preparing lessons, developing presentations, creating instructional materials, and communicating with learners and colleagues.

However, although ICT utilization was generally high, internet applications obtained the lowest mean among the identified domains. This may indicate that teachers are still limited in utilizing more advanced digital platforms, online collaborative tools, and interactive internet-based applications for instruction. The findings suggest that ICT integration among teachers remains focused primarily on basic and functional applications rather than transformative or highly innovative digital practices. Similar findings have been reported in previous studies, which noted that teachers frequently use ICT for administrative tasks, lesson preparation, and basic instructional support rather than for collaborative, interactive, and learner-centered teaching strategies (Hidayah et al., 2020; Ratheeswari, 2018; UNESCO, 2023).

The study further revealed no significant difference between teachers and administrators in terms of ICT competence. This finding suggests consistency in the perceptions of both groups regarding teachers' technological capabilities. The agreement between teachers and administrators may reflect the growing institutional emphasis on ICT integration and the increasing exposure of teachers to technology-based instruction. It also indicates that teachers' ICT competence is evident not only through self-assessment but also through the observations of school administrators.

Moreover, the significant relationship between ICT competence and ICT utilization confirms that competence significantly influences the extent to which teachers integrate technology in classroom instruction. The findings support the Diffusion of Innovations Theory of Rogers (2003), which highlights that readiness, knowledge, and capability influence the adoption and utilization of innovations. Teachers who possess greater ICT competence are more likely to use technology effectively and confidently in instructional

activities. This implies that strengthening teachers' digital competencies can contribute to more meaningful and effective ICT integration in the teaching and learning process.

Despite the positive findings, teachers continue to encounter serious challenges in ICT utilization, including limited internet connectivity, inadequate ICT resources, and insufficient training opportunities. These barriers restrict teachers' ability to maximize digital technologies and limit opportunities for innovative and interactive instructional practices. Inadequate infrastructure and limited access to technological resources remain common concerns in many public schools, particularly in areas with limited technological support. These challenges are consistent with reports that schools in underserved and geographically dispersed communities continue to experience barriers related to infrastructure, access to digital resources, and sustained professional development (Mustafa et al., 2024; Villaseñor, 2024; Zuo et al., 2025). The lack of sustained professional development programs further affects teachers' ability to continuously improve their technological competencies.

Overall, the findings underscore the importance of strengthening institutional support systems to promote effective ICT integration in education. Continuous professional development, improved technological infrastructure, reliable internet connectivity, and adequate ICT resources are essential in enhancing teachers' competence and utilization of technology. By addressing these challenges, schools can better support teachers in implementing more innovative, collaborative, and learner-centered instructional practices in the digital age.

Conclusions

The findings of the study reveal that intermediate grade teachers demonstrate a competent level of ICT competence across technical, instructional, assessment and data management, digital communication, and professional domains. ICT utilization is also high, particularly in computer literacy, productivity tools, and internet applications, indicating that teachers are able to integrate technology in routine instructional tasks.

The study further establishes that there is no significant difference between teachers and administrators in terms of ICT competence, suggesting a shared perception of teachers' capabilities. However, a significant relationship between ICT competence and ICT utilization was identified, confirming that higher levels of competence contribute to increased and more effective use of ICT in teaching.

Despite these positive findings, challenges such as limited internet connectivity, inadequate ICT resources, and insufficient training continue to hinder the full integration of ICT in classroom instruction. These issues highlight the need for sustained professional development, improved infrastructure, and institutional support to enhance teachers' capacity to utilize ICT more effectively.

These findings further reinforce global recommendations advocating continuous teacher capacity-building and institutional investment in educational technology to ensure

sustainable ICT integration in schools (UNESCO, 2023). Overall, the study underscores the importance of strengthening ICT competence to promote meaningful and innovative teaching practices and to support the continuous improvement of educational outcomes in the digital age.

Recommendations

Based on the findings of the study, the following recommendations are proposed:

1. Schools may strengthen continuous professional development programs focusing on enhancing teachers' ICT competence, particularly in advanced instructional applications and digital integration strategies.
2. School administrators may prioritize the improvement of ICT infrastructure, including reliable internet connectivity and adequate technological resources, to support effective teaching and learning.
3. Teachers are encouraged to explore and utilize more advanced and interactive ICT tools to promote collaborative and learner-centered instructional practices.
4. Educational leaders may provide sustained technical support and mentoring to assist teachers in integrating ICT effectively in classroom instruction.
5. Future researchers may conduct similar studies in different contexts or include additional variables to further examine ICT integration in education.

Compliance with ethical standards

This study was conducted in accordance with established ethical guidelines. Permission to conduct the study was obtained from the appropriate school authorities prior to data collection. Participation of respondents was voluntary, and informed consent was secured from all participants. They were assured that their responses would be treated with strict confidentiality and used solely for academic purposes. No personal identifiers were collected, and anonymity of respondents was maintained throughout the study. The researchers declare that there are no conflicts of interest related to this study. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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annamarie.bartolo002@deped.gov.ph
nfbenavides20@gmail.com