

Information and Communication Technology Competence of Public Elementary School Teachers in Urbiz Tondo District, Pangasinan I Division

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Publication Date: November 15, 2025

DOI: 10.5281/zenodo.17627174

Abstract

In the digital age, Information and Communications Technology (ICT) plays a crucial role in enhancing teaching and learning. Despite its potential, many public elementary schools face challenges in ICT integration due to limited resources and teacher preparedness. This study aimed to determine the extent of ICT competence among public elementary school teachers in the Urbiztondo District, Pangasinan I, and examine the differences in perceptions between teachers and school heads, as well as the challenges affecting ICT utilization.

A descriptive research design was employed, involving 206 teachers and 18 school heads. Data were collected using structured questionnaires measuring ICT competence across four domains: social and ethical skills, pedagogical skills, professional development, and technological operations. Responses were analyzed using weighted mean to assess competence levels and a t-test to determine significant differences between teacher and school head perceptions.

The seriousness of challenges encountered was also evaluated using mean scores.

Results revealed that teachers' ICT competence ranged from moderate to high across the domains, with the highest scores in pedagogical and professional development competencies. There was no significant difference between teachers' and school heads' perceptions of ICT competence ($t < 0.05$). Key challenges included limited access to digital resources, lack of training, and insufficient technical support, which moderately affected ICT utilization.

The findings suggest that while teachers recognize the value of ICT and demonstrate moderate-to-high competence, external and internal barriers hinder its full integration into teaching practices. Strengthening professional development, improving ICT infrastructure, and providing ongoing support are recommended to enhance the effective use of technology in classrooms.

Keywords: *ICT competence, digital literacy, teacher professional development, educational technology, public schools*

INTRODUCTION

Information and Communications Technology (ICT) has become essential in modern education, transforming the ways teachers teach and students learn. In the Philippines, integrating ICT in schools is a critical strategy to enhance teaching efficiency, student engagement, and academic performance. Despite initiatives such as the DepEd Computerization Program, many public elementary schools face limitations in resources, teacher training, and digital literacy, which impede the effective utilization of ICT in the classroom. Understanding teachers' competence in ICT and the challenges they encounter is crucial for improving instructional practices and ensuring quality education.

Teacher competence in ICT includes social and ethical responsibilities, pedagogical skills, professional development, and technological operations. Globally, ICT integration supports interactive learning, fosters higher-order thinking, and prepares students for participation in a digital society. Studies in the Philippines indicate that while teachers recognize the benefits of ICT, barriers such as limited training, insufficient digital resources, and lack of administrative support hinder effective utilization. Continuous professional development and practical application of ICT aligned with the curriculum are necessary for successful integration.

This study aimed to determine the extent of ICT competence of public elementary school teachers in the Urbiztondo District, Pangasinan I, examine differences in perceptions between teachers and school heads, and identify challenges affecting ICT utilization. Specifically, it sought to answer the following questions: (1) What is the extent of teachers' competence in ICT across social and ethical, pedagogical, professional development, and technological domains as perceived by themselves and school heads? (2) Is there a significant difference between teachers' and school heads' perceptions of ICT competence? (3) What is the degree of seriousness of challenges encountered in ICT utilization? (4) What action plan can be proposed to address these challenges?

The study hypothesized that there is no significant difference between the perceptions of teachers and school heads regarding the extent of ICT competence of public elementary school teachers.

MATERIALS AND METHODS

Research Design

This study employed a descriptive research design, which systematically describes existing conditions to provide insights into the extent of ICT competence and challenges among teachers.

Participants

The study involved 206 public elementary school teachers and 18 school heads from 18 schools in the Urbiztondo District, Pangasinan I. Complete enumeration was used to include all eligible respondents.

Instruments

Data were collected using two sets of structured questionnaires, one for teachers and one for school heads, adapted from De Vera (2020). The instrument measured ICT competence across four domains: social and ethical, pedagogical, professional development, and technological operations and concepts.

Procedure

Permission was secured from the adviser, Schools Division Superintendent, and individual school heads. Questionnaires were administered to respondents, retrieved promptly, and treated confidentially.

Data Analysis

Weighted mean scores were used to describe ICT competence levels. A t-test was conducted to determine significant differences between teacher and school head perceptions at the 0.05 level of significance. The seriousness of challenges was evaluated using mean scores on a 3-point scale ranging from least serious to serious.

RESULTS AND DISCUSSIONS

COMPETENCE IN UTILIZATION OF TEACHERS IN ICT ALONG SOCIAL AND ETHICAL AS PERCEIVED BY THE TEACHERS AND SCHOOL HEADS

Table 2 presents the extent of ICT competence along the Social and Ethical domain, showing an overall Average Weighted Mean (AWM) of 2.98, which indicates a “Moderate Extent” of utilization. Teachers rated themselves slightly higher than school heads, reflecting confidence in their ICT skills, particularly in legal and ethical use, equitable access, and responsible technology practices. These findings are consistent with previous studies highlighting that training, access to digital resources, and administrative support enhance ICT competence. The results imply the need for continuous professional development, provision of adequate ICT tools, and supportive school policies to strengthen integration in teaching. Study limitations include the focus on a single district and reliance on self-reported perceptions, suggesting the value of broader, multi-district research.

Table 2. Extent of Utilization on Information and Communications Technology Competence Along Social and Ethical as Perceived by the Teachers and School Heads

Social and Ethical	Teachers		School heads		Overall	
	Mean	DE	Mean	DE	AWM	DE
1. Understand and observe legal practices in the use of technology	3.32	ME	3.25	ME	3.29	ME
2. Recognize and practice ethical use of technology at both personal and professional levels	3.33	ME	2.94	ME	3.14	ME
3. Plan, model and promote a safe and sound technology-supported learning environment	3.26	ME	2.9	ME	3.08	ME

4. Facilitate equitable access to technology that addresses learning, social and cultural diversity,	3.17	ME	2.98	ME	3.08	ME
5. Demonstrate and uphold the responsible use of various technologies like computers, cell phones, etc.	2.97	ME	2.92	ME	2.95	ME
6. Accurately report malfunctions and problems with computer software and hardware.	3	ME	2.91	ME	2.96	ME
7. Design class activities to minimize the effect on students being disadvantaged or left-out	2.85	ME	2.95	ME	2.90	ME
8. Help minimize the effects of the digital divide by providing access to digital materials for all students	2.76	ME	2.91	ME	2.84	ME
9. Prepare lessons and activities appropriate to the level of learning and cultural background of students.	2.92	ME	2.76	ME	2.84	ME
10. Adapt activities using specialized hardware and software for physically disadvantaged students	2.79	ME	2.79	ME	2.79	ME
Total	3.04	ME	2.93	ME	2.98	ME

EXTENT OF UTILIZATION ON INFORMATION AND COMMUNICATIONS TECHNOLOGY COMPETENCE ALONG WITH PEDAGOGICAL AS PERCEIVED BY THE TEACHERS AND SCHOOL HEADS

Table 3 presents the extent of ICT competence along the Pedagogical domain, showing an overall Average Weighted Mean (AWM) of 3.00, which indicates a “Moderate Extent” of utilization. Teachers generally rated themselves slightly higher than school heads, particularly in applying technology to foster higher-order thinking, facilitating cooperative learning, and using multimedia materials. These results align with prior studies indicating that although teachers recognize the benefits of ICT in pedagogy, limited exposure, insufficient training, and lack of access to resources prevent full integration. The moderate extent of utilization suggests that professional development initiatives at the school and division levels have contributed to teachers’ competence, but further support is needed to enhance confidence and skill in leveraging technology for interactive and student-centered learning. Study limitations include reliance on self-reported data and the focus on a single district, indicating that broader research could provide a more comprehensive understanding of ICT pedagogical competence.

Table 3. Extent of Utilization on Information and Communications Technology Competence Along with Pedagogical as Perceived by the Teachers and School Heads

Pedagogical	Teachers		School heads		Overall	
	Mean	DE	Mean	DE	AWM	DE
1. Apply technology to develop students' higher-order thinking skills and creativity	3.33	ME	3.38	ME	3.36	ME
2. Conduct open and flexible learning environments where technology is used to support a variety of interactions among students, cooperative learning, and peer instruction	3.18	ME	3.13	ME	3.16	ME
3. Teach students to use various multimedia materials for the reports and class presentations	3.14	ME	3.25	ME	3.20	ME
4. Facilitate cooperative learning and exchange of ideas and information.	3.12	ME	3.25	ME	3.19	ME
5. Use various synchronous and asynchronous communication tools (email, chat, whiteboards, forum, blogs)	3.11	ME	3.13	ME	3.12	ME
6. Evaluate the usage of ICT integration in the teaching-learning process and use results to refine the design of learning activities, The teacher is knowledgeable of all standards,	2.94	ME	3.13	ME	3.04	ME
7. Design rubrics for assessing student performance in the use of various technologies	2.88	ME	3	ME	2.94	ME
8. Analyze assessment data using spreadsheets and statistical applications	2.97	ME	2.62	ME	2.80	ME
9. Use emails, group sites, blogs, etc. for disseminating and collect information directly to/ from students, colleagues, and parents	2.85	ME	2.75	ME	2.80	ME
10. Provide performance tasks that require students to locate and analyze information and to use a variety of media to communicate results	2.56	ME	2.25	ME	2.41	ME
Total	3.01	ME	2.99	ME	3.00	ME

EXTENT OF UTILIZATION OF INFORMATION AND COMMUNICATIONS TECHNOLOGY COMPETENCE ALONG WITH PROFESSIONAL DEVELOPMENT AS PERCEIVED BY THE TEACHERS AND SCHOOL HEADS

Table 4 presents the extent of ICT competence along the Professional Development domain, showing an overall Average Weighted Mean (AWM) of 2.63, which indicates a “Moderate Extent” of utilization. Both teachers and school heads rated the indicators similarly, with higher ratings for proactively exploring new technologies (3.20) and joining online communities (3.15), while lower ratings were observed for identifying educational sites (1.91) and sharing lesson plans and materials online (2.24). The results suggest that while teachers engage moderately in professional development activities related to ICT, there remains room for growth, particularly in research, collaboration, and advanced data usage. These findings align with previous studies highlighting that teachers’ professional development in ICT is often limited by insufficient training, lack of resources, and minimal institutional support, despite their willingness to adopt new technologies. The study implies that structured, need-based training, workshops, and continuous professional learning are essential to enhance teachers’ competence and confidence in integrating ICT effectively into teaching and learning. Limitations include reliance on self-reported data and the focus on a single district, which may restrict the generalizability of the findings.

Table 4. Extent of Utilization on Information and Communications Technology Competence Along with Professional Development as Perceived by the Teachers And School Heads

Professional Development	Teachers		School heads		Overall	
	Mean	DE	Mean	DE	AWM	DE
1. Proactively engage in exploring and learning new and emerging technologies	3.26	ME	3.13	ME	3.20	ME
2. Join online communities, subscribe to relevant mailing lists and online journals	3.17	ME	3.13	ME	3.15	ME
3. Review new and existing software for education	2.92	ME	2.63	ME	2.78	ME
4. evaluate and reflect on the use of technology in the profession for development and innovation	2.8	ME	2.75	ME	2.78	ME
5. Conduct research on the use of technology in the classroom	2.71	ME	2.88	ME	2.80	ME
6. Share experiences and expertise, and collaborate with peers and stakeholders in advancing the use of technology in education and beyond, The teacher is knowledgeable of all standards	2.68	ME	2.63	ME	2.66	ME

7. Participate in online forums and discussions	2.55	ME	2.13	ME	2.34	ME
8. Publish (formal /informal) research on the use of ICT in education	2.5	ME	2.5	ME	2.50	ME
9. Share lesson plans, worksheets, templates, and teaching materials through the course web sites	2.35	ME	2.13	ME	2.24	ME
10. Identify educational sites and portals suitable to their subject area	2.06	ME	1.75	ME	1.91	ME
Total	2.70	ME	2.57	ME	2.63	ME

EXTENT OF UTILIZATION ON INFORMATION AND COMMUNICATIONS TECHNOLOGY COMPETENCE ALONG WITH TECHNOLOGICAL OPERATIONS AND CONCEPTS AS PERCEIVED BY THE TEACHERS AND SCHOOL HEADS

Table 5 presents the extent of utilization of ICT competence along the Technological Operations and Concepts domain, with an overall Average Weighted Mean (AWM) of 3.24, interpreted as “Moderate Extent” (ME). Both teachers and school heads rated highly the indicators on basic computer operation, troubleshooting, and data management, with AWMs of 3.66, 3.46, and 3.48 respectively, indicating strong proficiency in foundational technological skills. Meanwhile, indicators such as protecting computers from viruses, using productivity tools, and distributing digital information received moderate ratings, reflecting areas where teachers and school heads recognize room for improvement. These findings suggest that while teachers demonstrate competence in core technological operations, their use of ICT in broader, integrative tasks remains moderate. This aligns with the study by Alba and Trani (2018), which noted that teachers frequently use ICT in teaching, assessment, and administrative tasks, but utilization varies depending on factors like age, experience, and training. The results imply that focused professional development, access to advanced ICT tools, and integration with curriculum objectives could enhance teachers’ capacity to leverage technology more effectively in the classroom, thereby promoting improved student learning outcomes and instructional efficiency. Limitations include reliance on self-reported data and the study’s focus on a single district, which may affect generalizability.

Table 5. Extent of Utilization on Information and Communications Technology Competence Along Technological Operations and Concepts as Perceived by the Teachers And School Heads

Technological Operations and Concepts	Teachers		School Heads		Overall	
	Mean	DE	Mean	DE	AWM	DE

Demonstrate knowledge and skills in basic computer operation and troubleshooting and maintenance	3.44	HE	3.87	HE	3.66	HE
Demonstrate knowledge and skills in information and data management	3.42	HE	3.5	HE	3.46	HE
Organize and manage files, folders and directories in any storage medium (e.g. hard disk, cd, flash memory, etc.)	3.33	HE	3.63	HE	3.48	HE
Protect the computer from virus, spyware, adware, malware, hackers etc.	3.3	ME	3.25	ME	3.28	ME
Use appropriate office and teaching productivity tools	3.2	ME	3.38	ME	3.29	ME
Demonstrate knowledge and skills in basic computer operation and troubleshooting and maintenance	3.21	ME	3.25	ME	3.23	ME
Acquisition, storing, and proper utilization of audio, video, and digital images.	3.05	ME	3.38	ME	3.22	ME
Use a computer for searching, communication, and resource sharing via the internet or LAN	3.09	ME	3.38	ME	3.24	ME
Use of internet software for searching and collecting textual and non-textual information from online and offline sources	2.83	ME	2.88	ME	2.86	ME
Distribute, share, publish, and print information via print or web.	2.61	ME	2.75	ME	2.68	ME
Total	3.15	ME	3.33	ME	3.24	ME

DIFFERENCES IN THE EXTENT OF UTILIZATION ON INFORMATION AND COMMUNICATIONS TECHNOLOGY COMPETENCE OF PUBLIC ELEMENTARY SCHOOL TEACHERS AND SCHOOL HEADS

Table 6 presents the differences between the perceptions of teachers and school heads regarding the extent of utilization of ICT competence across four domains: Social and Ethical, Pedagogical, Professional Development, and Technological Operations and Concepts. The results show that teachers' overall AWM is 2.97 while school heads' AWM is 2.95, both interpreted as "Moderate Extent" (ME). The computed t-value of 0.40 is less than the critical value of 2.3761 at a 0.05 level of significance with 3

degrees of freedom, leading to the acceptance of the null hypothesis. This indicates no significant difference between teachers' and school heads' perceptions, implying that both groups share a similar view on the extent of ICT competence utilization.

Table 6. Significant Differences in the Extent of Utilization of Information and Communications Technology Competence of Public Elementary School Teachers

Information and Communications Technology Competence	Teachers		School Heads	
	Weighted Mean	DE	Weighted Mean	DE
Social and Ethical	3.04	ME	2.93	ME
Pedagogical	3.01	ME	2.99	ME
Professional Development	2.70	ME	2.57	ME
Technological Operations and Concepts	3.15	ME	3.33	ME
Total	2.97	ME	2.95	ME

Computed t-value: 0.40 @ df 3

Alpha: @ 0.05 level of significance

Critical Value: 2.3761 df 3

Decision: accept the null hypothesis

Interpretation: No significant difference

EXTENT OF SERIOUSNESS OF PROBLEMS ENCOUNTERED BY TEACHERS

Table 8 presents the extent of seriousness of problems encountered by teachers in the utilization of Information and Communications Technology Competence. The total Average Weighted Mean (AWM) of 2.26 indicates that teachers perceive these problems as Moderately Serious (MS). The most serious challenges include insufficient numbers of computers (2.76), lack of training in the use of ICT (2.70), unavailability of technical support for teachers (2.56), and lack of expert technical staff in schools (2.52). Other challenges, such as poor internet connection, lack of interest in using ICT, unavailability of the latest ICT equipment, lack of a computer laboratory, poor quality of laptops, and inadequate teaching materials, were rated as moderately serious.

The implication of these findings is that while teachers demonstrate moderate competence in ICT utilization, their effectiveness is hindered by resource limitations, inadequate technical support, and insufficient professional development. Addressing these issues is essential for enhancing ICT integration in teaching practices. Schools and policymakers should prioritize upgrading ICT infrastructure, providing regular training, and ensuring accessible technical support to improve the teaching and learning process through technology.

Table 10. Degree of Seriousness of Problems Encountered

Indicators	Teachers		Rank
	Mean	DE	
Lack of training in the use of ICT of teachers	2.70	S	2
Lack of expert technical staff in schools	2.52	S	4
Unavailability of technical support for teachers	2.56	S	3
Lack of opportunity for professional development	1.60	MS	9
Lack of interest in the use of ICT in school	2.12	MS	8
Unavailability of the latest ICT equipment	2.15	MS	7
Insufficient number of computers	2.76	MS	1
lack of a computer laboratory	1.59	MS	10
Poor quality of laptops issued	2.19	MS	6
Lack of adequate content or materials for teaching with ICT.	2.37	MS	5
Total	2.26	MS	

Conclusion

Based on the findings of the study, it can be concluded that both teachers and school heads agree that public elementary school teachers demonstrate only a moderate level of competence in Information and Communications Technology (ICT) in carrying out their duties and navigating the teaching environment. The perceptions of teachers and school heads regarding the extent of ICT utilization did not significantly differ, indicating a shared understanding of teachers' ICT practices. The challenges encountered by teachers, such as limited resources, insufficient training, and lack of technical support, were perceived as moderately serious, which moderately impacted the effective utilization of ICT in teaching

and learning. To address these gaps, a structured action plan was proposed to enhance teachers' ICT competence and overcome the identified challenges.

In line with these conclusions, it is recommended that public elementary school teachers undergo development programs focused on the proper integration of ICT, particularly in the professional and pedagogical domains. Workshops should emphasize the application of technology to develop students' higher-order thinking skills and creativity, while promoting professional growth, research, innovation, and collaboration. Teachers' existing ICT competencies should be strengthened through advanced training in methodologies, application software, and curriculum-aligned ICT tools. Additionally, teachers should be exposed to modern software, 21st-century teaching strategies, and classroom enrichment technologies, supported by well-equipped school laboratories with reliable internet access. Finally, the proposed action plan should be submitted to the Schools Division Superintendent for wider implementation across the Division of Pangasinan I to improve the overall utilization of ICT competence among public elementary school teachers.

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