JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

Information Communication Technology (ICT) Competencies and Integration of Teachers

Michelle E. Basallote
Graduate School, Naga College Foundation
Naga City, Philippines

Abstract : This study assessed the level of teachers' ICT competencies and integration in Tinambac North District, School Year 2023-2024. The study used a descriptive-correlational design involving 46 respondents. Data Gathering tools included survey questionnaires and statistical tools utilized were Weighted Mean, Pearson Product Moment Correlation, and Coefficient of Determination.

The following conclusions were derived: (1) Elementary teachers have varied professional qualifications, with many holding advanced degrees; most were regarded as experienced teachers; almost all were not ICT majors but are teaching ICT, and only a few had attended ICT workshops and training. (2) Teachers' ICT competencies displayed moderate competence in understanding ICT in education, and high competence in gathering information and using technology tools and digital communication. (3) ICT integration was moderately observed in content and pedagogical knowledge, while highly observed technological knowledge. (4) Nine out of twenty aspects of ICT competencies showed a significant association with the profile of elementary teachers. (5) ICT competencies significantly influenced ICT integration. (6) The level of ICT competencies and ICT integration indicated a very weak influence. (7) An Intervention strategy is essential to equip teachers with the necessary ICT skills for effective teaching and integration in education.

Keywords: *ICT Competencies, Integration, Intervention Strategy*

I. INTRODUCTION

In education today, Information and Communication Technology (ICT) has had a widespread impact by transforming conventional approaches to teaching and learning. However, Digital Tools and Resources being integrated in the art of teaching and learning has emphasized the need for educators to possess a high level of competence in leveraging ICT for pedagogical purposes.
The swift improvement in the use of technology in the classroom in recent years stresses that an educator's ability in the use and application of ICT tools is now important in ensuring the effectiveness of teaching methods. Because of this, ICT competency is now being seen as an important factor in a modern educator's skill set. This competency can range from having basic technological knowledge to being proficient in handling and using advanced digital tools.

For this reason, this study dove into an exploration of the role that ICT competency plays in the effectiveness and efficiency of modern classrooms. Subsequently, it examined the multifaceted dimensions of ICT competency, examining its subtle impact on pedagogical approaches, student learning outcomes, and the overall educational environment. This research was intended to provide comprehensive insights on the importance of ICT competency in today's educational environment and thereby offer guidance to educational stakeholders in creating an environment that encourages its ongoing development and utilization.

As the Department of Education (DepEd) works to protect and promote Filipinos' right to quality basic education that is equitable, culture-based, and complete, it aims to empower individuals to realize their potential and contribute meaningfully to nation-building. DepEd's investment in developing human potential reflects its commitment not only to its learners but also to teachers. In line with this, DepEd fully supports the continuing professional development of its teaching personnel, grounded in the principle of lifelong learning and recognizing that the teaching profession "requires expert knowledge and specialized skills, acquired and maintained through rigorous and continuing study" (DepEd Order No. 35, s. 2016).

The advancement of technology in the 21 st century has greatly transformed education, making it essential for everyone to participate in a globally competitive learning system. This transformation has been driven specifically by digitalization. According to UNESCO (2017), the digital revolution is a revolution for development that bridges divides, strengthens inclusion, and leaves no one behind. For this to happen, inclusive access to technology and ability to use devices and internet connections are vital preconditions. In other words, the integration of Information Communication Technology (ICT) in education has become essential for achieving inclusive education today.

In remote areas like Tinambac North District, challenges in ICT integration arise due to geographical isolation, low internet access, limited electricity supply, a lack of technological devices, low readiness among students and teachers for online learning, and limited teachers' knowledge and skills in addressing issues related to remote teaching and learning with ICT. This situation, experienced by elementary school teachers in the remote areas of Tinambac, Camarines Sur, inspired the fruition of this present study.

II. Related Studies and Literature

Teacher's Profile

In the study by Abdukarimovich, et al., (2022) the concept of the "age of maturity" is emphasized. This stage is identified as a time involving various aspects of personal growth, including self-awareness, knowledge acquisition, and the process of maturation. The research underscores that during this age-based phase, individuals undergo substantial cognitive and emotional growth, actively engaging in the formation of their self-image. Furthermore, the study explores the idea that age serves as a framework for understanding social behavior complexities as individuals navigate their roles and relationships.

Beyond age and maturity, specialization is also part of a teacher's profile. The study by Co, et al. (2021) states that specialization indicates that educators' have undergone formal training and education, allowing them to acquire specialized knowledge and skills within a specific subject area. This training, often obtained through undergraduate or postgraduate programs, equip teachers with a deep understanding of the subject matter.

Similarly, experience plans an important role in building a teacher's profile. In the study by Podolsky, et al., (2019), titled "Does Teaching Experience Increase Teacher Effectiveness? A Review of US Research", findings indicate that teaching experience positively impacts the broader professional teaching community. The study also states that teachers tend to experience significant improvements in effectiveness when working in supportive environments.

Supporting this, Grosemans, et al. (2015) define teaching experience as the accumulated years in professional practice. The study emphasizes that learning extends beyond formal professional development, acknowledging that most learning occurs through daily teaching practices. Differences between novice and experienced teachers suggest that teaching experience is a significant factor. Both novice and experienced teachers continue to learn, but the nature of their learning activities evolves with experience.

The degree of professional competence of teachers, as asserted by Fachrurrazi (2017) is a determining factor of teachers' autonomy within the educational context. Teachers with extensive teaching experience tend to exhibit substantial autonomy, while educators with high levels of autonomy demonstrate increased competence in their teaching style and habits. This interdependent concept suggests that as teachers gain expertise, they are more likely to practice autonomy in instructional strategies and decision-making, reinforcing the connection between competence and autonomy in teaching.

According to Kadel (2020), training and seminars are essential for addressing educators' challenges and concerns related to integrating Information and Communication Technology (ICT) in teaching. Programs focusing on Technological Pedagogical and Content Knowledge (TPACK) aim to develop educators' ICT competencies. Equipping teachers with the necessary skills through training enables them to navigate challenges, such as insufficient ICT resources, and improves teaching and learning activities.

In today's educational process, ICT has become integral to teachers' and students' activities. Teachers employ ICT through two primary approaches: designing e-learning activities to meet students' academic needs with innovative teaching strategies, embracing openness in presenting their subject interests. Successfully implementing these approaches requires a supportive educational environment within schools and specialized teacher training (Kushnir, 2017).

Highest educational attainment is also significant. According to Anthony, et al. (2015), an "advanced degree" refers to achieving a master's or doctoral degree. Individuals who complete postgraduate education are considered to have reached the pinnacle of educational achievement within this study's context. This recognition of the "advanced degree" phase underscores the importance of exploring the characteristics of postgraduate education in analyzing educational attainment patterns and disparities.

The majority of Science Teachers in the Department of Education-Guihulngan City Division, Negros Oriental, do not specialize in General Science but in related fields such as Nursing and Pharmacy, while some specialize in unrelated fields such as English and Social Science. Most lacked the necessary educational qualifications to teach all science subjects in the K to 12 curriculum. The BSED-General Science group demonstrated outstanding teaching performance, while theBS in Scientific Field group performed very well. Non-science teachers received a "good" rating, indicating a gap in science content knowledge. Specialization is thus associated with teaching performance in terms of content knowledge across curriculum areas. Among the three groups of teachers, general science was the most effective, followed by those in specific fields, with non-science teachers ranking lowest (Malahay, 2021).

Lastly, Similarly, Horn and Jang (2017), conducted a study on the relationship between teacher educational attainment and student achievement. The result showed the effect of master's degree attainment on student reading and math achievement during high school remains unclear. He suggested that master's degree attainment will only yield a positive effect on student math achievement if the teacher majors in math during the master degree program. Regarding science achievement, one study demonstrated the scores where higher among students whose teachers had a master's degree, relative to students whose teachers only had a bachelor's degree.

Teachers ICT Competencies

According to Bhardwaj et al. (2020), technology plays a crucial role in the development of individuals and in any sector or economy. The adoption of ICT transforming higher education by providing students and academicians with an innovative learning environment that enhances both learning and teaching processes. Many universities have encouraged the integration of technology into the education system to support students and academics alike. Innovation and Technology make the learning experience global for students, who would otherwise have limited access to resources. Similarly, academicians can deliver lectures and share their experiences worldwide through online platforms, revolutionizing the delivery and access to higher education for a larger number of students at a lower cost. Effective use of technology can help academicians structure and design active learning opportunities, engaging students more deeply in the learning process and motivating them to achieve better outcomes. With rapid advancements in technology, students and faculty no longer need to meet in the same location to learn; students can access notes and lectures from any universities around the world. The transformative approach of ICT in higher education has helped address the growing demand for education through online classes, overcoming critical issues such as cost, the limited number of academicians, and time and distance barriers.

The higher education system in India faces challenges due to inadequate access to technology and issues of inequity. However, the application of ICT in higher education has diversified the system and opened new avenues for the international mobility of both traditional and non-traditional students (Pegu, 2014). ICTs have had a significant impact on educational practices, and this influence is expected to grow considerably in the coming years. Over time, ICT will become a powerful agent of change in many educational practices.

Based on current trends, the consistent use and development of ICT in education will significantly affect what and how students learn, as well as when and where learning takes place (Bala, 2018).

Correspondingly, ICT has become an integrated part of our daily life, and it is expected to become an inseparable part of students' and teachers' lives as well. However, integrating technology into the education system must consider numerous socio-technical factors, such as teachers' computer skills, confidence, attitudes toward ICT, infrastructural facilities, and institutional climate. Given recent trends in using communications and information technologies to support and deliver teaching, it is timely to enhance higher education institutions with smart technological devices to improve the quality of education. The process of reimagining education must begin with efforts to orient both teachers and students on how to use the ICT tools judiciously. To accelerate our country's progress, it is essential to integrate ICT into education intelligently while also addressing the needs and concerns of the key players–teachers. It is important to note that technological tools alone cannot improve the quality of education. However, broad educational goals can be realized through the reflective, creative, and strategic use of new technologies in higher education. (Sarma, 2017).

Information and Communication Technology (ICT) has influenced all aspects of life, with a particularly significant impact on education. ICT can contribute to universal access to education, promote equality in education, and enhance teaching and learning quality. It has also driven a shift from a teacher-centered education system to a learner-centered education system. In schools, ICT tools are used for administrative, management, teaching, learning ICT related skills, enhancing classroom presentations, developing thinking and problem-solving skills, stimulating creativity and imagination, facilitating research by teachers and students, and serving as a communication tool for teachers and students alike (Yadav, 2015).

Using ICT in school management systems helps schools effectively plan the effective use of digital technologies in daily practices. This preparation is essential for equipping students to meet the demands of an ever-changing world, achieving effective learning and teaching, and improving overall administration. ICT refers to any tools that enable students and teachers to access information through electronic communication. It has demonstrated the potential to increase options, access, participation, and achievement for all students. ICT's ability to facilitate learning, improve teaching, and enhance institutional administration has been well-established in the literature. Multimedia tools within ICT are particularly valuable due to their digital and interactive nature. Digital multimedia combines various media formats (text, pictures, audio, and video) to present study materials in a digitally accessible format. Interactivity combines multiple disciplines to develop multimedia systems that can sense their environment and dynamically process, edit, adjust, or generate new content (Singh & Mishra, 2016).

Schools employ a diverse set of ICT tools to communicate, create, disseminate, store, and manage information. In some contexts, ICT has become integral to teaching and learning through approaches such as replacing chalkboards with interactive digital whiteboards, allowing students to use their smartphones or other devices in class, and using the "flipped classroom" model, where students watch lectures at home on the computer and use class time for interactive exercises (Bodo, 2019).

Technological devices are advancing rapidly, producing a range of sophisticated tools. This has led to an explosion of ever-evolving technology that has created a world without limits. This phenomenon is characteristic of the 4.0 industrial revolution. This era has seen advanced technologies like e-banking, e-learning, online shopping, and online transportation. These shifts have also altered the social and cultural conditions of communities. Technological innovation, in turn, influences scientific and technological progress across all sectors of society (Bilyalova, 2017).

There is a global trend in education policy and research to recognize the need to reform education from the traditional paradigm of teaching and learning paradigms to more innovative pedagogical practices integrating Information and Communication Technology (ICT). As Ekayati (2019) stated that in line with the development of information technology (IT), the method chosen for education must also be able to keep up with IT development.

Similarly, the study of Maharaj-Sharma (2017) states that ICT devices and ICT – based activities when effectively integrated into science teaching facilitated greater learning in science class, promoted high levels of student engagement, and provided for student's new avenues of knowledge and accessibility. The researcher cautioned, however, that a harmonious balance between ICT-based activities such as computer simulations and virtual experiments and real hands-on, practical activities including traditional collaborative group work, must be established to ensure that science classrooms do not suffer. Technology in the classroom must be continued and enhanced. Several applications and downloadable educational games can help pupils attain higher-level thinking skills as stated in the study.

Moreover, Chon, et al. (2019) found that an organization's innovation climate is significantly and positively related to innovative teaching using ICT, and the acceptance of technological innovation is significantly and positively related to innovative teaching using ICT, as supported by the organization's innovation climate. A variety of innovative teaching strategies such as flipped classrooms and collaborative work and technologies such as interactive whiteboards, tablets, and videos were explored.

ICT Integration

In the topic brief published by USAID, Sasing (2020) reported how Teacher Professional Development (TPD) on ICT is currently being done in the Philippines education system. She reported that despite the current curricular goal of the department - ICT Integration for the broader framework of 21st-century learning and preparing for the modern workplace, evidence suggested that TPD remained limited to basic digital literacy and the use of technology to digitize traditional lessons.

Moreover, Coa (2018) reported that the attainment of the program objectives to enhance the ICT literacy of learners and educators was hindered by the slow-paced implementation of the DCP due to the delay in the procurement process and failure of the supplier to deliver the computer package to39, 950 targeted recipients' school from 2015 up to 2018.

Castillo (2017) in her study in a remote municipality in Southern Davao reported that the low infrastructure supply is among the factors that hinder ICT integration in schools. In some cases, malfunctioning of DCP devices affects the quality of the teaching process. Also, leadership is a critical factor in advancing ICT integration for the School Head usually controls the access and utilization of computer packages and internet access.

The study by Bordios (2016) determined the factors that can influence teachers' decisions on whether to integrate information and communication technology (ICT) in teaching. Results implied that along with the efforts of the government to provide physical resources to implement the DepEd Computerized Program, teachers as the main drivers of this initiative must be engaged in conceptual change regarding their attitudes, beliefs, and confidence (ABC)toward ICT integration.

In the study of Talua et al. (2016) on elementary grade teachers of Leyte Division, findings revealed that age, teaching experience, and ICT training in computer schools are socio-demographic variables consistent with having a significant relationship with attitude toward ICT, computer self-efficacy, and level of ICT competency. Correspondingly, other findings showed that teachers have a favorable attitude toward ICT and possess a high level of computer self-efficacy.

The DepEd Director for ICT Service Abanil oversees the department's initiative to incorporate ICT into the educational system. He believes that digital literacy is the first step and both technology and digital knowledge must be included in the education curriculum as early as possible (Umali, 2019).

In addition, Tamaro and Mutiarin (2018) in their review of two scholarly works on the case of ICT integration in the educational system of the Philippines, presented the significance of being ICT literate in this modern time. Furthermore, they mentioned that for Filipinos to be globally competent, the adoption of technological trends must be integrated into basic education.

Moreover, Alexander et al. (2016) suggested that digital literacy can be considered as the umbrella term that includes a continuum of meanings extending across the ability to use digital devices or software, to being capable of consuming and producing digital content, to meaningful participation in digital communities.

On the other hand, Nuncio et al. (2020) in a study on E-LearningOutreach Programs for public schools concluded that if given opportunities like access to online educational materials and exposure to a safe and child-friendly online environment, the students would excel and become well-adept in the use of technology for learning and various practical application. The said program was able to increase the learner's recipient computer and internet literacy. Also, they concluded that integrating computer literacy is important to ensure greater impact on education by providing more opportunities for pupils in public schools.

As Jones (2017) suggested, if school and district administrators want teachers to use more transformative technology, they need to re-evaluate the hardware and software they provide to teachers. Although most schools have some computers and internet access, the quality of those resources varies greatly. In this study, teachers still report a lack of appropriate technology as a barrier to technology integration. To foster innovative teaching, curricula need thorough development where teachers can adopt different innovative teaching strategies according to the needs of the students.

III. Methodology

This study used a descriptive-associational-correlational method of research in discussing the answers to the research questions. A descriptive method is designed to investigate and gather information about the present condition. This research utilized the associational method to test the significant association between the teacher's profile and ICT competencies. Moreover, the study utilized a correlational method to test the significant relationship between teacher's ICT competencies and integration. Likewise, it was also used to determine the influence of the teacher's ICT competencies and integration.

The data was obtained from 46 teachers from the 4 clustered schools through the use of a teacher-made questionnaire checklist which were statistically treated with Weighted Mean, Chi-Square, Pearson Product Moment Coefficient of Correlation, and Coefficient of Determination.

V. Results and Discussion

Teacher's Profile

Age. Students are greatly impacted by the teacher's age as well. Younger educators cultivated close relationships with their students. Table 1 reflects the profile of the teachers along with age. According to the data, just a few instructors managed ICT, and these were the older ones. Teachers are still relatively young and have more time to study, develop new skills, and broaden their knowledge in terms of ICT.

Area of Specialization. If educators are proficient in the subject matter they are instructing, they can effectively educate. Their field of expertise affected the students' performance level. Reflected in table 2A, there were 35 out of 46 respondents or 76.09% of the teachers who identified their specialization as Bachelor of Elementary Education where they can teach all learning areas. While 4 teachers or 8.70% were found to be an English major, 3 teachers or 6.52% specialized HELE or EPP, while 1 teacher or 2.17% where their area of specialization includes Araling Panlipunan, Science, Math and, only 1 teacher out of 46 respondents found to be an Information Technology major. It can be gleaned that teachers who don't specialize in ICT nevertheless handle computer subjects.

Table 1. Teacher's profile.

Profile		f	%
Age	20-30	15	32.61
	31-40	15	32.61
	41-50	9	19.57
	51-60	7	15.22
	Total	46	100.00
Specialization			
	BEED/Content Area	35	76.09
	English	4	8.70
	AP	1	2.17
	Science	1	2.17
	Hele	3	6.52
	Math	1	2.17
	Technology	1	2.17
	Total	46	100.00
No. of Years in Teaching			
	1- 10	29	63.04
	eleven to 20	11	23.91
	21-30	6	13.04
	Total	46	100.00
Trainings Related to ICT			
	None	14	30.43
	1- 5	26	56.52
	6- 10	2	4.35
	11- 15	4	8.70
	Total	46	100.00
Highest Educational Attainment			
	Bachelors' Degree	7	15.22
	Bachelors' Degree with Units	31	67.39
	Master's Degree Graduate	8	17.39
	Total	46	100.00

Length of Service. Attending training or seminars and teachers' educational attainment are not only factors affecting teachers' performance but also the length of service rendered by the teachers can be a factor to become competent in teaching. It could be noticed that the highest percentage of responses indicate that teachers have been in the service for 1-10 years according to 29 or 63.04%, for11-20 years there were 11 or 23.91% and lastly, for 21-30 years there were 6 teachers or 13.04%. From the foregoing data, it could be deduced that the ICT teachers have not been in the service for so long in the field. Educators who teach ICT are less experienced. However, there are relatively few teachers who have been in the classroom for 21 to 30 years. It can be concluded that serving too long in the field prevents teachers from handling ICT subjects because they don't have the necessary skills. Fresh graduates are assigned ICT subjects since they are up to date on the current technological advancements.

Training related to ICT. It is deemed necessary for teachers to undergo ICT training to acquire the requisite abilities. From the learnings that teachers may possess, pupils will benefit from the knowledge they acquire. The data about training and seminars attended by teachers related to ICT is reflected also in table 2A. It could be noticed that in terms of seminar workshop almost all the respondents attended 1-5 trainings only it is evident in the gathered data with 26 or 56.52%, while 14 or 30.43 respondents claimed that they do not have any trainings related to ICT, while 4 teachers or 8.70% attended 11-15 trainingsand2 or 4.35% have attended 6-10 trainings.

Highest Educational Attainment. Teachers with advanced degrees have an advantage. More knowledge acquired through study translates into increased proficiency. It can be noted that 31 or 67.39% out of 46 respondents earned a bachelor's degree with units in master's degree. On the other hand, 8 teachers are master's degree holders with a rate of 17.39%. Further, it shows that 7 or 15.22% are bachelor's degree holders. Notably, the highest educational attainment of teachers is seen to be one of the most significant elements in influencing students' growth and skill acquisition. This suggests that most teachers are currently pursuing their master's degrees. It also demonstrates that educators still have time and opportunity to further advance their career path.

Teacher's Level of ICT Competencies

In today's tightening educational expectations, teachers are required to demonstrate competencies that match the level of 21st-century abilities and be prepared with skills relevant to today's technological innovation.

Understanding ICT in education. ICT plays an important role in deepening the knowledge acquired by the learners. As educators, the use of technology inside the classroom should understand the role of ICT in education. A teacher's competence in this aspect is revealed in Table 2.

Based on the remarks, the indicator selecting appropriate digital and non-digital learning resources in response to the varied needs of students was considered the teachers' highest ability with a weighted mean of 3.28 known as highly competent. It is believed that teachers have sufficient information in selecting appropriate learning resources to respond to the needs of learners.

Table 2. Level of ICT competencies of the teachers along understanding ICT education.

Indicators	WM	Int.	Rank
Selects appropriate digital and non-digital learning resources in response to the varied needs of students	3.28	HC	1
Implements ICT policies in the teaching-learning process.	3.22	MC	2.5
Produces digital learning materials designed to enhance teaching and learning.	3.22	MC	2.5
Incorporates ICT policies in the design and implementation of teaching activities.	3.04	MC	4
Discusses ICT concepts, principles, and theories in various teaching processes	2.93	LC	5
AWM	**3.14**	**Moderately Competent**	

The indicator discusses ICT concepts, principles, and theories in various teaching processes and has a weighted mean of 2.93 considered partially competent. This indicator got the lowest mean which indicates that it should be improved on. The indicator incorporates ICT policies in the design and implementation of teaching activities and was rated 3.04 and considered moderately competent.

On the other hand, two indicators: *"implementing ICT policies in the teaching-learning process"* and *"producing digital learning materials designed to enhance teaching and learning",* got a weighted mean of 3.22, still considered moderately competent. This implies that instructors use ICT in their teaching methods but understand when and how to include ICT to meet the diverse requirements of their students, ensuring that ICT use is appropriate and relevant.

Gathering Information. Collecting information is a way to incorporate more relevant actions to be taken. Part of an education process is to gather information to come up with necessary remedies for the learners. The level of teacher's competency in gathering information is displayed in table 3.

Based on the assessment, the indicator *"uses technological tools, search engines, databases, and other internet resources to find and obtain information quickly"* rated as the highest with a weighted mean of 3.37; while the indicator *"explains the specific information requirement and objectives"* rated as the lowest with a weighted mean of 3.20 described as moderately competent.

Table 3. Level of ICT competencies of the teachers along gathering information.

Indicators	WM	Int.	Rank
Uses technological tools, search engines, databases, and other internet resources to find and obtain information quickly.	3.37	HC	1
Develops a high capacity to notice and gather knowledge from direct experiences through accurate and careful observation.	3.35	HC	2
Uses suitable data gathering methods, such as surveys, interviews, experiments, and observations, based on the nature of the information sought.	3.33	HC	3
Determines the reliability, dependability, and relevance of information sources, discriminating between reliable and questionable sources.	3.22	MC	4
Explains the specific information requirements and objectives.	3.20	MC	5
Average Weighted Mean	**3.29**	**Highly Competent**	

Technology tools. Technology has become an essential component of education, providing a wide range of tools and resources to enhance the learning experience for both students and teachers.

Integrating these technological tools into school can increase engagement, cooperation, and general learning for students of all ages. It is vital to adapt these tools to the specific aims and goals of the educational setting.

The table 4 revealed that the indicator *"chooses the technological tools that are relevant to certain learning objectives, considering students' educational requirements and interests"* is the highest among the five indicators with a weighted mean of 3.37 interpreted as highly competent. It demonstrates that teachers agreed that the intervention is appropriate and significant to teachers' level of competencies.

Table 4. Level of ICT competencies of the teachers along technology tools.

Indicators	WM	Int.	Rank
Chooses technological tools that are relevant to certain learning objectives, considering students' educational requirements and interests.	3.37	HC	1
Makes technology tools-based instructional materials to improve student's learning.	3.30	HC	2
Produces ICT-based teaching and learning tools in collaborations with students.	3.28	HC	3
Demonstrates self-sufficiency in addressing common technological difficulties or seeks support with minimal disruption to learning.	3.22	MC	4
Performs basic trouble shooting and maintenance of technology tools and systems.	3.13	MC	5
Average Weighted Mean	**3.26**	**Highly Competent**	

Furthermore, the indicator *"performs basic troubleshooting and maintenance of technology tools and systems"* is the lowest among the five with a weighted mean of 3.13 interpreted as moderately competent, which shows that teachers ICT skills and understanding of technology tools are insufficient to do basic troubleshooting and maintenance on tools and systems.

Digital Communication. Modern education is heavily reliant on digital communication to provide effective and successful interactions between students, instructors, administrators, and parents.

Table 5. Level of ICT competencies of the teachers along digital communication.

Aspects	WM	Int.	Rank
Ensures that all communication, whether written or spoken, is clear, concise, and easily understandable to the target audience, which may include students, parents, or co-workers.	3.46	HC	1
Enhances communication by including multimedia components (videos, graphics, etc.) to make information more interesting and accessible.	3.43	HC	2
Creates effective lines of communication with parents, including regular updates on student progress, successes, and areas for growth.	3.37	HC	3.5
Responds quickly to emails, texts, and queries, promoting a culture of timely communication and respecting others' time.	3.37	HC	3.5
Ensures that all users, including those with disabilities, have access to digital communication by providing different forms and applying universal design principles.	3.09	MC	5
Average Weighted Mean (AWM)	**3.34**	**HC**	

Table 5 revealed that the indicator *"ensures that all communication, whether written or spoken, is clear, concise, and easily understandable to the target audience, which may include students, parents, or co-workers"* with a weighted mean of 3.46 interpreted as highly competent is ranked first among the five. It demonstrates digital communication in education increases accessibility, promotes cooperation, and allows for more focused interactions. Prioritizing privacy and security, on the other hand, is critical for protecting sensitive data and creating a secure online learning environment.

The data further revealed that the indicator with the lowest rating is *"ensures that all users, including those with disabilities, have access to digital communication by providing different forms and applying universal design principles"* with a weighted mean of 3.09 interpreted as moderately competent. It suggests that improving teachers' proficiency with digital communication alone will not be enough.

It is essential to recognize these challenges to effectively handle them by making use of contemporary communication tools, appreciating the importance of in-person interactions, and keeping accessibility issues in mind. Some of these issues can be mitigated by programs that educate digital literacy and proper online behavior.

Table 6 below shows the summary on the level of ICT competencies of the teachers and the four indicators, namely *"understanding ICT in education"*, *"gathering information"*, *"technology tools"*, and *"digital communication*".

Table 6. Summary of the level of ICT competencies of the teachers.

ICT Competencies	AWM	Int.	Rank
Digital Communication	3.34	HC	1
Gathering Information	3.29	HC	2
Technology Tools	3.26	HC	3
Understanding ICT in education	3.14	MC	4
Overall Average Weighted Mean (OAWM)	**3.26**	**Highly Competent**	

In summary, the overall result of the ICT level of teacher's competence was indicated by a weighted mean of 3.26 interpreted as highly competent. The evaluation revealed that the ICT level of the teacher's competence met the given criteria for good quality. Yet *"understanding ICT in education"* was ranked last among the four aspects with a weighted mean of 3.14. This indicates that the level of teachers' ICT competencies in terms of understanding ICT in education was not enough for the teachers.

Teachers Level of ICT Integration

The amount of Information and Communication Technology (ICT) integration among teachers varies widely, and it is usually influenced by factors such as training, experience, technological availability, and institutional support.

Content Knowledge. The extent to which the items or construct contained in the status of teachers in ICT integration along with content knowledge. Table 4A revealed that the indicator *"provides clear and correct responses to student concerns, clarifies misconceptions, and guides students to improve their knowledge"* was rated as the highest with a weighted mean of 3.46 interpreted as highly observed. This indicates that it was understandable and that the students' answers were clear and helped them to increase their material knowledge without causing misunderstandings.

Table 6. Status of ICT integration of teachers along content knowledge.

Indicators	WM	Int.	Rank
Provides clear and correct responses to student concerns, clarifies misconceptions, and guides students to improve their knowledge.	3.46	HO	1
Creates assessments that correctly measure students' comprehension of the material, using a range of assessment methods like as quizzes, projects, and examinations.	3.33	HO	2
Ensures instructional material aligns with curricular standards and learning objectives, promoting educational consistency and coherence.	3.28	HO	3
Incorporates applicable technological tools and resources to improve content delivery, including multimedia resources and interactive materials to enhance learning experiences.	3.17	MO	4
Demonstrates subject-matter expertise through practical demonstrations, simulations, or hands-on activities.	3.11	MO	5
Average Weighted Mean	**3.27**	**Moderately Observed**	

The data further revealed that the indicator with the lowest rating, *"demonstrates subject-matter expertise through practical demonstrations, simulations, or hands-on activities"* with a weighted mean of 3.11 interpreted as moderately observed. This indicates that students were not monitored when they demonstrated their understanding of the material through role-playing, interactive exercises, or real-world examples.

Pedagogical Knowledge. In pedagogical knowledge, the indicator *"uses computer as a tool for demonstration and presentation of lessons"* was the highest among the five indicators with a weighted mean of 3.17 interpreted as moderately observed. This demonstrates that relying just on computers to support course presentations and demonstrations was insufficient to meet students' knowledge demands.

Furthermore, the indicator with the lowest rating was the *"use of collaborative technologies and platforms (e.g., Google Workspace, Microsoft Teams) to enable group projects, conversations, and real-time collaboration among students"* with a weighted mean of 2.39 interpreted as moderately observed. This illustrates how group projects, discussions, and real-time cooperation are very important in the teaching-learning process. It is moderately noticed that instructors' ICT integration level is inadequate according to a weighted average of 2.94, indicating insufficient pedagogical expertise.

Table 7. Status of ICT integration of teachers along pedagogical knowledge.

Indicators	WM	Int.	Rank
Uses computer as a tool for demonstration and presentation of lessons.	3.17	MO	1
Uses computer as a tool to teach new subject knowledge for pupils to acquire knowledge directly from the computer	3.11	MO	2
Employs multimedia components in lessons to increase student engagement and motivation, as well as educational games to reinforce learning objectives.	3.04	MO	3
Teaches students to consider the implications and opportunities of computer use	3.00	MO	4
Uses collaborative technologies and platforms (e.g., Google Workspace, Microsoft Teams) to enable group projects, conversations, and real-time collaboration among students.	2.39	LO	5
Average Weighted Mean	**2.94**	**Moderately Observed**	

The data implies that the ICT teachers in Tinambac North District have sufficient knowledge and understanding in teaching the content to the learners and applying the appropriate strategies to enhance students' learning and understanding.

Technological Knowledge. In technological knowledge, the indicator *"knows how to open, create, and save files in the computer with a file name"* was the highest among the five indicators with a weighted mean of 3.63 interpreted as highly observed. This indicates that a teacher with technological proficiency can use a file name to create, open, and store files on a computer. There are two indicators with highly observed interpretations: *"communicates using the Internet through emails, chat messages, and social media platforms"* and *"know how to install and remove programs"*. This could be understood that they have knowledge of installing and removing applications and are able to interact via email, chat, and social media platforms.

Table 8. Status of ICT integration of teachers along technological knowledge.

Indicators	WM	Int.	Rank
Knows how to open, create, and save files in the computer with a filename.	3.63	HO	1
Communicates using the Internet through emails, chat messages, and social media platforms.	3.61	HO	2
Knows how to install and remove programs.	3.46	HO	3
Knows computer parts and its basic functions.	3.33	MO	4
Identifies the part of a computer network that is malfunctioning if a network connection has been lost.	3.02	MO	5
Average Weighted Mean	**3.41**	**Highly Competent**	

The data further revealed that the indicator with the lowest rating *"identifies the part of a computer network that is malfunctioning if a network connection has been lost"* with a weighted mean of 3.02 interpreted as moderately observed. It appears that the instructors' understanding of ICT was lacking in identifying the problematic area of a computer network in the event of a lost network connection. Not many schools have sufficient access to devices like laptops, iPads, or dependable internet connections.

Table 9. Summary of status of ICT integration of teachers.

Aspects	WM	Int.	Rank
Technological Knowledge	3.41	HO	1
Content Knowledge	3.27	MO	2
Pedagogical Knowledge	2.94	MO	3
Overall Average Weighted Mean (OAWM)	**3.21**	**Moderately Observed**	

Technological Knowledge was the highest among the three metrics followed by Content Knowledge and Pedagogical Knowledge became the lowest. This indicates that instructors' use of ICT is not entirely effective and observed in the regular teaching lesson. It is possible that many educators lack the knowledge and self-assurance needed to integrate ICT tools and resources into their lessons. Their capacity to properly incorporate technology into their teaching may be limited as a result.

Table 10. Significant association between the profile of the teachers and the level of ICT competencies.

The findings showed that certain profile variables, such as specialization, years in teaching, and training related to ICT, are associated with higher levels of ICT competencies among the respondents. Meanwhile, other profile variables: age and educational attainment, do not show significant associations. It is also evident that the number of years in teaching and training related to ICT significantly influences teachers' ICT competencies, as indicated by the significant chi-square values and p-values less than 0.05.

Profile	ICT Competencies	Chi-Square Value	p-value	Int.
Age	Understanding ICT in education	30.60	0.44	NS
	Gathering Information	36.97	0.10	NS
	Technology Tools	28.83	0.37	NS
	Digital Communication	33.69	0.18	NS
Specialization	Understanding ICT in education	33.75	0.00	S
	Gathering Information	20.44	0.02	S
	Technology Tools	15.74	0.07	NS
	Digital Communication	17.77	0.04	S
No. of Years in Teaching	Understanding ICT in education	63.91	0.00	S
	Gathering Information	28.84	0.37	NS
	Technology Tools	45.95	0.01	S
	Digital Communication	44.57	0.02	S
Training Related to ICT	Understanding ICT in education	11.36	0.94	NS
	Gathering Information	29.85	0.04	S
	Technology Tools	27.29	0.07	NS
	Digital Communication	33.43	0.00	S
Educational Attainment	Understanding ICT in education	26.23	0.16	NS
	Gathering Information	20.37	0.31	NS
	Technology Tools	21.31	0.26	NS
	Digital Communication	35.13	0.01	S

Table 11. Test on Significant Relationship between the ICT competencies of the teachers and the status of their ICT integration

ICT Competencies	ICT Integration	R	p-value	Statistical Significance
Understanding ICT in education	Content Knowledge	0.20	0.18	**LC**
	Pedagogical Knowledge	0.32	0.03	**LC**
	Technological Knowledge	0.03	0.08	**LC**
Gathering Information	Content Knowledge	0.47	0.00	**MC**
	Pedagogical Knowledge	0.39	0.01	**LC**
	Technological Knowledge	0.35	0.02	**LC**
Technology Tools	Content Knowledge	0.24	0.11	**LC**
	Pedagogical Knowledge	0.27	0.07	**LC**
	Technological Knowledge	0.33	0.03	**LC**
Digital Communication	Content Knowledge	0.46	0.00	**MC**
	Pedagogical Knowledge	0.62	0.00	**MC**
	Technological Knowledge	0.35	0.02	**LC**

There is no significant relationship between understanding ICT in education and integration across content, and technological knowledge, but there is a statistically significant positive correlation with pedagogical knowledge. Proficiency in gathering information is significantly associated with content, pedagogical, and technological knowledge, revealing its importance in effective ICT integration. Meanwhile, there is no significant correlation between technology tools and content and pedagogical knowledge, but there is a significant association with technological knowledge. Lastly, digital communication skills show significant associations with all ICT integration, underscoring their importance in facilitating effective ICT integration in education.

Table 12. Extent of influence between the teachers' level of ICT competencies and the level of ICT integration

ICT Competencies	ICT Integration	R	r^2	Statistical Significance
Understanding ICT in education	Content Knowledge	0.20	0.04	**Very Low**
	Pedagogical Knowledge	0.32	0.10	**Very Low**
	Technological Knowledge	0.03	0.00	**No Influence**
Gathering Information	Content Knowledge	0.47	0.22	**Low**
	Pedagogical Knowledge	0.39	0.16	**Very Low**
	Technological Knowledge	0.35	0.12	**Very Low**
Technology Tools	Content Knowledge	0.24	0.06	**Very Low**
	Pedagogical Knowledge	0.27	0.07	**Very Low**
	Technological Knowledge	0.33	0.11	**Very Low**
Digital Communication	Content Knowledge	0.46	0.21	**Low**
	Pedagogical Knowledge	0.62	0.38	**Low**
	Technological Knowledge	0.35	0.12	**Very Low**

The findings indicated that the correlation coefficients (r) and corresponding r-squared values have weak associations across the board. Therefore, the ICT competencies in understanding ICT in education, gathering information, utilizing technology tools, and digital communication have limited explanatory power in predicting ICT integration in content, pedagogical, and technological aspects.

Conclusion

The assessment of the teachers' ICT competencies and the teachers' practices of ICT integration show that the understanding of ICT in education and the practices for achieving ICT integration of pedagogical knowledge are among the competencies of the teachers needing improvement. Reskilling and upskilling are two strategies to improve abilities in the realm of education. Facilitators must anticipate innovation when making decisions that affect the organization. The goal of teachers' upgrading the skill is situational in nature and needs to be addressed as it was a perceived factor that inhibits the teachers' achievement of ICT competencies and integration.

Recommendation

A development program is hereby proposed to enhance ICT competencies and integration among teachers in Tinambac North District, the district may implement targeted professional development programs; continuous training and support programs for educators, which include workshops and mentoring programs.; advocating for infrastructure enhancement to provide teachers with the necessary resources for effective ICT integration in the classroom; and integrating ICT training into the curriculum and fostering collaborative learning communities to familiarize educators with the guidelines, procedures, and validated materials necessary in integrating ICT effectively into their teaching practices.

V. Acknowledgement

The researcher is extending her heart felt thanks to teachers from Tinambac North District teachers in being the teacher-respondent of the study. She is thankful to the Public School District Supervisor and school principals for their understanding and support in order to make this study possible.

References

Abdukarimovich, Yuldoshev Tojiddin (2022). Crisis of the Age of Maturity, The Formation of The Image of "I". Global Scientific Review, 9, 21–25. From http://scienticreview.com/index.php/gsr/article/view/77. Retrieved on January 17, 2024.

Alexander, Kristopher, Vivek Venkatesh, Jihan Rabah, Magda Fusaro, Annie Couture and Wynnpaul Varela (2016) Factors Impacting University Instructors' and Students' Perceptions of Course Effectiveness and Technology Integration in the Age of Web 2.0 retrieved from https://www.erudit.org/en/journals/mje/2016-v51-n1-mje02648/1037358ar/abstract/ on March 2, 2022.

Bala, M. (2018). Use of ICT in higher education. Multidisciplinary HigherEducation, Research, Dynamics & Concepts: Opportunities & ChallengesForSustainable Development (ISBN 978-93- 87662-12-4), 1(1), 368-376.

Bhardwaj, Neha, Arora, Shilpa & Dr. Malik, Sahil (2020) UNDERSTANDING THE ROLE OF ICT IN ACHIEVING EXCELLENCE IN HIGHER EDUCATIONMBARetrieved on January 2023 from https://www. academia.edu/42200104/UNDERSTANDING_THE_ ROLE_OF _ICT_IN_ACHIEVING_EXCELLENCE_IN_HIGHER_EDUCATION.

Bilyalova, A. (2017). ICT in Teaching a Foreign Language in High School. Procedia– Social and Behavioral Sciences, 237 (June 2016), pp.175–181.

Bodo, Mili (2019). Information and Communication technology (ICT) in Education. Addaiyan Journal of Arts, Humanities and Social Sciences ©Addaiyan International Publishers (An international Publisher of Research & Academic Resources) Retrieved from https://aipublisher.org/projects/ajahss.

Bordios, E. (2016). Determinant factors in the integration of information and communication technologies in teaching. Univ. of Min. Intl. Mult. Res. Jour.1(2). Retrieved from: https://www.researchgate.net/publication/315574177_ Determinant_factors_in_the_integration_of_information_and_communicati on_technologies_in_teaching.

Castillo, Lian Sabella V. (2017). Call of Duty. A Case Study of ICT Integration in the Philippine Provincial Public Schools in San Isidro Davao Oriental PostK-12 Implementation. Master's Thesis. The University of Tokyo. GraduateSchool of Interdisciplinary Information Studies Information, Technology, and Society in Asia. Academic Year 2017.

Co, Annalene Grace E. (2021). Teaching Outside Specialization from the Perspective of Science Teachers. From: 10.4236/oalib.1107725.Retrievedon January 19, 2024.

DO 35, S. 2016 – The Learning Action Cell as a K To 12 Basic EducationProgramSchool-Based Continuing Professional Development Strategy for theImprovement of Teaching and Learning Retrieved on: January 4, 2024from:https://www.deped.gov.ph/2016/06/07/do-35-s-2016 -the-learning-action-cell-as-a-k-to-12-basic-education-program-school-based-continuing-professional-development-strategy-for-the-improvement-of-teaching-andlearning/.

Ekayati, R. (2019). Study of Blended-Learning Method Assisted By Edmodo in Teaching English at State Vocational School in Deli Serdang. Budapest International Research and Critics in Linguistics and Education (BirLE) Journal, 2(3), 18-26.

Fachrurrazi, M. (2017). Relationship between professional competences andteacher work-autonomy. Unpublished master's thesis in education. University of Tampere Aceh, Indonesia. From:https://www.researchgate.net /publication/334998416_Relationship_Between_Teacher_Professional_Competences_and_Teacher_Work-Autonomy. Retrieved on January 19, 2024.

Grosemans, Ilke (2015). Informal learning of primary school teachers:Considering the role of teaching experience and school culture. From:https://doi.org/10.1016/j.tate.2014.12.011. Retrieved on January 18, 2024.

Horn, Aaron S. and Jang, Sung Tae (2017). The Impact of Graduate Education on Teacher Effectiveness: Does a Master's Degree Matters? Retrieved fromhttps://mhec.org/resources/impact-graduate-education-teachereffectiveness -does-master's-degree-matters on July 17, 2023,

Jones, Suzanne (2017). New Zealand's ICT Strategy: The Respective Roles of Senior and Middle Management in Promoting Collaboration and Innovation retrieved from https://onlinelibrary.wiley.com/doi/full/10.1002/app5.199 on May 3, 2022.

Kadel, Purna Bahadur (2020). Challenges of Teacher Autonomy for Professional Competence. From: https://d1wqtxts1xzle7. cloudfront.net/83694134/27372-libre.pdf?1649606199=&response-content-disposition=inline%3B+filena me%3DChallenges_of_Teacher_Autonomy_for_Professional. Retrieved on January 18, 2024.

Mahraj-Sharma, Rawatee Aarti Sharma & Aditi Sharma (2017). Using ICT-Based Instructional Technologies to teach Science: Perspectives from Teachers in Trinidad and Tobago. Autralian Journal of teacher Education, 42 (10). Retrieved on January 2, 2023. Retrieved from https://dx.doi.org/10.14221 /ajte.2017v4 2n10.2.

Malahay, Roger (2021). Area of Specialization and Teaching Performance of the Performance of the Secondary Science Teachers in Negros Oriental,Philippines. Retrieved from https://journaljsrr.com/ index.php/JSRR/article/view/1600 on July 18,2023.

Nuncio, Roderick V. (2020). An E-learning Outreach Program for Public Schools:Findings and Lesson Learned Based on a Pilot Program in Makati City and Cabuyao City, Laguna, Philippines. A Multisectoral Action Research. De La Salle University, 2401 Taft Avenue, Manila, 1004, Philippines. July 2020.

Podolsky, Anne (2019). Does teaching experience increase teacher effectiveness? A review of US research. From: https://www.emerald.com/insight/content/doi/ 10.1108/JPCC-12-2018-0032/full/html. Retrieved on January 19, 2024.

Rockman, I.F. (2019). Integrating information literacy into the learning outcomes of academic disciplines: A critical 21st-century issue. College and Research Libraries News. Retrieved from https://files.eric.ed.gov on February 21, 2022.

Sarma, Moyuri (2017). A Study On The Attitude Of University Teachers Towards Ict With Special Reference To The Select Universities Of Assam. International Journal of Educational Science and Research (IJESR) ISSN (P): 2249-6947; ISSN (E): 2249-8052 Vol. 7, Issue 6, Dec 2017, 89-98 © TJPRC Pvt Ltd. From www.tjprc.org.

Sasing, Monalissa (2020). Teacher Professional Development on ICT in Education in the Philippines. Topic Brief. USAID.

Singh, S. & Mishra, S. (2016). A study an interactive elementary education (3-6) with multimedia‖, International Journal of Home Science, 2(1), 214-215.www.homesciencejournal.com.

Umali, Erlene G. (2019). The Transversal Competencies of Vietnamese Primary Students and The Relationship With Online Learning Activities During The COVID-19 Pandemic retrieved from https://files.eric.ed.gov/fulltext/EJ1364223.pdf on May 3, 2022.

Yadav, Vivek (2015). Study on the use of Information and Communication Technology (ICT) by secondary school teachers of Lucknow, U.P. Research scholar JRF University of Lucknow, U.P., India International Research Journal of Management Sociology & Humanity (IRJMSH) fromwww.irjmsh.com.