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Information and Communications Technology (ICT) Tools and Resources in Junior High School Technology and Livelihood Education (TLE) Instructions in San Manuel, Tarlac

Ed E. Collado and Dr. Caren O. Ventayen
Pangaisnan State University Open University Systems (PSU-OUS)

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Abstract - *The integration of Information and Communication Technology (ICT) has become an essential component of modern education, particularly in subjects that require practical and vocational competencies such as Technology and Livelihood Education (TLE). This study examined the utilization and effectiveness of ICT tools and resources in Junior High School TLE instruction in San Manuel District, Tarlac. The research aimed to determine the level of ICT utilization among TLE teachers, evaluate its perceived effectiveness from the perspectives of both teachers and students, and identify challenges encountered in ICT integration. A descriptive-correlational research design was employed. The respondents included thirteen (13) Junior High School TLE teachers and 328 students selected through Slovin's formula from a total student population of 1,836. Data were collected through structured survey questionnaires and analyzed using descriptive statistics, correlational analysis, and comparative analysis. Findings revealed that ICT tools were generally highly utilized in TLE instruction and were perceived as very effective in enhancing teaching, assessment, and communication. Teachers' ICT literacy significantly influenced their level of ICT utilization and effectiveness. However, several challenges were identified, including limited infrastructure, outdated devices, insufficient training, and inadequate technical support. Based on these findings, the study proposed the DIGITLE Program (Digital Integration and Growth in ICT for TLE Educators), a capacity-building initiative designed to enhance teachers' digital competencies and strengthen ICT integration in TLE instruction.*

Keywords - *ICT integration, Technology and Livelihood Education, Digital literacy, Teacher ICT competency, educational technology, Capacity-building program*

INTRODUCTION

The emergence of digital technologies has profoundly influenced various sectors of society, including education. The increasing reliance on digital tools for communication, information sharing, and problem solving has made digital literacy a fundamental competency for individuals in the modern world. As educational systems evolve to meet the demands of the digital age, schools are expected to integrate technology into teaching and learning processes to prepare students for participation in a technology-driven society.

In the Philippines, the Department of Education (DepEd) has recognized the importance of ICT integration in enhancing the quality of education.

Through initiatives such as the DepEd Computerization Program and the Digital Rise Program, the government has sought to provide schools with technological infrastructure and digital learning resources. These programs aim to improve access to computers, internet connectivity, and digital educational materials, thereby promoting innovative teaching practices and improving learning outcomes.

Technology and Livelihood Education (TLE) is a core subject within the K–12 curriculum that equips students with practical life skills, vocational competencies, and entrepreneurial knowledge. The subject covers various areas such as Information and Communication Technology, Agriculture and Fishery Arts, Industrial Arts, and Home Economics. Integrating ICT into TLE instruction can enhance the teaching of these practical skills by providing interactive simulations, multimedia demonstrations, and digital collaboration tools.

Despite the growing availability of ICT resources in schools, the successful integration of technology into classroom instruction remains a challenge. Previous studies have indicated that teachers' digital competencies, availability of technological resources, and institutional support play significant roles in determining the effectiveness of ICT integration. In many public schools, teachers continue to face barriers such as inadequate infrastructure, insufficient training, and limited access to updated digital tools.

Furthermore, while national policies strongly promote ICT integration, there remains limited empirical research examining the actual utilization of ICT tools in specific subject areas and local contexts. Understanding how ICT tools are used in TLE instruction at the district level can provide valuable insights into the effectiveness of current policies and programs.

In this context, the present study seeks to assess the utilization and effectiveness of ICT tools and resources in TLE instruction in Junior High Schools in San Manuel District, Tarlac. By examining teachers' ICT practices, perceptions of effectiveness, and challenges encountered in implementation, the study aims to contribute to the improvement of ICT integration in vocational education.

This study aimed to assess the utilization and effectiveness of ICT tools and resources in Technology and Livelihood Education instruction in Junior High Schools in the San Manuel District, Tarlac.

Specifically, the study sought to answer the following research questions:

1. What is the demographic profile of Junior High School TLE teachers in terms of:
    - Age
    - Gender
    - Marital status
    - Highest educational attainment
    - Position
    - Average monthly income
    - Number of years in teaching
    - Level of ICT literacy
    - TESDA certifications
    - Number of ICT-related seminars or training attended
2. What is the level of utilization of ICT tools and resources in TLE instruction as perceived by teachers and students?
3. What is the level of effectiveness of ICT tools and resources in improving teaching and learning processes?
4. Is there a significant relationship between teachers' profile variables and the level of ICT utilization?
5. Is there a significant relationship between teachers' profile variables and the perceived effectiveness of ICT tools?

6. Is there a significant difference between teachers' and students' perceptions of ICT utilization and effectiveness?
7. What problems do TLE teachers encounter in utilizing ICT tools and resources?
8. What capacity-building program can be proposed to enhance ICT integration in TLE instruction?

This study aims to evaluate the utilization and effectiveness of Information and Communication Technology (ICT) tools and resources in Junior High School Technology and Livelihood Education (TLE) instruction in the San Manuel District, Tarlac. Specifically, it seeks to examine how ICT tools are integrated into classroom teaching, learning activities, assessment processes, and communication practices between teachers and students. The study also aims to determine the extent to which these digital resources enhance instructional delivery, improve student engagement, and support the development of technical and vocational competencies among learners. Furthermore, it intends to identify the factors influencing ICT utilization among TLE teachers, including their level of ICT literacy, professional training, and access to technological resources. By analyzing the effectiveness of ICT integration in TLE instruction, the study aims to provide insights into how digital technologies can contribute to improving the quality of teaching and learning in vocational education within the basic education system.

The findings of this study are expected to benefit several stakeholders in the educational sector. For policymakers and educational leaders, the results may provide empirical evidence that can support the formulation of policies and strategies aimed at strengthening ICT integration in basic education. School administrators may utilize the findings as a basis for designing professional development programs and improving the provision and management of technological resources within their institutions. Teachers may gain valuable insights into effective practices for integrating ICT tools into their instructional strategies, enabling them to enhance classroom engagement and improve learning outcomes. Students may benefit from improved instructional approaches that incorporate digital technologies to support interactive, practical, and learner-centered experiences. Additionally, the study may serve as a useful reference for future researchers who intend to explore ICT integration, digital pedagogy, and vocational education in other educational contexts.

Department of Education (DepEd).

The study provides empirical evidence that can guide policy decisions and program development related to ICT integration in basic education.

School Administrators.

The findings may assist school leaders in designing strategies for improving digital infrastructure, supporting teacher training, and promoting effective technology integration.

Teachers.

The study highlights the importance of developing digital competencies and adopting innovative instructional strategies using ICT tools.

Students.

Improved ICT integration can enhance learning experiences, increase engagement, and equip students with skills relevant to the digital economy.

Future Researchers.

The study may serve as a reference for further research on ICT integration, digital pedagogy, and vocational education.

This study focused on the utilization and effectiveness of ICT tools in Technology and Livelihood

Education instruction among Junior High Schools in San Manuel District, Tarlac, during School Year 2025–2026.

The respondents consisted of TLE teachers and students from selected public schools in the district. The study employed descriptive-correlational research design and did not involve experimental interventions. The results are therefore limited to the context of the selected schools and may not be generalized to other educational settings.

METHODOLOGY

Research Design

This study employed a descriptive–correlational research design to examine the utilization and effectiveness of Information and Communication Technology (ICT) tools and resources in Technology and Livelihood Education (TLE) instruction. The descriptive component of the research aimed to determine the current level of ICT utilization and perceived effectiveness of digital tools in teaching and learning activities within the classroom. This approach allowed the researcher to describe existing practices, perceptions, and conditions related to ICT integration in TLE instruction.

In addition, the correlational component of the study sought to examine the relationship between selected teacher profile variables and their level of ICT utilization and effectiveness. By analyzing these relationships, the study aimed to determine whether factors such as teachers' ICT literacy, professional training, and teaching experience influence the integration of digital technologies in instructional practices. This research design was considered appropriate because it allowed the researcher to explore existing patterns and associations without manipulating the variables involved.

Respondents of the Study

The respondents of the study consisted of Junior High School Technology and Livelihood Education teachers and students from selected public secondary schools in the San Manuel District, Tarlac. A total of thirteen (13) TLE teachers participated in the study. Since the number of teachers in the district was relatively small and manageable, universal sampling was employed to ensure that all TLE teachers were included in the research.

For the student respondents, a representative sample was determined from a total population of 1,836 junior high school students enrolled in the participating schools. The required sample size was computed using Slovin's formula with a margin of error of 0.05, resulting in 328 student respondents. These students were selected proportionally from the participating schools to ensure fair representation of the student population.

Data Collection Methods

Data for the study were gathered using structured survey questionnaires designed by the researcher to collect both quantitative and descriptive information related to ICT integration in TLE instruction. The questionnaire was developed based on the objectives of the study and the variables identified in the research framework.

The survey consisted of several sections designed to collect the following information:

- **Teacher Profile** – demographic and professional characteristics of the teachers such as age, gender, educational attainment, teaching experience, ICT literacy level, and participation in ICT-related training programs.
- **ICT Utilization** – the extent to which teachers use ICT tools and digital resources in teaching activities, instructional delivery, and classroom management.

- **ICT Effectiveness** – perceptions of teachers and students regarding the effectiveness of ICT tools in improving teaching and learning processes.
- **Challenges in ICT Integration** – difficulties encountered by teachers in implementing ICT tools and digital resources in TLE instruction.

The questionnaires were administered to both teacher and student respondents in their respective schools. Responses were collected and organized for statistical analysis.

Data Analysis

The data collected were analyzed using appropriate statistical techniques to address the research objectives. The following statistical methods were employed:

- **Descriptive Statistics** such as frequency counts, percentages, and mean scores were used to summarize the demographic profile of respondents and to describe the level of ICT utilization and effectiveness in TLE instruction.
- **Correlation Analysis** was applied to determine the relationship between teacher profile variables and the level of ICT utilization and effectiveness. This analysis helped identify whether certain teacher characteristics influence the use of ICT in instructional practices.
- **Comparative Statistical Analysis** was conducted to determine whether there were significant differences between the perceptions of teachers and students regarding the utilization and effectiveness of ICT tools in TLE instruction.

These statistical procedures enabled the researcher to systematically interpret the data and draw conclusions regarding the role of ICT tools and resources in improving teaching and learning processes in Technology and Livelihood Education.

RESULTS

Table 1. Summary of Statistical Findings on ICT Utilization and Effectiveness in Technology and Livelihood Education (TLE) Instruction

Area of Analysis	Variables / Indicators	Statistical Method Used	Key Findings	Interpretation
Respondent Profile	Age, gender, marital status, educational attainment, teaching position, ICT literacy, TESDA certification, number of trainings	Frequency and Percentage	Majority of teachers aged 40–44, predominantly female, married, with Bachelor's degrees and Master's units	Teachers possess moderate professional experience and vocational qualifications
ICT Utilization	Availability of ICT tools and resources	Weighted Mean	Highly Utilized	Teachers frequently use available ICT tools in TLE instruction

	Teaching and learning enhancement	Weighted Mean	Highly Utilized	ICT improves lesson presentation and student engagement
	Assessment and performance monitoring	Weighted Mean	Highly Utilized	Digital tools support evaluation and tracking of student progress
	Communication and collaboration	Weighted Mean	Highly Utilized	ICT facilitates teacher–student communication and collaboration
Overall ICT Utilization	Combined indicators of ICT use	Weighted Mean	Highly Utilized	ICT integration is widely practiced in TLE instruction
ICT Effectiveness	Availability of ICT tools and resources	Weighted Mean	Very Effective	ICT resources significantly support teaching activities
	Teaching and learning enhancement	Weighted Mean	Very Effective	ICT improves students' understanding and participation
	Assessment and performance monitoring	Weighted Mean	Very Effective	ICT assists teachers in monitoring student performance
	Communication and collaboration	Weighted Mean	Very Effective	ICT enhances classroom interaction and teamwork
Overall ICT Effectiveness	Combined effectiveness indicators	Weighted Mean	Very Effective	ICT positively impacts teaching and learning outcomes
Relationship Analysis	Teacher profile vs ICT utilization	Correlation Analysis	Significant relationship between ICT literacy and utilization	Teachers with higher ICT literacy integrate ICT more effectively

	Teacher profile vs ICT effectiveness	Correlation Analysis	Age and ICT literacy significantly related to ICT effectiveness	Teacher competence influences ICT effectiveness
Comparative Analysis	Teacher vs student perception of ICT utilization	Comparative statistical test	No significant difference	Teachers and students share similar views on ICT usage
	Teacher vs student perception of ICT effectiveness	Comparative statistical test	No significant difference	Both groups perceive ICT as beneficial
Challenges in ICT Integration	Infrastructure, equipment, training, technical support	Weighted Mean	Moderate challenges identified	Limited resources and support affect ICT implementation

The findings of the study revealed that Information and Communication Technology (ICT) tools and resources are widely utilized in Technology and Livelihood Education (TLE) instruction in the San Manuel District. The results indicate that most teachers possess moderate to high levels of ICT literacy, enabling them to integrate various digital tools into their instructional practices. Teachers reported frequent use of computers, presentation software, internet-based resources, multimedia materials, and other digital applications to support lesson delivery and classroom activities.

The level of ICT utilization in TLE instruction was rated as highly utilized across several indicators, including the availability of ICT tools and resources, teaching and learning enhancement, assessment and performance monitoring, and communication and collaboration support. Similarly, the effectiveness of ICT tools in instruction was rated as very effective by both teachers and students.

The statistical analysis further revealed that teachers' ICT literacy showed a significant relationship with the level of ICT utilization and effectiveness in TLE instruction. However, the comparative analysis showed no significant difference between teachers' and students' perceptions regarding ICT utilization and effectiveness.

Despite the high level of ICT utilization, the study identified several challenges affecting ICT integration in TLE instruction. Among the commonly reported problems were limited technological infrastructure, outdated computer equipment, insufficient technical support, and inadequate training opportunities for teachers.

DISCUSSION

The results highlight the significant role of ICT in enhancing teaching and learning processes in Technology and Livelihood Education. The integration of digital tools allows teachers to deliver lessons that are more engaging, interactive, and visually supported, which is particularly important in vocational subjects that involve practical demonstrations and skill development. Using multimedia presentations, internet-based resources, and digital instructional materials, teachers can effectively illustrate procedures, concepts, and real-life applications relevant to TLE learning areas.

The findings also indicate that teachers' ICT literacy is an important factor influencing the successful integration of technology in the classroom. Teachers who possess higher levels of digital competence are more confident in utilizing technological tools and are more capable of incorporating them into their instructional strategies. This suggests that improving teachers' ICT skills through professional development programs can significantly enhance the effectiveness of ICT integration in education.

However, the study also reveals that several institutional and infrastructural challenges continue to limit the full potential of ICT integration in schools. The lack of adequate technological infrastructure, outdated equipment, and limited technical support can hinder teachers' ability to fully utilize available digital resources. These challenges highlight the importance of strengthening institutional support systems, improving school infrastructure, and providing continuous training opportunities for teachers.

Addressing these challenges is essential for maximizing the benefits of ICT integration in vocational education and ensuring that students develop the technological and practical skills required in the modern workforce.

CONCLUSION

The study examined the utilization and effectiveness of Information and Communication Technology (ICT) tools and resources in Technology and Livelihood Education (TLE) instruction in Junior High Schools in the San Manuel District, Tarlac. The findings revealed that ICT tools are widely utilized in TLE instruction and are perceived as highly effective in enhancing teaching and learning processes. Teachers demonstrated moderate to high levels of ICT literacy and regularly integrated digital tools such as computers, multimedia presentations, and internet-based resources to support lesson delivery, communication, and assessment activities.

The study also found that teachers' ICT literacy significantly influences the level of ICT utilization and perceived effectiveness in instruction. Both teachers and students recognized the positive contribution of ICT in improving instructional delivery, student engagement, and monitoring of learning outcomes. However, several challenges continue to affect the effective integration of ICT, including limited technological infrastructure, outdated equipment, insufficient technical support, and limited opportunities for continuous teacher training.

Overall, the findings suggest that ICT integration plays a crucial role in strengthening vocational education and enhancing teaching practices in TLE. Strengthening technological infrastructure, improving teacher competencies in digital technologies, and increasing institutional support can further enhance the effective implementation of ICT in education and better prepare students for the demands of the modern workforce.

RECOMMENDATIONS

Based on the findings of the study, several recommendations are proposed to strengthen the integration and effective utilization of Information and Communication Technology (ICT) in Technology and Livelihood Education (TLE) instruction.

First, schools should prioritize the improvement and modernization of their ICT infrastructure and equipment. This includes providing updated computers, reliable internet connectivity, multimedia instructional devices, and other digital learning resources that can support technology-enhanced teaching and learning. Adequate technological infrastructure is essential to ensure that teachers and students can fully utilize ICT tools in classroom instruction and vocational training activities.

Second, teachers should be provided with continuous professional development programs focused on educational technology and digital pedagogy.

Regular training, workshops, and seminars can help teachers enhance their ICT literacy, develop innovative teaching strategies, and become more confident in integrating digital tools into their instructional practices. Such professional development initiatives can significantly improve teachers' ability to utilize ICT resources effectively and support student-centered learning.

Third, school administrators should implement comprehensive and strategic ICT integration programs within their institutions. This may involve developing school-level ICT policies, establishing technical support systems, allocating resources for digital learning initiatives, and promoting a culture of technology-based innovation in teaching and learning. Strong leadership and institutional commitment are crucial in ensuring the sustainable implementation of ICT integration efforts.

Finally, future researchers are encouraged to conduct further studies on ICT integration in other subject areas and educational contexts. Expanding research to include different disciplines, educational levels, and geographic settings can provide a deeper understanding of how ICT can be effectively utilized to improve teaching practices and learning outcomes across the broader educational system.

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