

Information and Communication Technology Tools and the Academic Performance of JHS Students of Congressional District I, Division of Batangas

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Abstract

This study examined how useful ICT tools are in improving specific aspects of students' academic performance in TLE. Specifically, the study's main goal was to determine the extent of ICT tools utilization in terms of instructional delivery, student engagement and participation, skills development, and assessment and feedback, assess the level of usefulness of ICT tools in relation to learning outcomes and teacher efficiency, examine the relationship between ICT tools utilization and academic performance, and identify the challenges encountered by teachers in using the said ICT tools in teaching and learning.

The study employed a quantitative descriptive research design involving 126 Junior High School TLE teachers from public schools in Congressional District I, Division of Batangas. Survey questionnaires and interviews were mainly used as the data gathering instrument. After thorough analysis and interpretation of the gathered data, the findings revealed that ICT tools are utilized to a great extent across all areas, particularly in instructional delivery.

Moreover, ICT tools were also found to be highly useful in improving both learning outcomes and teacher efficiency. A significant relationship was also established between the level of ICT tools utilization and its usefulness in improving academic performance. Teachers, on the other hand, reported certain challenges such as limited ICT resources, unstable internet connection, lack of technical support, and unequal access among students.

Based on the findings, Project ELEVATE was proposed to enhance ICT integration in TLE instruction. The study concluded that ICT tools utilization is indeed useful for teachers and beneficial for students. More importantly, addressing the identified challenges is important in order to take full advantage of the benefits and effectiveness of ICT tools in improving teaching and learning outcomes

Keywords: *Information and Communication Technology Tools, academic performance, Technology and Livelihood Education, Junior high school students*

Introduction

Information and Communication Technology (ICT) has become an essential part of 21st-century education, transforming teaching methods, instructional delivery, and learning experiences. In secondary education, ICT tools such as computers, multimedia software, and online platforms provide opportunities to improve teaching efficiency and student learning outcomes. In subjects like Technology and Livelihood Education (TLE), ICT supports competency-based learning by increasing student engagement, creativity, and critical thinking.

As schools invest more in digital technologies, it is important to understand how ICT affects students' academic performance. The effectiveness of TLE instruction largely depends on teachers' use of ICT tools to enhance learning and assessment. However, the impact of ICT remains uncertain in some local contexts, including Congressional District I in the Division of Batangas, where schools experience varying levels of ICT access and utilization.

The Department of Education promotes ICT integration through programs such as the DepEd Computerization Program and policies like DepEd ICT4E Strategic Plan, which support technology-enabled classrooms and teacher training. Studies have shown that ICT positively influences student performance, skills development, and engagement in TLE. However, challenges such as poor internet connectivity, lack of equipment, insufficient teacher training, and limited technical support continue to hinder effective implementation, especially in rural schools.

In the Schools Division of Batangas Province, particularly Congressional District I, ICT integration in TLE remains inconsistent. Teachers observe increased student engagement when ICT is used, but limitations in infrastructure and resources affect implementation. Thus, this study aimed to assess the extent of ICT tools utilization in TLE and its influence on Junior High School students' academic performance, identify challenges faced by teachers, and propose strategies for improving ICT integration in instruction.

Statement of the Problem

This study aimed to assess the usefulness of Information and Communication Technology (ICT) tools in enhancing students' academic performance in Technology and Livelihood Education (TLE) of the Junior High Schools in Congressional District I, Division of Batangas. Specifically, it sought to answer the following questions:

1. What is the extent of ICT tools utilization in teaching TLE to enhance the academic performance of the students in terms of:
 - 1.1 instructional delivery;
 - 1.2 student engagement and participation;
 - 1.3 skills development; and
 - 1.4 assessment and feedback?
2. To what level of usefulness do ICT tools improve students' academic performance with regard to:
 - 2.1 learning outcomes; and
 - 2.2 teacher efficiency?

3. Is there significant relationship between the assessments on the extent of utilization and on the level of usefulness of ICT tools?
4. What challenges do TLE teachers encounter in utilizing ICT tools?
5. Based on the findings of the study, what enrichment activities may be proposed?

Hypothesis of the Study

There is no significant relationship between the assessments on the extent of utilization and on the level of usefulness of ICT tools.

Methodology

Research Design

This study employed a quantitative descriptive research design to examine the relationship between ICT tools utilization and the academic performance of Junior High School students in Technology and Livelihood Education (TLE). Using a quantitative approach, numerical data were collected and statistically analyzed to identify patterns and relationships in ICT use, particularly in instructional delivery, student engagement, skills development, and assessment.

The descriptive design was appropriate because it described the current situation without altering variables, providing a systematic analysis of ICT integration in TLE. The findings also served as the basis for developing enrichment activities to improve ICT utilization in schools in the Division of Batangas Province.

Participants

The respondents of this study were 126 Junior High School (JHS) TLE teachers from selected public schools in Congressional District I, Schools Division of Batangas Province, which covers 9 sub-offices. Out of a total population of 185 TLE teachers, the sample size of 126 respondents was determined using Slovin's formula with a 5% margin of error and proportionally allocated across the sub-offices. These teachers were chosen because of their direct involvement in implementing the TLE curriculum and their experience in using ICT tools in teaching.

Research Instrument

A researcher-made questionnaire was used as the main instrument to collect numerical data related to ICT tools utilization in TLE. It was developed through a review of related literature and consisted of three sections: extent of ICT use (instructional delivery, student engagement, skills development, assessment and feedback), usefulness of ICT tools in improving academic performance (learning outcomes and teacher efficiency), and challenges encountered by teachers in ICT integration.

To ensure validity and clarity, the questionnaire underwent adviser review and expert validation, with revisions made based on feedback before final approval. Data collection was conducted through Google Forms and printed questionnaires, ensuring accessibility for teachers with limited internet access. Confidentiality, voluntary participation, and informed consent were observed during administration.

Responses were measured using a four-point Likert scale to assess ICT utilization, usefulness, and challenges. Data from completed questionnaires were organized and analyzed statistically. In addition, semi-structured interviews with selected TLE teachers were conducted to gain deeper insights into their experiences and challenges in using ICT tools in teaching.

Data Collection Procedure

Before data collection, the researcher developed and validated the survey questionnaire through reviews by the thesis adviser and experts to ensure clarity, accuracy, and appropriateness. After revisions, permission was obtained from the Schools Division Office of Batangas Province and school principals before distributing the questionnaires to TLE teachers through Google Forms and printed copies.

The researcher explained the study's purpose, ensured confidentiality, and emphasized voluntary participation. After collection, online responses were automatically recorded, while printed responses were manually encoded. Selected TLE teachers were also interviewed to gather additional insights on ICT utilization and challenges. Finally, all data were organized, tabulated, and statistically analyzed to address the study's objectives.

Data Analysis

To ensure accurate interpretation of data, appropriate statistical tools were used in analyzing the responses of the participants. Frequency and percentage were used to describe the distribution of responses, while ranking identified the order of importance based on respondents' answers. The weighted mean was used to determine the overall perception of TLE teachers on ICT utilization and its usefulness in improving academic performance. Lastly, Pearson's r coefficient of correlation was applied to determine the significant relationship between the extent of ICT utilization and its perceived usefulness.

Results

1. Extent of ICT Tools Utilization in Teaching TLE in terms of:

This section presents the level of use of ICT tools in teaching Technology and Livelihood Education (TLE) based on the perspectives of teacher respondents. It examined how ICT is used in various aspects of teaching such as instructional delivery, student engagement and participation, skills development, and assessment and feedback. The results provided insights into how frequently and effectively these tools are utilized to support the teaching-learning process and enhance students' academic performance in TLE.

1.1 Instructional Delivery

Table 1 presents the extent of ICT tools utilization in teaching TLE in terms of instructional delivery.

As displayed on the table, the composite mean of 3.72 with the interpretation of “Great Extent” shows that ICT tools play a significant role in the way teachers teach in TLE. This means that they actively use digital resources to improve lesson presentation, facilitate understanding, and meet the various needs of students. This also indicates that ICT tools have become an integral part of TLE teaching, making the learning process more dynamic, engaging, and effective.

Table 1
Extent of ICT Tools Utilization in Teaching TLE in terms of
Instructional Delivery

Indicators	Weighted Mean	Verbal Interpretation	Rank
1. Uses multimedia presentations to enhance lesson delivery.	3.92	Great Extent	1
2. Utilizes online platforms (e.g., Google Classroom, Microsoft Teams) to deliver instructional materials.	3.58	Great Extent	8
3. Integrates video tutorials or demonstrations from credible online sources in my teaching.	3.87	Great Extent	2
4. Uses digital tools to supplement lectures and provide visual representations of complex TLE concepts.	3.85	Great Extent	4
5. Utilizes internet-based resources to update lesson content with current industry practices.	3.70	Great Extent	6
6. Applies ICT tools to differentiate instruction and cater to students' varied learning needs.	3.46	Moderate Extent	10
7. Makes use of interactive whiteboards or projectors to aid in class discussions and demonstrations.	3.57	Great Extent	9
8. Employs digital lesson plans or e-modules to organize and manage instructional content.	3.66	Great Extent	7
9. Incorporates real-world simulations or virtual tools in explaining practical TLE processes.	3.75	Great Extent	5
10. Uses communication tools (e.g., email, chat groups) to coordinate class activities and announcements.	3.86	Great Extent	3
Composite Mean	3.72	Great Extent	

The highest-rated indicator, use of multimedia presentations (mean = 3.92, “Great Extent”), shows that teachers widely use visuals, audio, and videos to make TLE lessons clearer and more engaging, especially for demonstrating technical processes. This is supported by

studies emphasizing that multimedia improves organization, interaction, and understanding of complex concepts.

Closely followed is the use of video tutorials and demonstrations (mean = 3.87), indicating frequent use of online videos to enhance understanding of step-by-step procedures and accommodate different learning styles. Next is the use of communication tools (mean = 3.86), reflecting strong reliance on digital platforms such as chat groups for coordination, updates, and continuous teacher–student communication.

Lower-ranked indicators include the use of online learning platforms (mean = 3.58) and interactive tools like projectors or whiteboards (mean = 3.57), suggesting limited use due to resource and connectivity constraints, though still helpful in instruction.

The lowest-rated indicator, ICT use for differentiated instruction (mean = 3.46, “Moderate Extent”), suggests that teachers have difficulty tailoring digital tools to individual learner needs, highlighting the need for further training. Overall, ICT is widely used in teaching TLE but is still constrained by resources and varying levels of implementation.

1.2 Student Engagement and Participation

Table 2 shows the level of use of ICT tools in teaching TLE when it comes to student engagement and participation.

With a composite mean of 3.65 with an interpretation of “Great Extent,” it can be seen that ICT tools are widely used to encourage active participation of students. This is a good indication of the strong integration of digital tools in strengthening interaction, collaboration, and participation within the classroom. In TLE, this reflects a shift to a learner-centered approach, where students are more active in their learning.

Table 2
Extent of ICT Tools Utilization in Teaching TLE in terms of
Student Engagement and Participation

Indicators	Weighted Mean	Verbal Interpretation	Rank
1. Uses interactive online platforms (e.g., Mentimeter, Kahoot, Quizizz) to encourage active participation.	3.50	Great Extent	10
2. Employs discussion forums or chat groups to facilitate student collaboration.	3.78	Great Extent	1
3. Integrates gamified learning tools to make lessons more engaging.	3.63	Great Extent	7
4. Uses social media or educational apps to promote collaborative projects among students.	3.62	Great Extent	8
5. Provides opportunities for students to present their outputs using digital formats.	3.73	Great Extent	2
6. Utilizes ICT tools to promote peer feedback and collaborative evaluation.	3.68	Great Extent	3
7. Assigns online research tasks that encourage students to explore authentic TLE applications.	3.65	Great Extent	6

8. Uses virtual classrooms to maintain engagement during blended or distance learning sessions.	3.58	Great Extent	9
9. Provides digital learning materials that allow students to explore lessons independently.	3.66	Great Extent	4.5
10. Uses ICT-based activities to recognize and reward student participation.	3.66	Great Extent	4.5
Composite Mean	3.65	Great Extent	

The highest-rated indicator, use of discussion forums or chat groups for collaboration (mean = 3.78, “Great Extent”), shows that communication tools—often Messenger in public schools—are widely used to support continuous student interaction and collaboration even outside class hours.

Next is the use of digital formats for student outputs (mean = 3.73), indicating that students frequently present their work through multimedia presentations and videos, helping develop creativity, communication skills, and confidence. The use of ICT for peer feedback and collaborative evaluation (mean = 3.68) further shows that students are encouraged to assess and learn from each other, making learning more interactive.

Lower-ranked indicators include the use of social media or apps for group projects (mean = 3.62) and virtual classrooms for blended learning (mean = 3.58), both limited by resource constraints, internet connectivity, and reliance on face-to-face instruction.

The lowest-rated indicator, use of interactive platforms like Kahoot, Quizizz, and Mentimeter (mean = 3.50), though still “Great Extent,” suggests these tools are less frequently used due to technical limitations. However, findings and teacher interviews confirm that such platforms are still valued for increasing student engagement and participation when resources allow.

1.3 Skills Development

Table 3 presents the extent of ICT tools utilization in teaching TLE in terms of skills development.

The composite mean of 3.66, interpreted as “Great Extent,” as reflected by the table indicates that ICT tools are being used to a great degree in developing students’ skills and abilities. The result shows that ICT tools are strongly integrated into practical learning, helping teachers connect theory with real-world applications and making skill development more engaging, understandable, and industry-relevant.

Table 3
Extent of ICT Tools Utilization in Teaching TLE in terms of Skills Development

Indicators	Weighted Mean	Verbal Interpretation	Rank
1. Uses instructional videos or simulations to demonstrate practical TLE skills.	3.85	Great Extent	1
2. Incorporates computer-based design tools (e.g., AutoCAD, SketchUp, or Canva) for skill practice.	3.55	Great Extent	10
3. Provides students with opportunities to perform virtual or digital skill-based exercises.	3.68	Great Extent	3.5
4. Utilizes ICT tools to guide students in developing entrepreneurial and technical competencies.	3.68	Great Extent	3.5
5. Encourages students to document their learning progress through digital portfolios.	3.61	Great Extent	7.5
6. Integrates ICT-assisted tutorials and exercises for mastery of practical skills.	3.72	Great Extent	2
7. Applies software or applications relevant to TLE specializations.	3.58	Great Extent	9
8. Uses ICT to track and evaluate students' skill improvement over time.	3.63	Great Extent	6
9. Employs digital resources that simulate real-life work environments for skills training.	3.65	Great Extent	5
10. Uses ICT tools to facilitate peer-to-peer mentoring and collaborative skill-building activities.	3.61	Great Extent	7.5
Composite Mean	3.66	Great Extent	

The findings show that ICT tools are widely used to support skills development in TLE, particularly through visual and simulation-based learning. The highest-ranked indicator, use of instructional videos and simulations (mean = 3.85, "Great Extent"), shows that teachers heavily rely on visual demonstrations to teach practical skills, especially when equipment is limited. This is followed by ICT-assisted tutorials and exercises (mean = 3.72), which allow students to practice skills repeatedly with clear guidance, improving understanding and independence.

Next, virtual or digital skill-based exercises (mean = 3.68) indicate that simulated activities help students continue practicing even with limited resources. Meanwhile, digital portfolios and peer collaboration (mean = 3.61) highlight ICT's role in promoting reflection, progress tracking, teamwork, and soft skill development.

Lower-ranked indicators include the use of specialized software for TLE fields (mean = 3.58), which is limited by access and teacher familiarity, and the use of design tools like AutoCAD, SketchUp, and Canva (mean = 3.55), which is the least utilized due to lack of resources and training.

Overall, the results show that while ICT is effectively used to enhance practical learning, its full potential is still constrained by resource and training limitations.

1.4 Skills Development

Table 4 shows the extent of ICT tools utilization in teaching TLE in terms of assessment and feedback.

As evidenced by the composite mean of 3.56, teacher-respondents perceived that ICT tools are utilized to a “Great Extent,” signifying that ICT tools are widely used in evaluating student performance and providing feedback. This outcome is a manifestation that teachers are increasingly relying on digital tools to make the assessment process more efficient, fast, and continuous.

The findings show that ICT tools are widely used in assessment and feedback in TLE, mainly to improve communication, evaluation, and instructional adjustment. The highest-ranked indicator, use of ICT tools to communicate assessment results to students and parents (mean = 3.65, “Great Extent”), highlights the common use of messaging apps and email for fast and accessible feedback sharing. This is followed by digital rubrics and checklists (mean = 3.61), which help ensure clear, consistent, and objective assessment criteria for student outputs.

Next, use of digital assessment data to improve instruction (mean = 3.60) shows that teachers use results to adjust teaching strategies and better address student needs, supporting data-driven instruction.

Lower-ranked indicators include the use of online quizzes, LMS platforms, and automated feedback tools (mean = 3.55), which are used but not yet fully maximized due to continued reliance on traditional paper-based assessments. The use of multimedia feedback (mean = 3.46) is less common because it requires more time and technical effort, while still providing more personalized feedback.

The lowest-ranked indicator, use of e-portfolios (mean = 3.45), suggests limited adoption due to lack of resources, training, and systems, although it remains valuable for more comprehensive student assessment. Overall, ICT enhances assessment practices but is still partially constrained by practical limitations.

Table 4
Extent of ICT Tools Utilization in Teaching TLE in terms of
Assessment and Feedback

Indicators	Weighted Mean	Verbal Interpretation	Rank
1. Uses online quizzes and tests to assess student learning.	3.55	Great Extent	6.5
2. Employs learning management systems (LMS) to monitor and record students' performance.	3.55	Great Extent	6.5
3. Provides digital rubrics or checklists for evaluating student outputs.	3.61	Great Extent	2

4. Gives students immediate feedback using online tools or automated systems.	3.55	Great Extent	6.5
5. Utilizes e-portfolios for tracking student progress and accomplishments.	3.45	Great Extent	10
6. Uses email or messaging platforms to provide individualized feedback on student work.	3.59	Great Extent	4.5
7. Incorporates ICT in conducting formative assessments (e.g., digital polls, interactive questions).	3.59	Great Extent	4.5
8. Uses data from digital assessments to adjust and improve instructional strategies.	3.60	Great Extent	3
9. Integrates multimedia feedback (e.g., recorded voice or video comments) for student outputs.	3.46	Great Extent	9
10. Employs ICT tools to communicate assessment results effectively to students and parents.	3.65	Great Extent	1
Composite Mean	3.56	Great Extent	

2. Level of Usefulness of ICT Tools in Improving Students' Academic Performance in terms of:

This section examines the level of usefulness of ICT tools in improving the academic performance of students in Technology and Livelihood Education (TLE) based on the perspectives of teacher respondents. It examines how ICT tools help in improving learning outcomes and in improving teacher efficiency in the teaching and learning process.

2.1 Learning Outcomes

Presented in Table 5 is the level of usefulness of ICT tools in improving students' academic performance in terms of learning outcomes.

The composite mean of 3.75, interpreted as "Highly Useful," specifies that ICT utilization is widely perceived as beneficial in enhancing student learning. This is also a good indication that the use of ICT contributes to clearer understanding, stronger retention, and better use of what has been learned. The high results across all indicators also show that ICT has become an integral part of creating meaningful and outcome-based learning experiences.

Table 5
Level of Usefulness of ICT Tools in Improving Students' Academic Performance
in terms of Learning Outcomes

Indicators	Weighted Mean	Verbal Interpretation	Rank
1. Learners understand TLE theoretical concepts more effectively when engaging with digital resources.	3.81	Highly Useful	1
2. Practical skills are applied more confidently through	3.78	Highly Useful	3.5

technology-based activities.			
3. Knowledge and concepts are retained for longer periods when interactive tools are used.	3.79	Highly Useful	2
4. Critical thinking and problem-solving skills develop during technology-supported activities.	3.74	Highly Useful	6.5
5. Higher scores in written assessments are achieved by utilizing digital learning materials.	3.68	Highly Useful	10
6. Creativity and innovation are demonstrated in completing TLE projects through multimedia applications.	3.78	Highly Useful	3.5
7. Ability to analyze and interpret data accurately improves with technology-assisted exercises.	3.75	Highly Useful	5
8. Mastery of essential procedures and technical skills is enhanced by practicing with interactive platforms.	3.74	Highly Useful	6.5
9. Integration of multiple TLE topics in practical tasks becomes more effective using structured digital exercises.	3.74	Highly Useful	6.5
10. Independent learning and self-directed study habits are strengthened through access to online resources.	3.74	Highly Useful	6.5
Composite Mean	3.75	Highly Useful	

The findings show that ICT tools are “Highly Useful” in improving students’ learning outcomes in TLE. The highest-ranked indicator, better understanding of TLE concepts through digital resources (mean = 3.81), shows that multimedia, simulations, and visual aids make lessons clearer and easier to understand. This is followed by longer knowledge retention through interactive tools (mean = 3.79), which supports different learning styles and improves memory and recall.

Next, confidence in applying practical skills through technology-based activities (mean = 3.78) highlights how ICT helps students practice skills in a guided environment. Several indicators tied at mean = 3.74 show that ICT also strengthens critical thinking, problem-solving, skill mastery, topic integration, and independent learning through interactive and structured digital activities.

The lowest-ranked indicator, improved written assessment scores through digital materials (mean = 3.68), suggests a weaker direct impact since assessments remain mostly paper-based, although ICT still supports preparation and review.

Overall, ICT tools significantly enhance understanding, skill development, and learner independence, making them highly effective in TLE instruction.

2.2 Teacher Efficiency

Table 6 displays the level of usefulness of ICT tools in improving student’s academic performance in terms of teacher efficiency.

As reflected in the composite mean of 3.84, teachers perceived ICT tools to be “Highly Useful” in significantly improving teachers’ effectiveness in performing their instructional

responsibilities. This means that the ICT tools help make the teaching process more efficient, organized, and responsive. Because digital tools support tasks, teachers can use their time more efficiently, reduce repetitive work, and focus more on meaningful student learning. Consequently, teaching becomes clearer and more relevant, resulting in better learning outcomes.

Table 6
Level of Usefulness of ICT Tools in Improving Students' Academic Performance
in terms of Teacher Efficiency

Indicators	Weighted Mean	Verbal Interpretation	Rank
1. Teachers deliver lessons more clearly by incorporating digital resources.	3.88	Highly Useful	1.5
2. Planning and organizing instructional activities become easier with the use of technology.	3.88	Highly Useful	1.5
3. Monitoring and assessing learners' performance is more efficient through ICT tools.	3.85	Highly Useful	5.5
4. Classroom management improves when interactive platforms are utilized.	3.79	Highly Useful	9
5. Feedback to learners becomes faster and more effective with digital applications.	3.76	Highly Useful	10
6. Preparation of instructional materials is streamlined by using multimedia and online resources.	3.85	Highly Useful	5.5
7. Collaboration with colleagues on teaching strategies is enhanced through online tools.	3.84	Highly Useful	8
8. Teachers adapt lessons more quickly to meet learners' needs using technology-supported approaches.	3.86	Highly Useful	4
9. Professional growth and skill development are promoted through access to digital training resources.	3.87	Highly Useful	3
10. Overall teaching performance improves when technology is integrated into daily instruction.	3.85	Highly Useful	5.5
Composite Mean	3.84	Highly Useful	

The findings show that ICT tools are “Highly Useful” in improving teacher efficiency in TLE instruction.

The highest-ranked indicators, clearer lesson delivery through digital resources and easier planning and organization of instructional activities (both mean = 3.88), highlight how ICT improves teaching clarity, reduces preparation time, and helps organize lessons more effectively.

Next, access to digital training resources for professional growth (mean = 3.87) shows that ICT supports continuous teacher development through online training, webinars, and

updated teaching strategies. Collaboration among teachers using online tools (mean = 3.84) further indicates improved sharing of ideas and instructional practices.

Lower-ranked indicators include improved classroom management through interactive platforms (mean = 3.79), which depends on proper use and teacher control, and faster and more effective feedback using digital tools (mean = 3.76), which is less frequently used due to time and effort requirements, although still beneficial.

Overall, ICT significantly enhances teacher efficiency in instruction, planning, collaboration, and professional growth, while its effectiveness in management and feedback depends on proper implementation.

3. Relationship Between the Assessments on the Extent of ICT Tools Utilization and on their Level of Usefulness in Improving Students' Academic Performance

The tables below present the relationship between the extent of ICT tools utilization and their level of usefulness in improving students' academic performance in Technology and Livelihood Education (TLE). It aims to determine whether the degree to which ICT tools are used in instructional practices is significantly associated with how useful these tools are perceived in enhancing learning outcomes and teacher efficiency.

Table 7
Relationship between the Extent of ICT Tools Utilization in terms of Instructional Delivery and on their Level of Usefulness in Improving Students' Academic Performance

Indicators	p-values	Computed R-values	Interpretation	Decision	Verbal Interpretation
Learning Outcomes	.000	.682	Strong Positive Relationship	Reject H_0	Significant
Teacher Efficiency	.000	.575	Strong Positive Relationship	Reject H_0	Significant

The results show a significant positive relationship between ICT tools utilization in instructional delivery and its usefulness in improving academic performance. For learning outcomes, the results ($p = .000$, $r = .682$) indicate a strong relationship, meaning that increased ICT use leads to better student understanding, retention, and application of concepts, resulting in improved academic performance.

Similarly, ICT use in instructional delivery also shows a significant relationship with teacher efficiency ($p = .000$, $r = .575$), indicating that greater ICT integration improves lesson organization, clarity of instruction, and classroom management.

Overall, the findings confirm that higher ICT utilization in teaching is associated with both improved student performance and more effective teaching practices, supported by related studies emphasizing the positive impact of technology integration in education.

Table 8

Relationship between the Extent of ICT Tools Utilization in terms of Student Engagement and on their Level of Usefulness in Improving Students' Academic Performance

Indicators	p-values	Computed R-values	Interpretation	Decision	Verbal Interpretation
Learning Outcomes	.000	.742	Strong Positive Relationship	Reject H_0	Significant
Teacher Efficiency	.000	.571	Strong Positive Relationship	Reject H_0	Significant

The findings reveal a significant positive relationship between ICT tools utilization in terms of student engagement and participation and its usefulness in improving academic performance.

For learning outcomes, the results ($p = .000$, $r = .742$) indicate a strong relationship, showing that higher ICT use leads to better student understanding, retention, and achievement through interactive and collaborative activities.

Similarly, ICT use in student engagement and teacher efficiency also shows a significant positive relationship ($p = .000$, $r = .571$), meaning that increased student participation through ICT helps improve classroom management and makes teaching more efficient.

Overall, the results confirm that ICT-enhanced engagement improves both student learning outcomes and teacher effectiveness by creating a more active, organized, and interactive learning environment.

Table 9

Relationship between the Extent of ICT Tools Utilization in terms of Skills Development and on their Level of Usefulness in Improving Students' Academic Performance

Indicators	p-values	Computed R-values	Interpretation	Decision	Verbal Interpretation
Learning Outcomes	.000	.790	Very Strong Positive Relationship	Reject H_0	Significant
Teacher Efficiency	.000	.668	Strong Positive Relationship	Reject H_0	Significant

The findings show a strong and significant relationship between ICT tools utilization for skills development and its usefulness in improving academic performance.

For learning outcomes, the results ($r = .790$, $p = .000$) indicate a very strong positive relationship, meaning that greater use of ICT in skill development leads to better student performance. ICT supports hands-on learning through simulations, guided exercises, and

interactive activities, which are especially important in TLE for developing both conceptual understanding and technical skills. The effectiveness of ICT also depends on students' digital literacy and ability to use the tools meaningfully.

In terms of teacher efficiency, the results ($r = .668$, $p = .000$) also show a strong positive relationship, indicating that ICT helps teachers deliver clearer instruction, better organize activities, and monitor student progress more effectively. Overall, ICT integration in skills development improves both student learning and teaching efficiency through more structured and practical learning experiences.

Table 10
Relationship between the Extent of ICT Tools Utilization in terms of Assessment and Feedback and on their Level of Usefulness in Improving Students' Academic Performance

Indicators	p-values	Computed R-values	Interpretation	Decision	Verbal Interpretation
Learning Outcomes	.000	.799	Very Strong Positive Relationship	Reject H_0	Significant
Teacher Efficiency	.000	.676	Strong Positive Relationship	Reject H_0	Significant

The results show a significant positive relationship between ICT tools utilization in assessment and feedback and its usefulness in improving academic performance.

Findings indicate that higher ICT use leads to better learning outcomes, as digital tools enable immediate, varied, and more effective feedback. ICT also improves assessment quality by allowing teachers to monitor student progress, use multiple assessment methods, and provide timely responses. Digital tools such as online assessments and e-portfolios also encourage students to track and reflect on their learning.

In terms of teacher efficiency, the results ($r = .676$, $p = .000$) show a strong relationship, meaning ICT helps streamline assessment tasks, improve accuracy in tracking performance, and reduce teachers' workload. This allows teachers to focus more on instruction and student support. Overall, ICT enhances both assessment effectiveness and teaching efficiency through faster, more organized, and data-driven evaluation processes.

4. Challenges Encountered by Teachers in Utilizing ICT Tools

This section identifies the challenges experienced by teachers in using ICT tools in teaching Technology and Livelihood Education (TLE). Despite the benefits of ICT tools in improving instructional delivery, student engagement, skills development, and assessment, there are still barriers that affect its effective use in the classroom.

Table 12 presents the challenges encountered by teachers in utilizing ICT tools in the teaching of TLE. The composite mean of 3.75, interpreted as "Strongly Agree," indicates that

teachers generally experience significant difficulties in integrating ICT into their instructional practices. This indicates that despite the recognition of the importance and benefits of ICT, its proper use remains limited due to various factors such as lack of resources, technical problems, and school situations. More so, this sheds light on the gap between the usefulness of ICT and its actual use in the classroom, caused by the barriers experienced by teachers.

Table 11
Challenges Encountered by Teachers in Utilizing ICT Tools

Indicators	Weighted Mean	Verbal Interpretation	Rank
1. Limited availability of ICT equipment and resources makes it difficult to integrate technology effectively in TLE instruction.	3.82	Strongly Agree	2.5
2. Poor or unstable internet connectivity often disrupts ICT-based classroom activities.	3.82	Strongly Agree	2.5
3. The lack of a designated computer laboratory limits students' opportunities to apply TLE lessons using ICT tools.	3.82	Strongly Agree	2.5
4. Encounters difficulty in preparing ICT-enhanced lessons due to insufficient training or professional development.	3.64	Strongly Agree	10
5. Technical issues such as software errors or device malfunction frequently interrupt class sessions.	3.68	Strongly Agree	8
6. The limited number of available computers or laptops forces students to share devices, affecting learning time and engagement.	3.78	Strongly Agree	5.5
7. Preparing ICT-based instructional materials requires more time and effort compared to traditional methods.	3.66	Strongly Agree	9
8. Some students have limited access to digital devices or internet connection at home, affecting their participation in ICT-related tasks.	3.82	Strongly Agree	2.5
9. The absence of immediate technical support in the school poses a challenge when troubleshooting ICT-related problems.	3.70	Strongly Agree	7
10. Inadequate ICT resources and support systems hinder the successful integration of technology in teaching TLE.	3.78	Strongly Agree	5.5
Composite Mean	3.75	Strongly Agree	

The findings show that teachers strongly agree on several major challenges affecting ICT integration in TLE.

The top challenges (mean = 3.82) include limited ICT equipment and resources, unstable internet connectivity, lack of computer laboratories, and students' limited access to devices and internet at home. These issues highlight serious infrastructure and digital divide problems that hinder consistent ICT use and reduce opportunities for hands-on learning.

Other challenges include technical issues such as system errors or device malfunction (mean = 3.68), which disrupt classes, and time-consuming preparation of ICT-based materials (mean = 3.66), due to teachers' workload and limited preparation time. The lowest-ranked but still significant challenge is insufficient training and professional development in ICT use (mean = 3.64), which affects teachers' confidence and effectiveness in integrating technology.

Overall, the results indicate that ICT implementation in TLE is mainly hindered by resource limitations, connectivity issues, technical problems, workload demands, and inadequate training, all of which reduce the full potential of technology in teaching.

5. Proposed Enrichment Activities to Improve Usefulness of ICT Tools in Teaching TLE

In response to the findings of the study on the use of ICT tools and the challenges experienced by teachers in teaching Technology and Livelihood Education (TLE), Project ELEVATE (Enhancing Learning through Effective and Versatile Application of Technology in Education) was proposed. It aims to enhance the effective and meaningful use of ICT tools in teaching. The program focuses on key aspects such as improving instructional delivery, student engagement, skills development, assessment and feedback, as well as strengthening teacher capacity and ICT tools resources. These are considered important factors in improving students' academic performance. The program also takes into account that TLE is a skill-based subject and that ICT tools can help students understand and use what they learn in real life.

More so, to address these concerns, Project ELEVATE proposed various measures such as ICT training workshops, the use of interactive and digital learning activities, the development of ICT-based instructional materials, and the improvement of assessment and feedback systems. This also includes strengthening infrastructure, providing technical support, and promoting digital equity to ensure that all students have the opportunity to participate. Through this, teachers will be better prepared to use ICT and student learning will be more engaging and meaningful.

Fundamentally, Project ELEVATE aims to improve the quality of teaching and learning in TLE through more effective and innovative use of technology. Through addressing the strengths and challenges identified in the study, it is expected to create a better learning environment where ICT tools is used to the fullest for student success and teacher effectiveness. Furthermore, it encourages continuous development, flexibility, and innovation so that teachers and students are better prepared for the modern era of education.

Discussion

The study found that the extent of ICT tools utilization in teaching TLE was generally to a “Great Extent” across all areas: instructional delivery, student engagement, skills development, and assessment and feedback. Teachers most frequently used ICT for multimedia presentations, video demonstrations, and digital communication, while least used tools included differentiation strategies, advanced design software, and e-portfolios.

In terms of the usefulness of ICT tools in improving academic performance, results showed they were “Highly Useful” in both learning outcomes and teacher efficiency. ICT improved students’ understanding, retention, creativity, and practical skills, while also enhancing lesson delivery, planning, adaptability, and professional development among teachers.

A significant relationship was found between ICT utilization and its usefulness, indicating that higher ICT use is associated with improved student performance and more effective teaching.

However, teachers reported several challenges, including lack of ICT resources, poor internet connectivity, limited access to devices, insufficient technical support, increased workload, and inadequate training.

Based on these findings, the study proposed Project ELEVATE (Enhancing Learning through Effective and Versatile Application of Technology in Education), an enrichment program aimed at strengthening ICT integration in TLE. The program focuses on improving instruction, student engagement, skills development, assessment practices, teacher capability, and access to ICT resources to create a more effective and inclusive learning environment.

Conclusion

Based on the findings of the study, the following conclusions are drawn:

1. ICT tools are utilized to a great extent in teaching Technology and Livelihood Education (TLE) in terms of instructional delivery, student engagement and participation, skills development, and assessment and feedback.
2. ICT tools are assessed to be highly useful in improving students’ academic performance in terms of both learning outcomes and teacher efficiency.
3. There is a significant relationship between the assessment on the extent of ICT tools utilization and on their level of usefulness in improving students’ academic performance.
4. Teachers encounter several challenges in utilizing ICT tools, including limited availability of ICT equipment, poor internet connectivity, lack of technical support, increased workload, and students’ limited access to digital resources.
5. To address the identified challenges and enhance the usefulness of ICT tools in teaching TLE, Project ELEVATE was developed. The proposed enrichment activities focus on improving instructional delivery, student engagement, skills development, assessment practices, teacher capacity, and ICT resource support, thereby promoting more effective and inclusive ICT integration in teaching and learning.

Recommendations

In light of the findings and conclusions of this study, the following recommendations are hereby proposed:

1. The school may review the proposed Project ELEVATE to evaluate its relevance and potential in enhancing the effective use of ICT tools in education.
2. The use of ICT tools in instructional delivery may be further strengthened by incorporating multimedia resources, video demonstrations, and differentiated digital activities that address the diverse needs of students. At the same time, integrating interactive ICT tools can enhance student engagement and promote collaboration by encouraging active participation, communication, and meaningful learning experiences.
3. Teachers may be encouraged to use digital assessment tools to more easily monitor student performance, provide immediate feedback, and assist in instructional decision-making.
4. The administrator may allocate additional funds and coordinate with LGUs or other partners to purchase additional computers, improve internet connectivity, and implement a sound ICT resource-sharing system in schools.
5. Further research may be conducted to explore the effectiveness of ICT tools across different TLE specializations and school contexts

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