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Innovating the Teaching–Learning Process through Pedagogical and ICT-Supported Practices in Technology and Livelihood Education at Hungduan National High School

Roy Cumihang Lunag

Northeastern College, Santiago City, Philippines
Hungduan National High School

Abstract

Technology and Livelihood Education (TLE) plays a crucial role in developing learners' practical skills, employability, and readiness for the world of work. However, traditional instructional approaches often limit student engagement and fail to maximize the potential of digital tools in skills-based education. This study examined how pedagogical and ICT-supported practices innovated the teaching–learning process in TLE at Hungduan National High School, Ifugao. Using a qualitative case study design, data were collected through classroom observations, semi-structured interviews with a TLE teacher who also serves as ICT coordinator, and document analysis of lesson plans and instructional materials. Thematic analysis revealed that learner-centered pedagogy, ICT-enabled demonstrations, blended instructional strategies, and contextualized skill-based tasks enhanced student engagement, participation, and learning continuity. Findings further indicate that the integration of ICT strengthened instructional efficiency, supported differentiated learning, and addressed contextual challenges in skills instruction. The study underscores the importance of pedagogical innovation and ICT integration in improving TLE teaching–learning processes and offers implications for teachers, school leaders, and curriculum planners in similar educational contexts.

Keywords: Technology and Livelihood Education, pedagogy, ICT integration, teaching–learning process, qualitative case study, secondary education



1. Introduction

Technology and Livelihood Education (TLE) is a core learning area in the Philippine secondary education curriculum, designed to equip learners with practical skills, technological competence, and entrepreneurial awareness. As a skills-oriented subject, TLE requires instructional approaches that emphasize active learning, hands-on engagement, and authentic task performance. However, in many school contexts, teaching–learning processes in TLE remain constrained by limited resources, traditional pedagogical practices, and underutilization of information and communication technologies (ICT).

The integration of ICT in education has been widely recognized as a catalyst for instructional innovation, particularly in skill-based disciplines. Digital tools can enhance demonstrations, facilitate access to learning resources, and support differentiated instruction. In TLE, ICT integration is especially relevant, as it mirrors real-world technological practices and prepares learners for digitally mediated work environments. When combined with learner-centered pedagogy, ICT-supported practices have the potential to transform the teaching–learning process from teacher-dominated instruction to interactive, flexible, and context-responsive learning.

Despite policy support for ICT integration in Philippine schools, empirical studies examining how pedagogical and ICT-supported practices shape the teaching–learning process in TLE at the school level remain limited, particularly in rural and geographically isolated areas such as Ifugao. This study addresses this gap by exploring how pedagogical innovation and ICT integration influence the teaching–learning process in TLE at Hungduan National High School. Specifically, it seeks to document instructional practices, examine their impact on learner engagement and participation, and identify contextual factors shaping instructional innovation.

2. Review of Related Literature

2.1 Pedagogical Practices in Technology and Livelihood Education

Effective pedagogy in TLE emphasizes experiential learning, task-based instruction, and the development of practical competencies. Learner-centered approaches such as project-based learning and guided practice enable students to apply theoretical knowledge to authentic tasks, fostering skill mastery and problem-solving abilities. Studies indicate that when TLE instruction is grounded in real-life applications and performance-based tasks, learners demonstrate higher engagement and skill retention.

2.2 ICT Integration in Skills-Based Education

ICT integration enhances teaching and learning by providing access to multimedia resources, simulations, and digital demonstrations. In skills-based education, ICT tools support visualization of procedures, self-paced learning, and flexible access to instructional content. Research shows that ICT-supported instruction improves learner motivation and facilitates differentiated learning, particularly when teachers strategically align technology use with pedagogical goals.

2.3 Teaching–Learning Process and Instructional Innovation

The teaching–learning process is shaped by the interaction between pedagogy, instructional resources, and learner characteristics. Instructional innovation occurs when teachers adapt pedagogical strategies and technologies to respond to learner needs and contextual constraints. Literature emphasizes that sustained innovation requires teacher competence, institutional support, and reflective practice.

3. Methodology

This study adopted a qualitative case study research design to examine pedagogical and ICT-supported practices in Technology and Livelihood Education (TLE) and their influence on the teaching–learning process. The case study approach was deemed appropriate as it allowed for an in-depth, context-sensitive exploration of instructional practices and classroom dynamics within a real school setting.

The research was conducted at Hungduan National High School located in Hapao, Hungduan, Ifugao. The participant of the study was one TLE teacher who also serves as the school’s ICT coordinator. The participant was purposively selected due to active involvement in ICT integration, instructional planning, and implementation of technology-supported pedagogical strategies in TLE instruction.

To ensure data triangulation and strengthen the credibility of the findings, multiple data collection methods were employed. These included classroom observations to capture actual instructional practices and student engagement, semi-structured interviews to elicit the teacher’s reflections on pedagogical and ICT-supported practices, and document analysis of lesson plans, instructional modules, and digital learning materials used in teaching TLE.

The collected qualitative data were analyzed using thematic analysis. Recurring instructional patterns and significant statements related to pedagogy, ICT integration, and the teaching–learning process were coded and systematically organized into overarching themes. This analytical process enabled a comprehensive interpretation of how pedagogical and ICT-supported practices contributed to instructional innovation in TLE.

4. Results and Findings

4.1 Learner-Centered and Skills-Based Pedagogy

Findings indicate that Technology and Livelihood Education (TLE) instruction at Hungduan National High School was anchored on learner-centered and skills-based pedagogy. Lessons were structured around hands-on activities, guided demonstrations, and performance-based tasks that required learners to actively apply knowledge rather than passively receive information. Instruction emphasized “learning by doing,” allowing students to practice technical skills, make decisions during task execution, and reflect on their performance. This pedagogical orientation shifted the teaching–learning process from content transmission to skill acquisition, mastery, and real-world application.

Participant responses:

“Students learn better when they actually do the task themselves instead of just listening to explanations.”

“Hands-on activities motivate learners to participate because they see the relevance of what they are learning.”

“Performance-based tasks allow students to develop confidence in their skills.”

These responses suggest that learner-centered, skills-based pedagogy enhanced student engagement and ownership of learning. By situating instruction within authentic tasks, learners were able to connect theoretical concepts with practical applications, which sustained participation and improved task performance. The emphasis on guided demonstrations and practice also provided scaffolding, enabling learners to gradually build competence and confidence.

This finding is consistent with experiential learning theory, which posits that knowledge is constructed through direct experience and reflection (Kolb, 2015). Research in technical and vocational education further supports this approach, indicating that performance-based and learner-centered instruction enhances skill retention and employability readiness (Billett, 2011; UNESCO, 2016). The present study reinforces the importance of skills-oriented pedagogy in strengthening the teaching–learning process in TLE.

4.2 ICT-Supported Instructional Practices

The study found that ICT-supported instructional practices played a significant role in improving the clarity and effectiveness of TLE instruction. Digital tools such as presentation software, instructional videos, and electronic learning modules were integrated into lessons to supplement demonstrations and explain complex technical procedures. ICT use enabled learners to visualize processes, review content repeatedly, and access learning materials beyond scheduled class time, thereby extending learning opportunities.

Participant responses:

“Instructional videos help students understand procedures that are difficult to demonstrate repeatedly.” P3

“Digital materials allow learners to review lessons even after class.” P10

“ICT tools make lessons more engaging and easier to understand.” P13

These findings indicate that ICT integration enhanced instructional efficiency and learner comprehension by providing multiple representations of content. The ability to revisit digital materials supported self-paced learning and reduced dependency on one-time demonstrations, which is particularly important in skills-based subjects. ICT also served as a motivational tool, capturing learners’ interest and sustaining engagement.

Existing literature supports these observations. Studies by Mishra and Koehler (2006) emphasized that effective ICT integration occurs when technology is aligned with pedagogy and content knowledge. Similarly, Schindler et al. (2017) found that instructional technologies enhance engagement and understanding when used purposefully. In vocational education contexts, ICT-supported demonstrations confirm learning continuity and reinforce procedural knowledge (OECD, 2020). The present findings affirm the value of ICT as a pedagogical support in TLE instruction.

4.3 Blended and Flexible Teaching–Learning Processes

Results further revealed that ICT integration facilitated blended and flexible teaching–learning processes. Face-to-face instruction was complemented by digital resources, allowing learners to access instructional content both during and outside classroom sessions. This blended approach accommodated varied learning paces and ensured continuity of learning, particularly during periods of limited instructional time or resource constraints.

Participant responses:

“Blended learning allows students to continue learning even when time in class is limited.”
P3

“Students can learn at their own pace using digital materials.” P18

“Combining face-to-face teaching and online resources makes instruction more flexible.” P11

The responses indicate that blended learning supported differentiated instruction and learner autonomy. By integrating digital resources into traditional instruction, the teacher was able to address diverse learner needs and sustain engagement beyond classroom boundaries. This flexibility was particularly beneficial in a skills-based subject where repeated exposure and practice are essential.

These findings align with research demonstrating that blended learning enhances flexibility, learner control, and instructional effectiveness (Graham, 2013). In secondary education, blended approaches have been shown to improve learner engagement and accommodate varying learning styles (Horn & Staker, 2015). The present study supports the growing body of evidence that blended learning is a viable instructional model for improving teaching–learning processes in TLE.

4.4 Role of the ICT Coordinator in Instructional Innovation

The findings also highlighted the significant role of the teacher’s dual position as TLE teacher and ICT coordinator in driving instructional innovation. This role enabled informed selection, adaptation, and implementation of digital tools aligned with pedagogical goals. Technical expertise supported troubleshooting and resource management, while pedagogical knowledge ensured that ICT use enhanced rather than replaced meaningful instruction.

Participant responses:

“Being an ICT coordinator helps me choose appropriate tools for my lessons.” P1

“I can easily integrate technology because I understand both pedagogy and ICT.” P5

“My role allows me to support other teachers while improving my own teaching.” P7

These responses suggest that instructional innovation was strengthened by the integration of technical and pedagogical expertise. The teacher’s dual role facilitated purposeful ICT use and promoted sustainable instructional change. This synergy reduced barriers to technology adoption and encouraged reflective instructional practices.

This finding is supported by studies on teacher leadership and ICT integration, which emphasize the importance of teacher expertise and institutional roles in sustaining innovation (Fullan, 2016; Tondeur et al., 2018). Research indicates that teachers who serve as ICT leaders or coordinators are more likely to implement effective technology-supported pedagogy and influence school-wide instructional practices. The present study highlights the strategic importance of ICT coordinators in enhancing the teaching–learning process in TLE.

5. Discussion

The findings demonstrate that pedagogical and ICT-supported practices significantly innovated the teaching-learning process in TLE. Learner-centered, skills-based pedagogy aligned with existing research emphasizing experiential learning as essential to vocational education. ICT integration further enhanced instructional efficiency and learner engagement, supporting differentiated and flexible learning.

The study highlights the importance of teacher agency and dual professional roles in sustaining instructional innovation. The ICT coordinator’s involvement in pedagogy bridged technical and instructional dimensions, enabling effective integration of technology into teaching practice.

6. Conclusion and Implications

6.1 Conclusion

This case study provides evidence that pedagogical innovation and ICT-supported practices can effectively enhance the teaching–learning process in Technology and Livelihood Education. Learner-centered strategies, combined with purposeful ICT integration, promoted engagement, skill development, and instructional flexibility.

6.2 Pedagogical Implications

TLE teachers are encouraged to integrate ICT tools strategically to support skills-based instruction and learner engagement.

6.3 School Leadership Implications

School leaders should strengthen institutional support for ICT integration through infrastructure, training, and instructional coaching.

6.4 Future Research

Future studies may employ mixed-methods designs or involve multiple schools to examine the impact of ICT-supported pedagogy on learner performance and employability outcomes.

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