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Teaching and Learning TLE in an IPED Context: An Action Research on the Challenges and Coping Strategies of Teachers and Students in ICT, AFA, FCS, and IA at Villar Integrated School

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Abstract: This action research examined the teaching and learning of Technology and Livelihood Education (TLE) within an Indigenous Peoples Education (IPED) context at Villar Integrated School. Specifically, the study investigated the challenges encountered by teachers and Indigenous Peoples (IPED) students in the delivery and acquisition of TLE subjects—Information and Communications Technology (ICT), Agri-Fishery Arts (AFA), Family and Consumer Sciences (FCS), and Industrial Arts (IA)—as well as the coping strategies they employed to address these challenges. Grounded in experiential learning theory, sociocultural theory, and the Indigenous Knowledge Systems and Practices (IKSP) framework, the study utilized a qualitative action research design following the Plan–Act–Observe–Reflect (PAOR) cycle. Data were gathered through researcher-made questionnaires and semi-structured interviews with purposively selected TLE teachers and IPED students. The findings revealed that teachers faced significant challenges related to inadequate instructional materials, limited access to electricity and technology, difficulty in contextualizing lessons, language barriers, and irregular student attendance. Similarly, students experienced difficulties in understanding abstract lessons, limited opportunities for hands-on activities, and challenges in balancing school tasks with community and household responsibilities. Despite these constraints, both teachers and students demonstrated adaptive coping strategies, including lesson contextualization using indigenous practices, improvisation of materials, peer-assisted learning, observation-based learning, and strong community support. Based on these findings, action research–based intervention emphasizing culturally responsive instruction, integration of IKSPs, community collaboration, and flexible teaching strategies was developed and implemented. Initial results indicated improved student engagement, participation, and teacher confidence. The study concludes that culturally grounded action research interventions are effective in addressing instructional challenges and enhancing the relevance and quality of TLE instruction in IPED settings.

Keywords: *Technology and Livelihood Education, Indigenous Peoples Education, Action Research, Coping Strategies, Culturally Responsive Teaching.*

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I. INTRODUCTION

➢ *Background*

Technology and Livelihood Education (TLE) is a pivotal component of the K–12 Basic Education Curriculum in the Philippines, as it equips learners with practical, technical, and life skills that underpin productivity, employability, entrepreneurship, and self-reliance. Encompassing four distinct yet interrelated fields—Information and Communications Technology (ICT), Agri-Fishery Arts (AFA), Family and Consumer Sciences (FCS), and Industrial Arts (IA)—TLE fosters the development of competencies essential in both school and community contexts. Through experiential learning, problem-solving, and values formation, TLE contributes significantly to holistic learner development and the acquisition of 21st-century skills.

In Indigenous Peoples Education (IPED) settings, the relevance of TLE is further amplified by the presence of rich cultural traditions, sustainable livelihood systems, and Indigenous Knowledge Systems and Practices (IKSPs). The

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TLE curriculum provides a platform for contextualizing technical skills such as crop production, fishing, food processing, weaving, craftsmanship, carpentry, and basic digital literacy within indigenous community practices. When effectively contextualized, TLE instruction affirms learners' cultural identities while enabling them to adapt traditional knowledge to contemporary socioeconomic demands.

The Department of Education (DepEd) institutionalized IPED through DepEd Order No. 62, s. 2011, which established policy guidelines for inclusive, culture-based education for Indigenous Peoples. This policy was further strengthened by the IPED Curriculum Framework (DepEd, 2016), which emphasizes culturally responsive pedagogy, curriculum contextualization, community participation, and respect for IKSPs. These frameworks require schools and teachers to design learning experiences that are learner-centered, culturally grounded, and responsive to local realities while ensuring alignment with national curriculum standards.

Despite these policy directions, the implementation of IPED principles in classroom practice remains challenging, particularly in skill-based subjects such as TLE. Effective TLE instruction requires adequate tools, equipment, facilities, and teacher expertise, which are often limited in geographically isolated and disadvantaged areas. Additional challenges include linguistic diversity, limited access to electricity and technology, and the need to align school activities with community livelihood cycles. These constraints necessitate adaptive teaching strategies and locally developed instructional materials.

At Villar Integrated School, an IPED-implementing institution, teachers and students encounter instructional, cultural, and resource-related challenges that affect the teaching and learning of TLE. Teachers are expected to integrate indigenous knowledge, contextualize lessons, address diverse learning needs, and ensure mastery of technical competencies across ICT, AFA, FCS, and IA. Students, on the other hand, must balance academic requirements with community responsibilities, often engaging with learning tasks that may not fully reflect their lived experiences. These conditions underscore the need for culturally responsive and flexible instructional approaches.

Action research provides a systematic and reflective process through which teachers can examine classroom challenges, implement context-specific interventions, and evaluate their effectiveness. As a practitioner-based research approach, action research empowers teachers to continuously improve their practice through planning, action, observation, and reflection. In IPED contexts, it encourages collaboration with learners, parents, and community members, ensuring that interventions are culturally appropriate and sustainable.

Guided by these considerations, the present study focuses on the challenges encountered by teachers and students in the teaching and learning of Technology and Livelihood Education in an IPED context at Villar Integrated School. It further examines the coping strategies employed and proposes action research–based intervention aimed at improving instructional practices and learner outcomes. Ultimately, this study seeks to contribute to the enhancement of culturally responsive TLE instruction that supports equity, relevance, and quality education for indigenous learners.

➢ *Statement of the Problem*

This action research aimed to examine the challenges and coping strategies of teachers and students in teaching and learning TLE subjects—ICT, AFA, FCS, and IA—within an IPED context at Villar Integrated School and to design an intervention to improve instructional practices and learning experiences.

- *Specifically, it sought to Answer the Following Questions:*

✓ What challenges do teachers encounter in teaching TLE subjects in an IPED context?
✓ What challenges do IPED students experience in learning TLE subjects?
✓ What coping strategies do teachers employ to address these challenges?
✓ What coping strategies do students use to manage learning difficulties in TLE?
✓ What action research-based intervention can be developed to improved teaching and learning of TLE?

➢ *Significance of the Study*

The findings of this study are significant to the following stakeholders:

- Students. The research supports improved learning experiences by promoting teaching approaches aligned with students' cultural backgrounds and lived realities.
- Teachers. The study provides insights into effective coping strategies and culturally responsive practices that can improve TLE instruction in IPED settings.
- School Administrators. The results may guide school-based support, professional development, and resource allocation for IPED and TLE programs.
- DepEd and Policy Makers. The study offers empirical evidence that may inform policy enhancement, curriculum contextualization, and IPED implementation strategies.
- Future Researchers. The research contributes to the limited body of literature on TLE within IPED contexts and action research in indigenous education.

➢ *Scope and Delimitation*

This study focused on selected Technology and Livelihood Education (TLE) teachers and Indigenous Peoples Education (IPED) students enrolled in ICT, Agri-Fishery Arts (AFA), Family and Consumer Sciences (FCS), and Industrial Arts (IA) at Villar Integrated School. The inquiry was delimited to a qualitative action research design and investigated the challenges, coping strategies, and the effects of a school-based intervention implemented within one academic period.

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The selection of participants followed specific inclusion criteria to ensure that the individuals involved possessed direct and relevant experience with TLE instruction and learning in an IPED context. For TLE teachers, the inclusion criteria required that they:

- Were currently teaching at least one of the TLE components (ICT, AFA, FCS, or IA) during the conduct of the study;
- Had a minimum of one academic year of teaching experience at Villar Integrated School;
- Directly handled classes composed of IPED learners; and
- Were willing to participate and engage in the action research process, including reflection, collaboration, and intervention implementation.

For IPED student participants, the inclusion criteria required that they:

- Were officially enrolled in at least one TLE subject under ICT, AFA, FCS, or IA during the study period;
- Belonged to an Indigenous Peoples (IP) community served by Villar Integrated School;
- Had regular class attendance sufficient to provide meaningful insights into learning challenges and coping strategies; and
- Voluntarily agreed to participate in the study with informed consent from their parents or guardians.

The study was limited to exploring classroom-based and context-specific instructional realities within the school and did not include external factors such as district-level program implementation, long-term community livelihood outcomes, or TLE performance in non-IPED contexts. Furthermore, the findings were bounded by the experiences of the selected participants and the duration of the intervention cycle, and thus are not intended to represent all IPED schools or all TLE learning environments.

➢ *Conceptual Framework*

This study was anchored on the dynamic interaction among three core components: (1) the challenges in teaching and learning TLE within an IPED context, (2) the coping strategies adopted by both teachers and students, and (3) the action research–based intervention developed in response to these conditions. The framework rests on the assumption that instructional and contextual challenges shape the types of coping strategies that emerge, and these strategies, in turn, provide the empirical foundation for crafting a culturally responsive intervention tailored to the needs of indigenous learners and their teachers.

The model further assumes that challenges encountered in skill-based, culturally diverse learning environments—such as resource limitations, linguistic diversity, curriculum contextualization demands, and limited access to tools and facilities—generate adaptive responses from teachers and students. Teachers may implement contextualization techniques, modify lesson delivery, integrate indigenous knowledge, or develop improvised instructional materials. Students may rely on peer assistance, community-based knowledge, hands-on learning, or observation-based strategies. These coping mechanisms collectively provide insight into what forms of intervention are feasible, sustainable, and culturally appropriate.

The action research–based intervention, guided by the Plan–Act–Observe–Reflect (PAOR) cycle, draws directly from these observed challenges and coping processes. The intervention is not imposed, but rather constructed from lived classroom realities, aligning with IPED principles such as community engagement, cultural grounding, and learner-centeredness. The conceptual flow posits that understanding challenges → identifying coping strategies → designing and implementing intervention leads to improved instructional quality, learner engagement, and culturally relevant TLE learning experiences.

Ultimately, the framework emphasizes a cyclical, reflective process in which challenges inform strategies, strategies inform intervention, and intervention leads to enhanced teaching–learning outcomes, thereby contributing to a continuous improvement cycle within the TLE program of Villar Integrated School.

Fig 1 Directional Relationship of Teaching and Learning TLE in an IPED Context

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II. REVIEW OF RELATED LITERATURE AND STUDIES

➢ *Teaching and Learning TLE*

Technology and Livelihood Education (TLE) is designed to equip learners with functional competencies relevant to livelihood, employability, and technical skills essential for 21st-century demands (DepEd, 2016). Foundational studies emphasize that effective TLE instruction requires experiential learning, adequate facilities, and contextualized pedagogies aligned with community practices (Kolb, 1984). Recent research strengthens these findings: Pamor, Legarda, and Bauyot (2024) revealed that TLE teachers in Davao del Norte continue to struggle with insufficient materials, equipment, and specialized skills, which directly limit hands-on learning opportunities—an essential feature of TLE instruction.

Similarly, Caresosa et al. (2025) found that Indigenous Peoples (IP) students pursuing TLE programs in higher education experience difficulties due to limited prior exposure to TLE technical skills, requiring them to develop resilience and alternative strategies to cope with the program's demands. These findings illustrate that the meaningful implementation of TLE remains dependent on contextualized approaches, sufficient resources, and learner support mechanisms.

➢ *Indigenous Peoples Education (IPED)*

The IPED Framework emphasizes culturally grounded instruction, contextualization, and the use of Indigenous Knowledge Systems and Practices (IKSPs) as valid and essential sources of learning (DepEd, 2016). Global and local research establishes that culturally responsive teaching enhances identity affirmation, motivation, and academic engagement among indigenous learners (Gay, 2018; UNESCO, 2017). More recent studies highlight the continued importance of integrating local knowledge in subject areas such as TLE. For example, Buendia (2024) and Alangui et al. (2024) demonstrate that integrating indigenous knowledge in formal instruction enhances students' cultural identity, ecological awareness, and community participation—reinforcing the need for contextualized, place-based learning in IP communities.

Caresosa et al. (2025) also observed that IP students value TLE instruction more when the curriculum reflects their cultural backgrounds and community livelihoods, such as crafting, farming, food processing, and manual trades. This reinforces the argument that culturally aligned pedagogies significantly enhance IP learners' engagement and sense of belonging.

➢ *Challenges in IPED Implementation*

Empirical studies continue to highlight persistent challenges in implementing IPED, especially in skill-based disciplines like TLE. Dulay and David (2020) previously identified issues such as limited resources, language barriers, and insufficient teacher training. Recent findings echo these challenges:

Pamor et al. (2024) reported that TLE teachers face ongoing difficulties related to lack of materials and inadequate training, which hinder effective curriculum delivery in IPED communities. Miole (2023) emphasized gaps between national policy intentions and real classroom practices, pointing to a need for deeper teacher support and community involvement in IPED implementation. World Bank (2024) highlighted persistent inequities in educational access among Indigenous Peoples in the Philippines due to geographic isolation, economic barriers, and systemic marginalization.

Additionally, studies revealed that TLE teachers often work without adequate tools, functional laboratories, or consumables needed to execute skills-based activities—issues even more pronounced in remote IPED schools.

➢ *Coping Strategies of Teachers and Students*

Earlier studies noted that teachers cope by contextualizing lessons, collaborating with peers, and integrating local knowledge into instruction (Banks, 2015), while students rely on peer learning, experiential methods, and sociocultural support systems (Vygotsky, 1978). Newer studies provide updated insights:

Monday (2024) found that teachers utilize community engagement, stakeholder collaboration, and professional development to address challenges in TLE implementation. Pamor et al. (2024) reported that teachers employ coping strategies such as pedagogical diversity, technology integration, and participation in training and seminars to mitigate instructional limitations. Caresosa et al. (2025) found that IP students cope through resilience, family and community support, peer collaboration, and developing strong motivation to persist despite academic hardships.

These coping mechanisms demonstrate the adaptive and resourceful ways both teachers and students navigate instructional, cultural, and material constraints.

➢ *Theoretical Foundations*

This study is grounded in three key theoretical perspectives that collectively inform the examination of teaching and learning processes in Technology and Livelihood Education (TLE) within an Indigenous Peoples Education (IPED) context. First, Experiential Learning Theory by Kolb (1984) posits that learning is most effective when individuals actively engage in concrete experiences, reflect on these experiences, form conceptual understandings, and apply the acquired knowledge in real-world situations. This cyclical learning model aligns with the nature of TLE, which emphasizes hands-on activities, skill performance, and contextualized tasks that mirror authentic community practices. In IPED settings, experiential learning becomes even more relevant as indigenous learners often rely on direct observation, apprenticeship, and participation in cultural and livelihood activities as their primary modes of knowledge acquisition.

Complementing this is Sociocultural Theory by Vygotsky (1978), which underscores the role of social

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interaction, language, and cultural tools in shaping cognitive development. According to Vygotsky, learning is mediated through meaningful collaboration with more knowledgeable others—such as teachers, peers, elders, and community members—and occurs within the Zone of Proximal Development (ZPD). This theory reinforces the need for culturally grounded pedagogy in IPED classrooms, where learners' cultural backgrounds, community practices, and indigenous languages serve as powerful mediators of understanding. In TLE, sociocultural principles are reflected in collaborative learning tasks, mentorship, peer-assisted skill development, and community participation in contextualizing technical competencies.

The third foundation of this study is the Indigenous Knowledge Systems and Practices (IKSP) Framework articulated in DepEd's IPED Curriculum Framework (2016). This framework asserts that indigenous knowledge—encompassing livelihood skills, ecological stewardship, craftsmanship, values, and traditional problem-solving systems—must be recognized as legitimate sources of learning within the basic education curriculum. It emphasizes cultural integrity, community involvement, and contextualization, advocating for the integration of IKSPs in lesson planning, instructional strategies, and assessments. In the context of TLE, the IKSP Framework validates the incorporation of indigenous weaving, farming, fishing, food preservation, craftsmanship, and other community-based practices as essential components of skill development. It also strengthens the alignment between school-based competencies and community realities, ensuring that learning remains culturally relevant, inclusive, and empowering for indigenous learners.

Taken together, these theories offer a robust foundation for understanding the challenges and coping strategies of teachers and students in TLE within an IPED environment. Kolb's experiential learning emphasizes the importance of hands-on, practice-based instruction; Vygotsky's sociocultural theory highlights the role of cultural context, interaction, and collaboration; and the IKSP Framework ensures the cultural responsiveness and relevance of teaching practices. Their convergence supports the design of action research–based interventions that are holistic, culturally grounded, and responsive to the unique learning conditions of indigenous communities.

III. METHODOLOGY

➢ *Research Design*

This study employed a qualitative action research design grounded in the Plan–Act–Observe–Reflect (PAOR) cycle proposed by Kemmis and McTaggart (2014), which positions teachers as reflective practitioners who systematically investigate their own instructional contexts to improve educational outcomes. Action research is particularly appropriate in culturally diverse and resource-challenged learning environments because it allows teacher-researchers to identify real and immediate classroom-based problems, collaboratively design context-specific interventions, and iteratively assess their effectiveness through continuous reflection. This approach aligns with the characteristics of Indigenous Peoples Education (IPED), where pedagogical decisions must be culturally grounded, community-validated, and responsive to the lived realities of learners.

Recent studies affirm the value of action research in supporting teachers' professional growth, enhancing instructional relevance, and fostering culturally responsive practice. Miole (2023) highlights that IPED implementation often suffers from gaps between national policy and classroom realities, requiring localized and participatory research methods to address contextual challenges. Similarly, Monday (2024) found that action research enables TLE teachers to strengthen community engagement, adapt instruction, and develop coping mechanisms that directly respond to the constraints of their school environments. Moreover, action research has been shown to facilitate problem-solving in TLE settings, particularly where shortages of materials, training, and infrastructure hinder effective skills-based instruction (Pamor et al., 2024).

Given the instructional, cultural, and resource-related challenges present in TLE classes at Villar Integrated School, the PAOR cycle provided a systematic structure for the teacher-researcher to collaboratively explore issues with learners, develop a culturally responsive intervention, and evaluate its impact over time. The iterative and reflective nature of the action research process thus made it an appropriate and effective design for improving TLE instruction within the IPED context.

➢ *Research Locale*

The study was conducted at Villar Integrated School, an integrated public basic education institution that implements the Indigenous Peoples Education (IPED) Program under the Department of Education. The school caters primarily to learners belonging to Indigenous Peoples (IP) communities whose cultural practices, languages, and socio-economic conditions shape their educational needs and experiences. As an IPED-implementing school, Villar Integrated School aligns its curriculum, instructional practices, and community engagement activities with the Indigenous Knowledge Systems and Practices (IKSPs) of the local cultural community, consistent with the mandates of DepEd Order No. 62, s. 2011 and the IPED Curriculum Framework.

Situated in a geographically disadvantaged area, the school faces contextual realities typical of many IP-serving institutions, including limited access to technological infrastructure, fluctuating attendance patterns due to livelihood cycles, and resource constraints that affect the implementation of skill-based subjects. Despite these challenges, Villar Integrated School maintains a commitment to providing culturally responsive and relevant education through strong partnerships with parents, tribal elders, community leaders, and local stakeholders.

The school offers the four major components of Technology and Livelihood Education (TLE)—Information and Communications Technology (ICT), Agri-Fishery Arts (AFA), Family and Consumer Sciences (FCS), and Industrial

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Arts (IA). These learning areas are particularly significant in this context because they align closely with the community's traditional livelihood practices such as farming, fishing, weaving, food processing, carpentry, and handicrafts. The offering of TLE subjects provides opportunities to integrate indigenous knowledge with modern technological and entrepreneurial competencies, making learning both practical and culturally grounded.

Given its diverse learner population, limited instructional resources, and the unique culturalcontext of the community it serves, Villar Integrated School provides an appropriate and meaningful setting for investigating the challenges and coping strategies involved in teaching and learning TLE within an IPED framework. The locale offers rich conditions for action research, as teachers continuously develop innovations and contextualized strategies to address the instructional demands and cultural realities of indigenous learners.

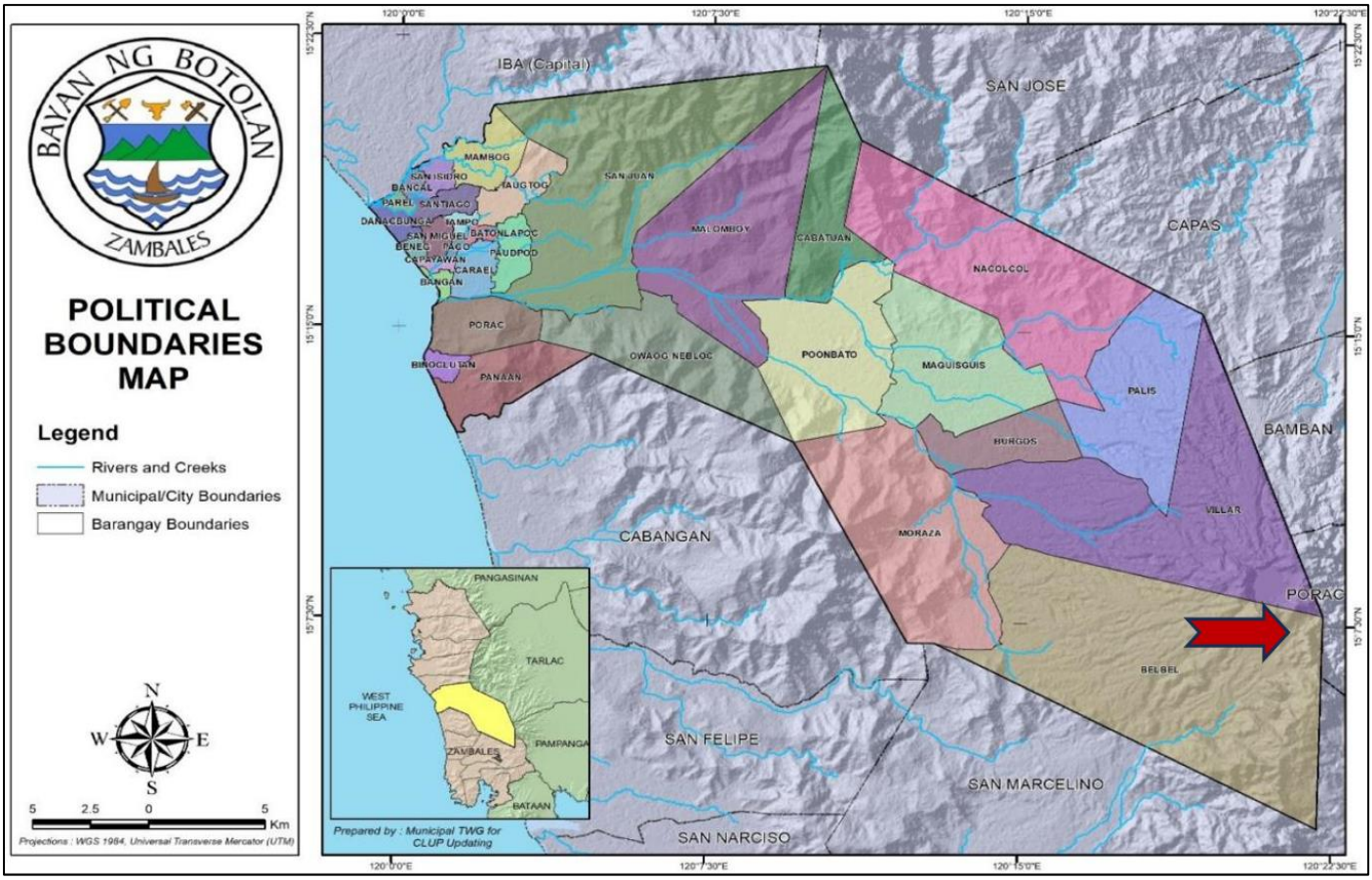

Fig 2 Map of Botolan Showing the Location of Villar Integrated School

➢ *Participants of the Study*

The participants included selected TLE teachers handling ICT, Agri-Fishery Arts (AFA), Family and Consumer Sciences (FCS), and Industrial Arts (IA), as well as purposively chosen IPED students enrolled in these subjects. Purposive sampling was employed to ensure that all participants possessed direct, relevant, and meaningful experience with teaching and learning within the TLE–IPED context. This sampling technique allowed the researcher to intentionally select individuals who were most knowledgeable about the challenges and coping strategies encountered in TLE instruction, thereby enhancing the depth and credibility of the data gathered.

For the teacher participants, selection was based on their current assignment in any of the four major TLE components and their active involvement in teaching IPED learners. Their firsthand experience in managing culturally diverse classrooms, addressing resource limitations, and integrating indigenous knowledge into technical lessons positioned them as key informants capable of providing rich insights into instructional realities.

Meanwhile, student participants were selected from among officially enrolled Indigenous Peoples (IP) learners who had continuous engagement in TLE classes during the conduct of the study. Their perspectives were essential in understanding learner-level challenges, cultural considerations, and coping mechanisms within hands-on and skills-based activities. By focusing on students who regularly participated in class and demonstrated familiarity with TLE tasks, the study ensured that the data reflected authentic learning experiences rather than peripheral observations.

Overall, the purposive sampling approach ensured that the selected teachers and students were not merely representatives of the population, but individuals whose experiences could meaningfully illuminate the complexities

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of teaching and learning TLE in an IPED setting. This strategic selection strengthened the study's ability to capture context-specific insights necessary for developing effective action research–based intervention.

➢ *Research Instrument*

The main research instrument that will be used in this study is a researcher-made questionnaire and interview guide.

The questionnaire will be designed to collect information about the challenges experienced by both teachers and students in teaching and learning TLE subjects. It will also include questions that will help identify the coping strategies they use to address these challenges.

In addition, semi-structured interviews may be conducted with selected participants to gather more detailed responses and deeper insights about their experiences. The interview guide will contain open-ended questions that will allow participants to freely express their thoughts and opinions.

The research instruments will be reviewed and validated by experts or experienced teachers to ensure that the questions are clear, relevant, and appropriate for the objectives of the study.

➢ *Data Gathering Procedure*

The researcher will follow several steps in conducting the data gathering process.

First, the researcher will seek permission from the school principal of Villar Integrated School to conduct the study. After receiving approval, the researcher will coordinate with the TLE teachers to identify the participants of the study.

Second, the researcher will explain the purpose of the study to the participants and request their voluntary participation. The participants will also be assured that their responses will remain confidential and will only be used for research purposes.

Third, the researcher will distribute the questionnaires to the selected teachers and students. Participants will be given enough time to answer the questions honestly and completely.

After the questionnaires are collected, the researcher may conduct interviews with selected participants to gather additional information and clarification regarding their responses.

Finally, all the collected data will be organized, summarized, and prepared for analysis.

➢ *Data Analysis*

The data collected from the questionnaires and interviews will be analyzed using thematic analysis and descriptive analysis.

The researcher will carefully review the responses of the participants and identify common themes related to the challenges encountered in teaching and learning TLE as well as the coping strategies used by teachers and students.

The responses will be grouped and categorized based on similar ideas or patterns. These categories will help the researcher interpret the data and answer the research questions.

The results of the analysis will then be presented through descriptions, summaries, and discussions to provide a clearer understanding of the challenges and coping strategies within the IPED context.

IV. RESULTS AND DISCUSSION

This chapter presents the results and interpretation of the findings gathered from the selected teachers and IPED students regarding the teaching and learning of Technology and Livelihood Education (TLE) subjects—Information and Communications Technology (ICT), Agri-Fishery Arts (AFA), Family and Consumer Sciences (FCS), and Industrial Arts (IA)—within an Indigenous Peoples Education (IPED) context at Villar Integrated School. The discussion of findings is anchored on the data collected through questionnaires and interviews, supported by related literature and studies, and enriched by the researcher's observations and actual teaching experiences.

The presentation of results is organized according to the specific research questions of the study, focusing on (1) the challenges encountered by teachers, (2) the challenges experienced by students, (3) the coping strategies employed by teachers, (4) the coping strategies adopted by students, and (5) the development of an action research–based intervention.

➢ *Challenges Encountered by Teachers in Teaching TLE in an IPED Context*

The data revealed several recurring challenges faced by TLE teachers in delivering instruction within an IPED setting. These challenges were categorized into resource-related, instructional, cultural, and contextual challenges.

One of the most significant challenges identified by teachers was the lack of adequate instructional materials, tools, and equipment necessary for effective TLE instruction. Teachers handling ICT reported limited access to computers, unstable electricity, and lack of internet connectivity, which restricted opportunities for hands-on digital activities. Similarly, teachers in AFA, FCS, and IA cited insufficient tools, consumables, and functional workspaces, making it difficult to conduct practical demonstrations and skill-based activities.

Another major challenge was the difficulty in contextualizing the TLE curriculum to align with indigenous learners' culture and community practices. Teachers expressed that while the curriculum encourages contextualization, limited training and instructional guides specific to IPED made it challenging to consistently integrate

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Indigenous Knowledge Systems and Practices (IKSPs) into lesson delivery. Some teachers reported uncertainty in selecting culturally appropriate examples that would still meet national competency standards.

Language barriers also emerged as a concern. Teachers noted that students often speak indigenous languages at home and have varying levels of proficiency in Filipino and English. This sometimes led to misunderstandings during instruction, especially when introducing technical terms and procedural concepts in TLE.

Additionally, teachers reported challenges related to student attendance and engagement, particularly during peak livelihood seasons. Some learners were absent due to community and family responsibilities, affecting continuity of learning and mastery of skills.

These findings support earlier studies that highlight persistent difficulties in IPED implementation, particularly in skill-based subjects like TLE, where resources, teacher preparation, and contextual realities intersect (Pamor et al., 2024; Miole, 2023).

- *Challenges Experienced by IPED Students in Learning TLE*

The findings revealed that IPED students also encounter multiple challenges that affect their learning of TLE subjects. These challenges were grouped into learning, resource, and socio-cultural factors.

Many students reported experiencing difficulty in understanding lessons, particularly those that relied heavily on textbooks, abstract explanations, or unfamiliar terminologies. Students expressed that lessons became more challenging when they could not relate the content to their everyday experiences or community practices.

Limited access to learning resources was another concern raised by students. Some learners reported that the lack of tools, materials, and equipment prevented them from fully participating in hands-on activities, which are essential in TLE learning. In ICT, students noted limited time for computer use due to the small number of available units.

Students also shared challenges related to balancing school requirements and community responsibilities. Participation in farming, household chores, or cultural obligations sometimes affected their ability to complete assignments, attend classes regularly, or focus on skill development.

Despite these challenges, students expressed appreciation for TLE subjects when lessons were aligned with their culture and community livelihood. This finding reinforces research emphasizing that culturally relevant instruction enhances motivation and engagement among indigenous learners (Gay, 2018; Alangui et al., 2024).

- *Coping Strategies Employed by Teachers*

In response to the challenges encountered, teachers demonstrated various adaptive coping strategies to sustain effective TLE instruction in the IPED context.

One common strategy was lesson contextualization using local materials and indigenous practices. Teachers reported integrating community-based examples such as traditional farming methods, food preparation, weaving, and craftsmanship into lessons to make learning more meaningful and relatable.

Teachers also employed improvisation of instructional materials, using locally available resources as substitutes for unavailable tools and equipment. This included recycled materials, indigenous tools, and community-shared resources to support hands-on learning.

Collaboration with colleagues and community members emerged as another important strategy. Teachers sought assistance from fellow teachers, parents, and local experts to enhance lesson delivery and validate the cultural appropriateness of activities.

Additionally, teachers practiced flexibility in instruction, adjusting schedules, pacing lessons, and using differentiated approaches to accommodate students who had irregular attendance or varied learning needs.

These coping strategies reflect teachers' resilience and commitment to culturally responsive education, aligning with findings that emphasize teacher adaptability as a key factor in successful IPED implementation (Monday, 2024; Banks, 2015).

- *Coping Strategies Used by IPED Students*

The data showed that IPED students also developed coping strategies to manage challenges in learning TLE.

One prevalent strategy was peer-assisted learning. Students frequently relied on classmates for guidance, sharing skills, and collaborating during activities. This social approach to learning aligns with indigenous practices of communal knowledge sharing.

Students also utilized observation-based and experiential learning, learning by watching demonstrations, imitating procedures, and practicing repeatedly when given opportunities. Some students reported learning skills from family members and elders at home, which they applied during TLE activities in school.

Motivation and resilience were frequently mentioned by students as personal strategies. Despite challenges, many expressed determinations to learn TLE skills because they saw them as useful for future livelihood and community contribution.

Family and community support also played a significant role in helping students cope, reinforcing the importance of

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sociocultural support systems in indigenous education (Vygotsky, 1978).

➢ *Action Research–Based Intervention Developed*

Based on the identified challenges and coping strategies, the study developed action research–based intervention anchored on the Plan–Act–Observe–Reflect (PAOR) cycle. The intervention focused on strengthening culturally responsive TLE instruction through:

- Contextualized lesson planning integrating IKSPs
- Use of improvised and locally sourced instructional materials
- Collaboration with community members and elders
- Flexible scheduling and differentiated instruction strategies

Initial observations during the implementation of the intervention indicated improved student engagement, increased participation in activities, and enhanced teacher confidence in delivering culturally grounded lessons. Teachers reported that contextualized instruction made lessons more meaningful, while students showed improved interest and appreciation of TLE subjects.

These results confirm that action research serves as an effective approach for addressing classroom-based challenges in IPED settings by grounding interventions in lived experiences and reflective practice.

➢ *Summary of Findings*

Overall, the findings revealed that while significant challenges exist in teaching and learning TLE within an IPED context—particularly related to resources, language, and contextualization—both teachers and students demonstrate adaptive coping strategies rooted in culture, collaboration, and resilience. The action research–based intervention provided a practical and culturally responsive pathway for improving instructional practices and enhancing learning experiences in TLE.

V. SUMMARY OF FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

This chapter presents the summary of the major findings of the study, the conclusions drawn based on the results, and the recommendations proposed by the researcher. These are grounded on the data gathered from teachers and IPED students, analyzed in relation to the research questions, relevant theories, and existing literature on Technology and Livelihood Education (TLE) and Indigenous Peoples Education (IPED).

A. Summary of Findings

Based on the analysis and discussion of results presented in Chapter 4, the following key findings were established:

➢ *Challenges Encountered by Teachers*

TLE teachers in Villar Integrated School encountered multiple challenges in teaching ICT, AFA, FCS, and IA within an IPED context. These challenges included inadequate instructional materials, tools, and equipment; limited access to electricity and digital resources; difficulty in contextualizing lessons using Indigenous Knowledge Systems and Practices (IKSPs); language barriers between teachers and learners; and irregular student attendance due to community and livelihood responsibilities.

➢ *Challenges Experienced by IPED Students*

IPED students faced difficulties in understanding lessons that were abstract, textbook-based, or not closely related to their lived experiences. They also experienced limited participation in hands-on activities due to a lack of materials and equipment. Balancing school requirements with household, livelihood, and cultural responsibilities further affected their learning and engagement in TLE subjects.

➢ *Coping Strategies Employed by Teachers*

Teachers adopted adaptive and resourceful coping strategies to address instructional challenges. These included contextualizing lessons using local examples and indigenous practices, improvising instructional materials from locally available resources, collaborating with fellow teachers and community members, and practicing flexibility in lesson delivery and scheduling. These strategies helped sustain instruction despite material and contextual constraints.

➢ *Coping Strategies Used by IPED Students*

Students demonstrated resilience and adaptability by engaging in peer-assisted learning, observation-based and experiential learning, and applying skills learned from family members and elders. Motivation to acquire practical skills for future livelihood and strong family and community support also helped students cope with learning challenges in TLE.

➢ *Action Research–Based Intervention Developed*

An action research–based intervention anchored on the Plan–Act–Observe–Reflect (PAOR) cycle was developed and implemented. The intervention emphasized culturally responsive lesson planning, integration of IKSPs, use of improvised materials, collaboration with community members, and flexible instructional strategies. Initial implementation resulted in improved student engagement, increased participation, and enhanced teacher confidence in delivering contextualized TLE instruction.

B. Conclusions

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

- Teaching and learning TLE in an IPED context is significantly affected by resource limitations, cultural considerations, language diversity, and contextual realities unique to indigenous communities.
- Teachers and students are not passive recipients of these challenges; rather, they demonstrate resilience, creativity, and adaptability through culturally grounded coping strategies.
- Contextualization and integration of Indigenous Knowledge Systems and Practices are essential in making

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TLE instruction relevant, meaningful, and engaging for IPED learners.

- Action research is an effective approach for addressing classroom-based challenges in IPED settings, as it allows teachers to design, implement, and reflect on interventions rooted in actual teaching and learning conditions.
- A culturally responsive, community-engaged, and flexible instructional approach strengthens both teaching effectiveness and student learning outcomes in TLE within an IPED framework.

C. Recommendations

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

➢ *For Teachers*

- Continue to strengthen the integration of Indigenous Knowledge Systems and Practices in TLE lesson planning and implementation.
- Engage in collaborative planning with colleagues, parents, and community elders to enhance the cultural relevance of instruction.
- Conduct continuous classroom-based action research to address emerging teaching and learning challenges in IPED settings.

➢ *For School Administrators*

- Provide sustained support for TLE and IPED programs through school-based professional development, instructional supervision, and resource mobilization.
- Encourage partnerships with local communities, stakeholders, and agencies to supplement materials, tools, and learning spaces for TLE.
- Support flexible scheduling and learner-centered policies that consider the socio-cultural realities of IPED learners.

➢ *For the Department of Education and Policy Makers*

- Strengthen capacity-building programs for teachers on culturally responsive pedagogy, IPED implementation, and TLE contextualization.
- Allocate additional resources, equipment, and infrastructure support to IPED-implementing schools, particularly in geographically isolated areas.
- Review and enhance curriculum guides to provide clearer frameworks for integrating IKSPs in skill-based subjects like TLE.

➢ *For Students and the Community*

- Encourage strong family and community involvement in supporting learners' skill development both in school and at home.
- Continue valuing education alongside indigenous practices by viewing TLE skills as tools for community sustainability and economic empowerment.

➢ *For Future Researchers*

- Conduct similar studies in other IPED-implementing schools to validate and expand the findings of this research.
- Explore quantitative or mixed-method approaches to measure the long-term impact of culturally responsive TLE interventions on learner performance and livelihood outcomes.
- Investigate other key learning areas within IPED contexts to further strengthen inclusive and equitable education practices.

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RESEARCH QUESTIONNAIRE

➢ *Title of the Study:*
Teaching and Learning TLE in an IPED Context: An Action Research on the Challenges and Coping Strategies of Teachers and Students in ICT, AFA, FCS, and IA at Villar Integrated School.

➢ *Part I – Profile of Respondents*

- *Teacher-Respondents*
  Please check (✓) the appropriate answer.

✓ TLE Component handled:

- ICT
- Agri-Fishery Arts (AFA)
- Family and Consumer Sciences (FCS)
- Industrial Arts (IA)

✓ *Number of Years Teaching in Villar Integrated School:*

- 1–3 years
- 4–6 years
- 7 years and above

✓ *Have you Attended any IPED-Related Training or Seminar?*

- Yes
- No

- *Student-Respondents*

✓ Grade Level: _____
✓ TLE Subject currently enrolled in:

- ICT
- Agri-Fishery Arts (AFA)
- Family and Consumer Sciences (FCS)
- Industrial Arts (IA)

➢ *Part II – Challenges Encountered in Teaching and Learning TLE*

- *For Teachers*

✓ Direction: Please rate the following statements based on your experience using the scale below:

5 – Strongly Agree
4 – Agree
3 – Neutral
2 – Disagree
1 – Strongly Disagree

No.	Statement	5	4	3	2	1
1	There are insufficient tools and equipment for effective TLE instruction.	☐	☐	☐	☐	☐
2	Limited access to electricity and technology affects my TLE teaching.	☐	☐	☐	☐	☐
3	I find it challenging to contextualize TLE lessons for IP learners.	☐	☐	☐	☐	☐
4	Language differences make it difficult for students to understand lessons.	☐	☐	☐	☐	☐
5	Irregular student attendance affects continuity of TLE learning.	☐	☐	☐	☐	☐

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- *For Students*

✓ Direction: Rate the following statements honestly.

No.	Statement	5	4	3	2	1
1	I find some TLE lessons difficult to understand.	☐	☐	☐	☐	☐
2	I lack materials or tools needed for hands-on TLE activities.	☐	☐	☐	☐	☐
3	TLE lessons are sometimes not related to my community experience.	☐	☐	☐	☐	☐
4	Household or community duties affect my TLE learning.	☐	☐	☐	☐	☐
5	I have difficulty understanding lessons due to language differences.	☐	☐	☐	☐	☐

➢ *Part III – Coping Strategies*

- *Coping Strategies of Teachers*

No.	Statement	5	4	3	2	1
1	I use local and indigenous examples when teaching TLE.	☐	☐	☐	☐	☐
2	I improvise instructional materials using available resources.	☐	☐	☐	☐	☐
3	I collaborate with other teachers and community members.	☐	☐	☐	☐	☐
4	I adjust my teaching strategies to suit student needs.	☐	☐	☐	☐	☐
5	I practice flexibility in scheduling and lesson pacing.	☐	☐	☐	☐	☐

- *Coping Strategies of Students*

No.	Statement	5	4	3	2	1
1	I learn TLE skills by observing demonstrations.	☐	☐	☐	☐	☐
2	I ask help from classmates when I don't understand lessons.	☐	☐	☐	☐	☐
3	I learn TLE skills from my family or elders at home.	☐	☐	☐	☐	☐
4	I try my best to continue learning despite difficulties.	☐	☐	☐	☐	☐
5	My family supports my learning in TLE.	☐	☐	☐	☐	☐

➢ *Part IV – Open-Ended Questions*

- *For Teachers*

✓ What are the major challenges you experience in teaching TLE in an IPED context?
✓ What strategies do you find most effective in addressing these challenges?
✓ What support or intervention do you suggest to improve TLE teaching in IPED schools?

- *For Students*

✓ What difficulties do you experience in learning TLE subjects?
✓ How do you cope with these difficulties?
✓ What suggestions can you give to improve TLE learning in your school?