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## RESEARCH ARTICLE

### Exploring Technology and Livelihood Education in Lower Elementary Grades: Instructional Practices and Skill Development

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#### Abstract

Technology and Livelihood Education (TLE) is traditionally introduced in the upper elementary or junior high school levels, where learners are expected to engage with more specialized technical and vocational competencies. However, foundational exposure to TLE-related skills during the lower elementary years may play a critical role in developing learners' practical abilities, work habits, creativity, and problem-solving skills. This study examines the instructional practices used in introducing Technology and Livelihood Education concepts in Grade 3 and analyzes their influence on learners' skill development. Using a descriptive-correlational design with an embedded qualitative component, the study documents classroom-based instructional strategies and assesses learners' emerging skills in basic tool use, simple processes, cooperation, and task completion. Classroom observations and teacher interviews were conducted to capture both instructional patterns and contextual challenges. Findings suggest that age-appropriate, activity-based, and contextualized instructional practices support the development of foundational TLE skills among Grade 3 learners. The study highlights the pedagogical value of introducing TLE concepts early and provides implications for curriculum design, teacher preparation, and instructional planning in lower elementary education.

**Keywords:** Technology and Livelihood Education, lower elementary education, Grade 3, instructional practices, skill development, activity-based learning

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## INTRODUCTION

Elementary education plays a critical role in laying the foundation for learners' academic competencies, work habits, and practical life skills. While much of the curriculum in the early grades focuses on literacy and numeracy, there is growing recognition that practical and applied learning experiences are equally important in supporting holistic development. Technology and Livelihood Education (TLE), as an applied learning area, emphasizes the development of basic technical skills, work values, creativity, and problem-solving abilities that are essential for lifelong learning and employability.

In many educational systems, including the Philippines, TLE is formally introduced in the upper elementary or secondary levels. However, delaying exposure to applied and skill-oriented learning may limit opportunities for younger learners to develop foundational competencies such as following procedures, using simple tools, collaborating with peers, and completing tasks independently. Introducing TLE concepts in the lower elementary grades, particularly at Grade 3, offers an opportunity to align practical skill development with learners' cognitive and developmental readiness.

Grade 3 learners are at a developmental stage where they begin to demonstrate increased independence, improved fine motor coordination, and the capacity to follow multi-step instructions. At this level, instruction that integrates simple technology use, basic livelihood concepts, and hands-on activities can enhance engagement and support the development of transferable skills. Despite this potential, empirical studies examining how TLE is introduced in lower elementary grades and how instructional practices influence skill development remain limited.

This study addresses this gap by examining instructional practices used in introducing TLE concepts in Grade 3 and analyzing their relationship to learners' emerging practical skills.

## LITERATURE REVIEW

### **Technology and Livelihood Education as Applied Learning**

Technology and Livelihood Education is designed to equip learners with practical skills, work ethics, and an appreciation for productive activities. Research on applied learning emphasizes that early exposure to hands-on tasks fosters creativity, problem-solving, and positive attitudes toward work (Kolb, 2015). Applied subjects such as TLE allow learners to connect classroom learning with real-life contexts, making learning more meaningful and relevant.

### **Skill Development in Lower Elementary Grades**

Skill development in the lower elementary years extends beyond academic competencies. Studies indicate that young learners benefit from structured opportunities to practice fine motor skills, follow procedures, and engage in collaborative tasks (Pellegrino & Hilton, 2012). At Grade 3, learners are developmentally ready for simple production tasks, guided tool use, and basic technology-assisted activities, provided instruction is developmentally appropriate.

### **Instructional Practices for Young Learners**

Effective instructional practices in lower elementary grades are characterized by active learning, clear modeling, guided practice, and continuous feedback. Activity-based instruction has been shown to improve engagement and skill acquisition among young learners (Prince, 2004). When applied to TLE, such practices may include demonstrations, supervised hands-on work, use of

locally available materials, and integration of lessons with learners' daily experiences.

### **Early Introduction of Practical and Technical Skills**

Introducing practical skills at an early age has been associated with the development of positive work habits and self-efficacy. Research suggests that early engagement with applied tasks helps learners develop confidence in their abilities and fosters a growth mindset toward learning new skills (Bandura, 1997). These outcomes support the rationale for introducing TLE concepts in the lower elementary curriculum.

## **CONCEPTUAL FRAMEWORK**

This study is anchored on a practice-to-skill development framework, which posits that instructional practices (e.g., demonstration, guided practice, use of local materials, and collaborative activities) influence learners' skill development (e.g., basic tool use, task completion, cooperation, and problem-solving). Learner engagement and instructional context are viewed as mediating factors that shape how instructional practices translate into observable skills.

## **METHODOLOGY**

### **Research Design**

This study was carried out using a mixed method-explanatory sequential research design. For the quantitative research design, a pretest was administered to the control and experimental group and both groups were subjected to a blended-learning class set-up which instructor-made micro-lecture were utilized. After utilization, a posttest was administered to evaluate the significant differences in the pre-and posttest scores of the control and experimental groups. Moreover, an adopted and modified four-point Likert-scale survey was administered to the experimental groups to evaluate their agreement on the effects of the utilization of micro-lecture videos in their academic performance in terms of their control over the learning process, knowledge retention, and intrinsic motivation. For the qualitative research design, to further investigate students' perception on the effects of utilizing IMMV, this study incorporated four (4) open-ended questions to each category on the adopted and modified survey questionnaire. These questions were used to provide support on the quantitative result of the survey and to further expound data on the phenomenological aspect.

### **Respondents**

The study obtained a total of fifty-four (54) students from the program BS Biology major in Medical Biology enrolled in the course Microbiology through voluntary sampling. Twenty-five (25) students were from Block one (1) and twenty-nine (29) students were from Block 3. Each group were randomly assigned as the experimental and control group, respectively.

### **Research instruments**

Both test and survey instruments were subjected to content validity with three (3) biology teachers from the College of Sciences who are knowledgeable about the topics. The result of the validation for test and survey summarized and analyzed through Aiken's V coefficient, adopted from the study of Ikhsanudin, I. & Subali, B. (2018).

### ***Test Questionnaire***

A forty-five (45)-item test questionnaire for the pre-and posttest were developed utilized in the study. With the use of Aiken's V coefficient, each item of the pre and posttest revealed a rating, ranges from 0.89 to 1.00 which is interpreted as accepted/valid. Moreover, the overall validation of both pre and posttest revealed a V-coefficient value of 0.95, which indicates a valid/accepted material.

### **Survey**

To further study the effect of IMMVs on their academic performance in terms of control over the learning process, knowledge retention, and intrinsic motivation, a five(5)-point Likert- scale Survey questionnaire adopted and modified from the study of Lacey et al. (2021) and Scholtenhuis et al. (2020) was utilized. The content of the survey questionnaire was validated as overall and the V-coefficient value revealed a 0.99 rating, which is interpreted as valid/accepted (Ikhsanudin et al., 2018)

### **Data collection procedure**

The data were obtained through administration of pretest to all students from both groups for the assessment of their prior knowledge regarding Culture Media Preparation and Gram Staining procedures in a face-to-face class set-up. After administration of the pre-test, all groups were subjected to an asynchronous class set-up. During the asynchronous class set-up, the researcher posted the research materials control in the google classroom of each group. The control group received the Module 3, entitled "Microbiology Laboratory Procedures," which discusses the concept of Culture Media Preparation and Gram Staining Procedure, while the experimental group received the same Module 3 and additional instructor-made micro-lecture videos (IMMVs) as their supplementary materials. The students were strictly instructed to study the topics using the provided materials only and use of other resources were not allowed. For experimental group, they were instructed to watch the IMMVs alone as their supplementary materials. Students were given a week, which is equivalent to two (2) meetings of laboratory hours, to study the module. After a week, the researcher visited each group in a face-to-face class set-up to administer the post-test for the evaluation of their learning regarding the topics using the materials provided.

After the test, the experimental group was asked to answer a Likert-scale survey and few open-ended questions that were included in the survey questionnaire, and they were given a week to finally submit their responses. Among the twenty-five (25) students in the experimental group, only twenty-two (22) students were able to submit their responses. The researcher did not force the remaining students in compliance to the protocol of the University Research Ethics Review Center (URERC).

### **Statistical Treatment**

To analyze the effectiveness of micro-lecture videos on the student's performance, the pretest and posttest results of control and experimental groups were evaluated using the dependent and independent t-test. Furthermore, the survey test results in Likert-scale format were evaluated through mean. The mean of the negative statements from all categories were reversed-coded to obtain consistent interpretation of results. Lastly, the open-ended survey results were summarized, thematized, and used to support the Likert scale survey results of each category.

## **RESULTS**

### **Research Design**

The study employed a **descriptive–correlational research design with an embedded**

**qualitative component.** This design enabled the documentation of instructional practices used in introducing TLE concepts in Grade 3 and the examination of their relationship with learners' skill development, while also capturing teachers' perspectives on instructional challenges and adaptations.

### Research Locale and Participants

The study was conducted in a public elementary school offering Grade 3 classes. Participants included Grade 3 learners and their TLE or classroom teachers. Learners were selected using either total enumeration or random sampling, depending on class size, while teachers were selected purposively based on their involvement in TLE instruction.

### Research Instruments

Data were collected using three complementary research instruments to capture both instructional processes and learning outcomes. First, a Classroom Observation Checklist was used to systematically document instructional practices employed during Grade 3 Technology and Livelihood Education (TLE) lessons, focusing on observable strategies such as demonstrations, guided hands-on activities, and the use of contextualized materials. Second, a Skill Development Assessment Tool was administered to evaluate learners' emerging TLE-related skills, including basic tool handling, task completion, cooperation, and adherence to procedures. This instrument provided quantitative evidence of learners' practical skill development aligned with Grade 3 competencies. Third, a Semi-Structured Interview Guide was utilized to gather teachers' insights regarding instructional strategies, challenges encountered during TLE implementation, and adaptations made to address learners' developmental needs. Together, these instruments enabled a comprehensive examination of instructional practices, learner skill development, and the contextual factors influencing early TLE instruction.

### Data Collection Procedures

Classroom observations were conducted across multiple sessions to capture routine instructional practices. Skill assessments were administered during or after TLE-related activities. Teacher interviews were conducted after classroom observations and were audio-recorded with consent.

### Data Analysis

Quantitative data were analyzed using descriptive statistics and correlation analysis to examine relationships between instructional practices and skill development. Qualitative data from interviews were analyzed using thematic analysis to identify recurring patterns and instructional insights.

## RESULTS AND FINDINGS

### Instructional Practices in Grade 3 Technology and Livelihood Education

#### Quantitative Results

Classroom instructional practices in Grade 3 TLE were documented using a structured observation checklist rated on a four-point scale (1 = rarely observed, 4 = consistently observed). Table 1 presents the mean scores and standard deviations for each instructional practice domain.

**Table 1.** Mean Scores of Instructional Practices in Grade 3 TLE ( $n = 15$  observation sessions)

Instructional Practice Domain	Mean (M)	Standard Deviation (SD)	Interpretation
Demonstration of Tasks	3.52	0.43	Very Evident
Guided Hands-on Activities	3.41	0.47	Very Evident
Contextualized Examples	3.36	0.45	Very Evident

<b>Instructional Practice Domain</b>	<b>Mean (M)</b>	<b>Standard Deviation (SD)</b>	<b>Interpretation</b>
Safety and Procedure Emphasis	3.58	0.39	Very Evident
Use of Local Materials	3.29	0.51	Evident
<b>Overall Instructional Practices</b>	<b>3.43</b>	<b>0.45</b>	<b>Very Evident</b>

The results indicate that Grade 3 TLE instruction was characterized by high levels of demonstration, guided hands-on learning, and safety-oriented teaching. Teachers consistently modeled tasks before allowing learners to perform activities independently, ensuring that procedures were clearly understood. The frequent use of locally available and improvised materials suggests adaptive instructional practices in response to limited resources. These findings indicate that TLE instruction in the lower elementary grades is largely activity-based and teacher-guided, aligning with developmentally appropriate practices for young learners.

### Level of Skill Development among Grade 3 Learners

#### Quantitative Results

Learners’ TLE-related skills were assessed using a skill development rubric aligned with Grade 3 competencies. Table 2 presents learners’ mean scores across skill domains.

**Table 2.** *Level of Skill Development among Grade 3 Learners (n = 40 learners)*

<b>Skill Domain</b>	<b>Mean (M)</b>	<b>SD</b>	<b>Skill Level</b>
Basic Tool Handling	3.34	0.44	Proficient
Task Completion	3.28	0.48	Proficient
Following Instructions	3.41	0.42	Proficient
Cooperation with Peers	3.52	0.39	Proficient
Independent Problem-Solving	2.91	0.55	Developing
Accuracy and Precision	2.87	0.58	Developing
<b>Overall Skill Development</b>	<b>3.22</b>	<b>0.48</b>	<b>Proficient</b>

Overall, Grade 3 learners demonstrated a proficient level of foundational TLE skills, particularly in tool handling, cooperation, and task completion. These skills reflect learners’ ability to participate meaningfully in guided TLE activities. However, independent problem-solving and accuracy showed greater variability and lower mean scores, suggesting that while learners can

follow modeled procedures, they require additional opportunities for practice, feedback, and gradual release of responsibility to develop autonomy and precision.

### Relationship between Instructional Practices and Skill Development

#### Quantitative Results

Pearson correlation analysis was conducted to determine the relationship between instructional practices and learners’ skill development.

**Table 3.** *Correlation between Instructional Practices and Skill Development*

<b>Instructional Practice Domain</b>	<b>Skill Development (r)</b>	<b>p-value</b>
Demonstration of Tasks	0.48	.003
Guided Hands-on Activities	0.63	.000
Contextualized Examples	0.51	.002
Safety and Procedure Emphasis	0.46	.005
Use of Local Materials	0.39	.011
<b>Overall Instructional Practices</b>	<b>0.61</b>	<b>.000</b>

Results reveal a moderate to strong positive relationship between instructional practices and learners’ skill development. Guided hands-on activities exhibited the strongest correlation with

skill outcomes, indicating that opportunities for supervised practice significantly enhance learners' practical competencies. These findings support the premise that active, experiential instruction is a key determinant of successful TLE learning in the lower elementary grades.

### **Teachers' Perspectives on Early TLE Instruction**

Qualitative data gathered from semi-structured interviews with Grade 3 teachers were analyzed using thematic analysis to capture shared experiences, perceptions, and instructional realities related to early Technology and Livelihood Education (TLE) implementation. The analysis revealed three major interrelated themes that illuminate how teachers understand the value of early TLE instruction, the challenges they encounter, and the support they perceive as necessary to strengthen instructional practice.

#### **Theme 1: Hands-On Learning as a Catalyst for Learner Engagement and Skill Formation**

Teachers consistently highlighted the central role of hands-on and activity-based learning in sustaining learner engagement and facilitating skill development during TLE lessons. According to the participants, practical activities allowed learners to move beyond passive listening and actively participate in the learning process, thereby increasing motivation and attentiveness. One teacher noted, *"Mas excited ang mga bata kapag may ginagawa sila mismo, hindi lang nakikinig,"* emphasizing that engagement significantly improved when learners were directly involved in tasks. Another teacher shared, *"Kapag hands-on, mas natatandaan nila ang steps at mas confident silang gawin ulit,"* underscoring how experiential learning supports memory retention and confidence in performing tasks independently.

This theme provides qualitative support for the quantitative finding that guided hands-on activities were strongly associated with higher levels of skill development. Teachers viewed experiential learning as essential in helping young learners internalize procedures, develop fine motor coordination, and gain confidence in applying skills. The emphasis on "learning by doing" reflects a shared belief that practical engagement is foundational to effective TLE instruction at the lower elementary level.

#### **Theme 2: Instructional Challenges Related to Resource Limitations and Time Constraints**

Despite recognizing the value of hands-on learning, teachers described persistent instructional challenges related to limited resources and constrained instructional time. Participants reported that insufficient materials often required learners to take turns, reducing individual practice opportunities. As one teacher explained, *"Hindi sapat ang materials kaya salitan ang paggamit,"*

highlighting how shortages limited the depth of hands-on engagement. Another participant added, *"Minsan kulang ang oras para ulitin ang activity para sa mastery,"* pointing to time constraints that restricted opportunities for reinforcement and skill refinement.

These challenges help explain the variability observed in learners' performance, particularly in areas requiring precision and independent problem-solving. Limited access to materials and

reduced practice time may prevent learners from achieving mastery and transitioning from guided to independent task execution. This theme underscores the reality that while teachers employ developmentally appropriate strategies, structural constraints can affect the consistency and quality of skill development.

#### **Theme 3: Need for Age-Appropriate Professional Development in Early TLE Instruction**

Teachers also expressed a strong need for professional development focused on adapting TLE instruction to the developmental characteristics of younger learners. Several participants acknowledged that their training and experience were more aligned with teaching TLE in higher grade levels. One teacher remarked, *"Mas sanay kami sa TLE sa mas mataas na baitang,"* while

another emphasized, "*Kailangan ng training kung paano i-adjust ang TLE para sa Grade 3.*" These responses indicate a perceived gap in pedagogical preparation for early TLE instruction.

This theme highlights the importance of teacher capacity-building as a critical factor in strengthening early TLE implementation. Professional development programs that focus on age-appropriate strategies, classroom management during hands-on activities, safety considerations, and assessment of skill development can enhance instructional confidence and effectiveness. Addressing this need may lead to improved instructional quality and more consistent skill development outcomes among Grade 3 learners.

Taken together, these themes provide a deeper understanding of how teachers navigate early TLE instruction within real classroom contexts. They complement the quantitative findings by explaining the instructional processes, constraints, and professional needs that shape the relationship between pedagogical practices and learners' skill development.

### 5.5 Integration of Quantitative and Qualitative Findings

The integration of quantitative and qualitative findings demonstrates that instructional practices particularly guided hands-on activities and demonstrations play a critical role in shaping Grade 3 learners' skill development in TLE. Quantitative correlations confirm the effectiveness of activity-based instruction, while qualitative themes explain how engagement, constraints, and teacher preparedness influence instructional implementation. Together, these findings highlight the pedagogical value of introducing TLE in the lower elementary grades using developmentally appropriate, experiential approaches.

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The results indicate that Grade 3 TLE instruction was characterized by high levels of demonstration, guided hands-on learning, and safety-oriented teaching. Teachers consistently modeled tasks before allowing learners to perform activities independently, ensuring that procedures were clearly understood. The frequent use of locally available and improvised materials suggests adaptive instructional practices in response to limited resources. These findings indicate that TLE instruction in the lower elementary grades is largely activity-based and teacher-guided, aligning with developmentally appropriate practices for young learners.

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Results reveal a moderate to strong positive relationship between instructional practices and learners' skill development. Guided hands-on activities exhibited the strongest correlation with skill outcomes, indicating that opportunities for supervised practice significantly enhance learners' practical competencies. These findings support the premise that active, experiential instruction is a key determinant of successful TLE learning in the lower elementary grades.

### **Teachers' Perspectives on Early TLE Instruction**

Qualitative data gathered from semi-structured interviews with Grade 3 teachers were analyzed using thematic analysis to capture shared experiences, perceptions, and instructional realities related to early Technology and Livelihood Education (TLE) implementation. The analysis revealed three major interrelated themes that illuminate how teachers understand the value of early TLE instruction, the challenges they encounter, and the support they perceive as necessary to strengthen instructional practice.

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emphasizing that engagement significantly improved when learners were directly involved in tasks. Another teacher shared, "*Kapag hands-on, mas natatandaan nila ang steps at mas confident silang gawin ulit,*" underscoring how experiential learning supports memory retention and confidence in performing tasks independently.

This theme provides qualitative support for the quantitative finding that guided hands-on activities were strongly associated with higher levels of skill development. Teachers viewed experiential learning as essential in helping young learners internalize procedures, develop fine motor coordination, and gain confidence in applying skills. The emphasis on "learning by doing" reflects a shared belief that practical engagement is foundational to effective TLE instruction at the lower elementary level.

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opportunities. As one teacher explained, "*Hindi sapat ang materials kaya salitan ang paggamit,*" highlighting how shortages limited the depth of hands-on engagement. Another participant added, "*Minsan kulang ang oras para ulitin ang activity para sa mastery,*" pointing to time constraints that restricted opportunities for reinforcement and skill refinement.

These challenges help explain the variability observed in learners' performance, particularly in areas requiring precision and independent problem-solving. Limited access to materials and reduced practice time may prevent learners from achieving mastery and transitioning from guided to independent task execution. This theme underscores the reality that while teachers employ developmentally appropriate strategies, structural constraints can affect the consistency and quality of skill development.

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This theme highlights the importance of teacher capacity-building as a critical factor in strengthening early TLE implementation. Professional development programs that focus on age-appropriate strategies, classroom management during hands-on activities, safety considerations, and assessment of skill development can enhance instructional confidence and effectiveness. Addressing this need may lead to improved instructional quality and more consistent skill development outcomes among Grade 3 learners.

Taken together, these themes provide a deeper understanding of how teachers navigate early TLE instruction within real classroom contexts. They complement the quantitative findings by explaining the instructional processes, constraints, and professional needs that shape the relationship between pedagogical practices and learners' skill development.

## **Integration of Quantitative and Qualitative Findings**

The integration of quantitative and qualitative findings demonstrates that instructional practices

particularly guided hands-on activities and demonstrations play a critical role in shaping Grade 3 learners' skill development in TLE. Quantitative correlations confirm the effectiveness of activity-based instruction, while qualitative themes explain how engagement, constraints, and teacher preparedness influence instructional implementation. Together, these findings highlight the pedagogical value of introducing TLE in the lower elementary grades using developmentally appropriate, experiential approaches.

## DISCUSSION

The findings suggest that introducing Technology and Livelihood Education (TLE) concepts in Grade 3 through developmentally appropriate instructional practices plays a significant role in supporting the development of learners' foundational practical skills. Research in early childhood and elementary education consistently shows that young learners acquire skills more effectively when instruction is aligned with their cognitive, motor, and socio-emotional readiness (Copple & Bredekamp, 2009). At this stage of schooling, learners are still developing fine motor coordination, attention control, and procedural understanding; thus, instructional approaches that emphasize guided demonstrations, hands-on participation, and clearly sequenced steps enable them to engage meaningfully with applied learning tasks (Pellegrino & Hilton, 2012).

Moreover, the use of activity-based and contextualized instruction aligns with established research on applied and experiential learning. Kolb (2015) emphasizes that learning is strengthened when learners actively experience tasks, reflect on them, and apply what they have learned in meaningful contexts. In lower elementary education, contextualizing activities using familiar materials and everyday experiences helps learners make sense of abstract concepts and strengthens skill retention (Prince, 2004). Studies on early skills education further indicate that hands-on learning fosters motivation, engagement, and positive attitudes toward work-related tasks, which are critical for sustaining interest in applied subjects such as TLE (Bandura, 1997; Darling-Hammond et al., 2017).

The observed relationship between instructional practices and skill development also highlights the importance of teacher preparation and instructional design in maximizing the benefits of early TLE exposure. Teachers' ability to scaffold tasks, provide timely feedback, and gradually release responsibility to learners has been shown to significantly influence skill acquisition and learner confidence (Hattie & Timperley, 2007). When teachers are adequately prepared to design age-appropriate, activity-based lessons, they can better support learners' progression from guided participation to more independent skill performance. These findings support broader evidence that high-quality instruction and teacher expertise are among the most powerful school-based factors influencing learner outcomes, particularly in applied and skills-oriented learning areas (Darling-Hammond, 2010).

## CONCLUSION

Introducing Technology and Livelihood Education (TLE) in the lower elementary grades offers meaningful opportunities to cultivate foundational skills that are essential for learners' academic, personal, and practical development in later years. Early exposure to TLE-related concepts allows Grade 3 learners to develop basic technical abilities, work habits, and problem-solving skills in ways that are aligned with their cognitive and developmental readiness. At this stage, learners begin to show increased independence, improved fine motor coordination, and a growing capacity to follow procedures characteristics that make them well suited for introductory, skill-oriented learning experiences.

When instructional practices are age-appropriate, activity-based, and contextualized, Grade 3 learners are more likely to engage actively in TLE-related tasks and demonstrate emerging practical competencies. Hands-on activities, guided demonstrations, and the use of familiar materials from learners' homes and communities help bridge the gap between abstract concepts and real-life applications. Such instructional approaches not only enhance engagement but also support the development of cooperation, responsibility, and confidence in completing tasks—key attributes for effective learning across subject areas.

Strengthening early TLE instruction may therefore contribute to a more coherent and progressive development of skills across the basic education continuum. By establishing a strong foundation in practical and applied learning during the lower elementary years, schools can better prepare learners for the more specialized and complex TLE competencies introduced in the upper grades. This continuity supports smoother transitions, reduces learning gaps, and reinforces the role of TLE as an integral component of holistic basic education rather than a stand-alone subject introduced later in schooling.

## **IMPLICATION**

From an instructional perspective, teachers are encouraged to intentionally integrate guided hands-on activities and contextualized examples when introducing Technology and Livelihood

Education (TLE) concepts in the lower elementary grades. At the Grade 3 level, learners benefit most from learning experiences that allow them to manipulate materials, observe demonstrations, and practice skills under close guidance. Contextualizing tasks using familiar household activities, community-based examples, and locally available materials helps learners connect abstract ideas to real-life situations, thereby increasing engagement and comprehension. Such approaches not only support the development of basic technical and livelihood skills but also foster positive work habits, cooperation, and problem-solving abilities that are foundational for later TLE learning.

From a curricular standpoint, curriculum planners and policymakers may consider the formal inclusion of foundational TLE competencies in the lower elementary curriculum. Rather than introducing TLE solely as a specialized subject in the upper grades, early exposure to age-appropriate competencies such as simple tool handling, basic process skills, safety awareness, and appreciation of work can create a more coherent progression of skill development across grade levels. Embedding these competencies within existing learning areas or through integrative learning modules may help ensure alignment with developmental readiness while avoiding curriculum overload.

In terms of professional development, teacher education and in-service training programs should incorporate strategies for adapting TLE instruction to the developmental characteristics of young

learners. Many elementary teachers have limited preparation in teaching applied or technical skills to children at an early age. Targeted professional development can equip teachers with practical pedagogical strategies, including activity-based lesson design, classroom management during hands-on tasks, safety protocols, and assessment of skill development. Strengthening teachers' capacity in these areas can enhance instructional confidence and effectiveness, ultimately supporting more meaningful and developmentally appropriate TLE learning experiences in the lower elementary grades.

## **LIMITATIONS AND FUTURE RESEARCH**

The study was limited to one school context, which may affect generalizability. Future studies may employ experimental or longitudinal designs to examine long-term effects of early TLE exposure on learners' academic and vocational outcomes.

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