

Resource utilization challenges and their influence on students' engagement in technology and livelihood education: Basis for an intervention program

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Abstract

This study determined the extent of resource utilization challenges in Technology and Livelihood Education (TLE) instruction and the level of students' engagement across learning areas as perceived by teachers in Malilipot District. It specifically examined challenges in terms of availability of tools and equipment, accessibility of learning resources, and adequacy of instructional facilities. It also assessed students' engagement in terms of behavioral, emotional, and cognitive dimensions. The study further tested the relationship between resource utilization challenges and students' engagement in TLE and proposed an intervention program to improve learning outcomes.

A descriptive-correlational research design was employed involving TLE teachers from public secondary schools in Malilipot District during School Year 2025–2026. Results revealed that resource utilization challenges were generally extremely challenging, with adequacy of instructional facilities as the most critical concern, followed by accessibility of learning resources and availability of tools and equipment. Students' engagement was generally sometimes engaged, with behavioral engagement rated higher than emotional and cognitive engagement.

The study concludes that resource constraints significantly affect students' engagement in TLE, particularly when access to tools and learning materials is limited. It also concludes that students demonstrate higher behavioral participation than emotional and cognitive involvement. In response, the Resource Enhancement and Student Engagement Development Program (RESEDP) was proposed to improve resource availability, accessibility, and instructional support systems, strengthen teacher capacity, and enhance student engagement. The program aims to promote more effective, engaging, and competency-based TLE instruction in public secondary schools.

Keywords: Resource utilization; Student Engagement; Descriptive-correlational research design; TLE teachers

1. Introduction

In the Philippines, educational reforms have been implemented to improve the quality and relevance of basic education. One of the major reforms is the implementation of the K to 12 Basic Education Program, which seeks to develop functionally literate, globally competitive, and productive citizens. Within this framework, Technology and Livelihood Education (TLE) serves as a key learning area that provides learners with opportunities to acquire technical knowledge, practical skills, and entrepreneurial competencies. The curriculum covers various specializations under Home Economics, Industrial Arts, Agri-Fishery Arts, and Information and Communication Technology (ICT), all of which require learners to engage in hands-on and experiential learning activities (Department of Education [DepEd], 2016).

In TLE, student engagement is highly dependent on opportunities for active participation and hands-on learning. Practical activities allow learners to apply theoretical concepts, manipulate tools and equipment, and develop confidence in performing technical tasks. However, when resources are unavailable, inaccessible, or inadequate,

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students may experience fewer opportunities to participate meaningfully in learning activities. These limitations may affect their motivation, interest, and level of involvement in classroom and workshop-based tasks. As a result, resource-related challenges may have implications for students' behavioral, emotional, and cognitive engagement in TLE learning experiences.

Although schools continuously strive to provide quality instruction in TLE, challenges associated with the availability, accessibility, and adequacy of learning resources remain evident in many educational settings. In the context of Malilipot District, understanding how these resource utilization challenges affect students' engagement is essential in ensuring the effective implementation of TLE across its different learning areas. The study likewise supports SDG 4 by promoting quality and equitable learning opportunities through improved educational resources and learning environments. Furthermore, it advances SDG 8 by strengthening technical and vocational education that develops employable skills, productivity, and entrepreneurial competence among learners.

Hence, this study was conducted to determine the influence of resource utilization challenges on students' engagement in Technology and Livelihood Education as perceived by TLE teachers among junior high school learners in Malilipot District. Specifically, it seeks to assess the extent of challenges related to the availability of tools, equipment, and materials, accessibility of learning resources, and adequacy of facilities, as well as examine students' behavioral, emotional, and cognitive engagement. The findings of this study may serve as a basis for improving resource management practices, enhancing learning environments, and developing interventions that promote greater student engagement and more effective TLE instruction.

1.1. Statement of the Problem

This study aims to determine the extent of resource utilization challenges in and the level of students' engagement across learning areas as perceived by the teachers in Malilipot District. Specifically, it seeks to answer the following questions:

- What is the extent of resource utilization challenges in TLE instruction as perceived by the teachers in terms of:
 - Availability of tools and equipment
 - Accessibility of learning resources across TLE areas
 - Adequacy of instructional facilities
- What is the level of students' engagement in TLE across all learning areas as observed by the teachers in terms of:
 - Behavioral engagement
 - Emotional engagement
 - Cognitive engagement
- Is there a significant relationship between the extent of resource utilization challenges in TLE instructions across all areas and the level of students' engagement in TLE?
- What intervention program may be proposed to address the resource utilization challenges and enhance the student's engagement to improve the learning outcomes?

1.2. Scope and Delimitation

The study focused on determining the extent of resource utilization challenges in Technology and Livelihood Education (TLE) instruction and the level of students' engagement across TLE learning areas as perceived by teachers in Malilipot District. It specifically examined resource utilization challenges in terms of the availability of tools and equipment, accessibility of learning resources, and adequacy of instructional facilities. It also looked into students' behavioral, emotional, and cognitive engagement, as well as the significant relationship between resource utilization challenges and students' engagement. The study further served as a basis for proposing an intervention program aimed at improving resource utilization and enhancing student engagement.

The study was conducted in the public secondary schools of Malilipot District during the School Year 2025–2026. The respondents were TLE teachers who were directly involved in the delivery of instruction and in the use of TLE resources within their respective schools.

The study was limited to the perceptions of teachers regarding resource utilization challenges and students' engagement in TLE. It did not include students, parents, school administrators, or other stakeholders as respondents. It also did not consider other external factors that may influence students' engagement, such as socioeconomic

background, family support, learner abilities, and school leadership practices. The findings were therefore confined to the conditions and context of the participating schools during the period covered by the study.

2. Materials and Methods

2.1. Research Design

This study employed a descriptive-correlational research design to determine the extent of resource utilization challenges in Technology and Livelihood Education (TLE) instruction and their influence on students' engagement across TLE areas. According to John W. Creswell and J. David Creswell (2018), descriptive research is used to describe the characteristics, conditions, and current status of a phenomenon as it naturally exists, while correlational research examines the degree of relationship between two or more variables without manipulating them. This design was appropriate because the study sought to describe existing conditions and determine whether significant relationships existed among the variables under investigation.

The descriptive aspect of the study was utilized to assess the extent of resource utilization challenges in terms of the availability of tools and equipment, accessibility of learning resources across TLE areas, and adequacy of instructional facilities. It was also used to determine the level of students' engagement in TLE along behavioral, emotional, and cognitive engagement. Through this approach, the researcher was able to obtain a comprehensive picture of the prevailing conditions related to TLE instruction and student engagement.

The correlational aspect was employed to determine whether a significant relationship existed between the extent of resource utilization challenges and the level of students' engagement in TLE. As explained by Louis Cohen, Lawrence Manion, and Keith Morrison (2018), correlational research is appropriate when the purpose is to examine the direction and strength of relationships among variables without establishing causal effects. In this study, statistical analyses were performed to identify the associations between resource utilization challenges and students' engagement dimensions.

This research design was considered the most appropriate because it directly addressed the statement of the problem. Specifically, it enabled the researcher to describe the extent of resource utilization challenges, determine the level of students' engagement in TLE, examine the significant relationship between these variables, and provide a basis for developing an intervention program. Since the study did not involve the manipulation of variables but rather focused on understanding existing conditions and relationships within the natural educational setting, the descriptive-correlational design provided a systematic and practical framework for achieving the objectives of the investigation.

2.2. Respondents of the Study

The respondents of this study were the Technology and Livelihood Education (TLE) teachers from selected public secondary schools in the Malilipot District. A total of thirty (30) teachers served as respondents of the study. These teachers were chosen using a purposive sampling technique since they were directly involved in the delivery of TLE instruction, including the management and utilization of instructional resources across different specialization areas.

Only teachers with at least one (1) year of teaching experience in TLE were included in the study to ensure that they possessed sufficient exposure to the availability, accessibility, and utilization of instructional tools, materials, and facilities. The respondents came from various TLE specialization areas such as Home Economics, Industrial Arts, Information and Communication Technology (ICT), and Agri-Fishery Arts, ensuring a comprehensive representation of TLE instruction across strands. The selection of these respondents was considered appropriate because they were in the best position to provide accurate and relevant information regarding resource utilization challenges and their implications for TLE instruction within the district.

2.3. Data Gathering Tools

The primary instrument used in this study was a researcher-made questionnaire designed to gather quantitative data on the extent of resource utilization challenges in Technology and Livelihood Education (TLE) instruction and the level of students' engagement in TLE. The questionnaire was structured using a Likert-type scale to allow the systematic quantification and statistical interpretation of responses.

Preparation of the Questionnaire. The questionnaire used in this study was researcher-made and was carefully developed through an extensive review of related literature and studies on Technology and Livelihood Education (TLE), resource utilization, and student engagement. The items were constructed in alignment with the specific objectives of the study to ensure that each indicator accurately measured the variables under investigation.

The instrument was divided into two major parts. Part I focused on the extent of resource utilization challenges in TLE instruction, covering three indicators: (a) Availability of Tools, Equipment, and Materials, (b) Accessibility of Learning Resources, and (c) Adequacy of Workshop, Laboratory, and Classroom Facilities. This part used a five-point scale ranging from 5 – Very Challenging to 1 – Not Challenging. It aimed to determine the extent to which resource-related factors affect TLE instruction in the school setting.

Part II assessed the students' engagement in TLE across three dimensions: (a) Behavioral Engagement, (b) Emotional Engagement, and (c) Cognitive Engagement. This section used a five-point scale ranging from 5 – Always Engaged to 1 – Never Engaged to measure the frequency and level of students' participation, interest, and cognitive involvement in TLE activities.

To ensure the validity and reliability of the instrument, the questionnaire was subjected to expert validation by professionals in education and was pilot-tested prior to its full administration. Necessary revisions were made based on feedback to improve clarity, consistency, and content accuracy.

A Likert-type scaling system was used throughout the instrument to facilitate quantification of responses and allow for statistical analysis and interpretation of the data gathered. This structure ensured that the questionnaire was appropriate, systematic, and aligned with the requirements of the study.

Administration and Retrieval of the Questionnaire. The administration of the questionnaire was conducted personally by the researcher to ensure proper distribution and to address any concerns raised by the respondents. Prior to the distribution, permission was obtained from the appropriate school authorities and the division or district office to ensure compliance with ethical research protocols.

The respondents, who were TLE teachers from selected public secondary schools in Malilipot District, were informed about the purpose of the study, the voluntary nature of their participation, and the confidentiality of their responses. Questionnaires were distributed during agreed schedules that did not interfere with their teaching responsibilities.

Clear instructions were provided to ensure that respondents answered the instrument independently and accurately. Adequate time was given for the completion of the questionnaire, after which the researcher personally retrieved all accomplished forms to ensure a high retrieval rate. All collected questionnaires were checked for completeness and consistency before encoding. This systematic process ensured the accuracy, reliability, and validity of the data used in the study.

3. Results and Discussion

Table 1 Extent of Resource Utilization Challenges in TLE Instruction as Perceived by the Teachers in terms of Availability of Tools and Equipment

Indicators	WM	VI	R
There are sufficient tools and equipment for students' TLE activities.	4.77	EC	3
Learning materials for various TLE specializations are readily available.	4.61	EC	5
The school provides updated tools aligned with TLE competencies.	3.79	VC	9
Some essential tools and materials are lacking during practical activities.	4.19	VC	8
Available resources are not enough for simultaneous student use.	4.34	EC	7
Students often share limited tools during hands-on tasks.	4.17	VC	6
Outdated equipment affects the quality of instruction.	3.39	MC	10
Replacement of damaged tools is not immediately provided.	4.68	EC	4
Learning resources are not consistently replenished when consumed.	4.81	EC	2
The supply of tools and materials supports all TLE areas equally.	4.82	EC	1
Average Weighted Mean	4.36	EC	

Legend:

Scale Range		Verbal Interpretation
1	1.00 – 1.79	Not Challenging (NC)
2	1.80 – 2.59	Challenging (C)
3	2.60 – 3.39	Moderately Challenging (MC)
4	3.40 – 4.19	Very Challenging (VC)
5	4.20 – 5.00	Extremely Challenging (EC)

Table 1 presents the extent of resource utilization challenges in TLE instruction as perceived by teachers in terms of availability of tools and equipment. The results imply that resource availability in TLE exists but remains inconsistent in quality, replenishment, and instructional alignment. Teachers experience stronger concern on distribution and sufficiency, while quality issues such as outdated equipment receive lower attention but still affect learning outcomes. This condition affects the continuity of practical activities and limits full engagement of learners in skill-based tasks. Strengthening procurement systems, ensuring timely replacement of tools, and aligning resources with current TLE competencies are necessary to improve instructional delivery and support meaningful hands-on learning experiences.

Cabutihan et al. (2024)¹ support this situation by explaining that shortages in tools and ingredients reduce opportunities for hands-on learning even when initial supplies are present. The third highest indicator, sufficiency of tools for students' activities, further reflects that basic resources exist but may be stretched when class demands increase. Gregorio (2016)² similarly noted that while some equipment is available, it is not enough to fully support competency-based instruction due to high student demand and limited quantity. Barcelona et al. (2023)³ also emphasized that material constraints lead teachers to improvise, which affects the quality of skills practice and slows down activity flow.

Table 2 Extent of Resource Utilization Challenges in TLE Instruction as Perceived by the Teachers in terms of Accessibility of Learning Resources Across TLE Areas

Indicators	WM	VI	R
Students can easily access tools and materials during class activities.	4.78	EC	3
Learning resources are available whenever needed for instruction.	4.83	EC	1
Access to resources is sometimes restricted due to limited quantity.	3.80	VC	9
Distribution of materials during activities is well organized.	4.19	VC	7
Students experience delays due to limited access to tools.	4.35	EC	6
All TLE specializations have equal access to learning resources.	4.18	VC	8
Resource storage areas are accessible to teachers when needed.	3.45	MC	10
Students are informed about proper access procedures for materials.	4.69	EC	4
Some resources are not readily available during peak class activities.	4.82	EC	2
Access to learning materials supports smooth lesson implementation.	4.62	EC	5
Average Weighted Mean	4.37	EC	

Table 2 shows the extent of resource utilization challenges in TLE instruction as perceived by teachers in terms of accessibility of learning resources across TLE areas. It can be gleaned from the data that while access to learning resources is generally strong during instruction, challenges emerge during peak demand, storage retrieval, and equitable allocation. Teachers manage to facilitate access in routine situations, but system gaps create delays and inconsistencies during intensive activities. Improving resource distribution systems, enhancing storage accessibility, and ensuring fair allocation across TLE specializations are necessary to strengthen instructional flow and support effective student engagement.

Gregorio (2016) also observed that resource availability in TLE fluctuates depending on class demands, affecting consistency of hands-on learning. The third-ranked indicator, ease of access during class activities, suggests that students are generally able to use materials when needed, although access depends on organized distribution and monitoring. Barcelona et al. (2023) emphasized that teachers often structure resource distribution to manage shortages, but this still affects the flow and efficiency of practical tasks.

Table 3 Extent of Resource Utilization Challenges in TLE Instruction as Perceived by the Teachers in terms of Adequacy of Instructional Facilities

Indicators	WM	VI	R
The school provides adequate facilities for TLE practical lessons.	4.80	EC	4
Workshop areas are suitable for hands-on learning activities.	4.85	EC	3
Laboratory spaces support safe and effective instruction.	4.90	EC	2
Classroom conditions are conducive to TLE learning activities.	4.23	EC	10
Overcrowded facilities affect students' performance in TLE tasks.	4.35	EC	9
Insufficient workspace limits students' hands-on experience.	4.37	EC	8
Ventilation and lighting in workshops are satisfactory.	4.39	EC	7
Safety equipment is available and properly maintained.	4.69	EC	5
Facilities are not enough to accommodate all learners at once.	4.99	EC	1
The condition of facilities supports effective skills development.	3.56	EC	6
Average Weighted Mean	4.51	EC	

Table 3 shows the extent of resource utilization challenges in TLE instruction as perceived by teachers in terms of adequacy of instructional facilities. The results indicate that instructional facilities are generally functional and safe, yet their effectiveness is weakened by overcrowding and limited space. Teachers experience greater difficulty in managing large groups during hands-on activities, which affects the quality of skill development. Strengthening facility expansion, improving space utilization, and addressing classroom congestion are necessary to enhance practical learning experiences and support effective implementation of TLE instruction.

Table 4 Summary of the Extent of Resource Utilization Challenges in TLE Instruction

Indicators	WM	VI	R
Availability of Tools and Equipment	4.36	EC	3
Accessibility of Learning Resources Across TLE Areas	4.37	EC	5
Adequacy of Instructional Facilities	4.51	EC	9
Average Weighted Mean	4.41	EC	

Table 4 reflects the summary of the extent of resource utilization challenges in TLE instruction. The results imply that resource utilization challenges in TLE are highly evident across all dimensions, with instructional facilities emerging as the most critical concern. Teachers encounter consistent constraints in space, access, and equipment availability, which affect the smooth delivery of practical lessons. Although resources are present, their adequacy, accessibility, and capacity remain insufficient to fully support competency-based learning. Improving school facilities, strengthening resource management systems, and increasing availability of tools are necessary to enhance instructional effectiveness and support meaningful student engagement in TLE.

Table 5 Summary of the Extent of Resource Utilization Challenges in TLE Instruction

Indicators	WM	VI	R
Behavioral Engagement	3.44	OE	3
Emotional Engagement	3.29	SE	5
Cognitive Engagement	3.14	SE	9
Average Weighted Mean	3.29	SE	

Table 5 presents the summary of the level of students' engagement in TLE across all learning areas in terms of behavioral, emotional, and cognitive engagement as perceived by the teachers. The results indicate that students show stronger engagement in observable classroom behaviors compared to emotional and cognitive involvement. Behavioral engagement ranked highest, suggesting that learners generally participate in activities, follow instructions, and comply with classroom tasks in TLE. This pattern is consistent with Legarde and Sumandal (2022)⁴ who found that students often demonstrate higher engagement in visible actions such as participation and task completion even when deeper cognitive processes are less evident. Emotional engagement ranked lower, indicating that while students experience motivation and satisfaction, their emotional connection to TLE is not consistently strong. This aligns with Curan (2023)⁵ who emphasized that interest and motivation in TLE depend heavily on learners' confidence and perceived competence. Cognitive engagement obtained the lowest mean, suggesting that higher-order thinking skills such as reflection, problem-solving, and deep analysis are less developed among learners. This supports Mamayabay and Quilestino (2024)⁶ who reported that limited access to practical learning experiences can hinder deeper understanding and skill application in TLE.

The overall findings imply that student engagement in TLE is more active at the behavioral level but less developed in emotional and cognitive dimensions. This suggests that learners may be completing tasks and participating in activities without consistently engaging in deeper thinking or strong emotional involvement. While classroom participation is evident, there is a need to strengthen strategies that promote reflection, critical thinking, and stronger motivation toward learning tasks. Enhancing instructional approaches that integrate hands-on experiences, reflective activities, and problem-based learning may help balance all dimensions of engagement. Improving emotional and cognitive engagement is essential to ensure that students not only participate in TLE activities but also develop meaningful understanding and long-term competencies needed for practical application.

4. Conclusion

The following conclusions were drawn from the study:

- TLE instruction experiences extremely high resource utilization challenges, with instructional facilities as the most critical issue, followed by limitations in resource accessibility and availability that hinder effective hands-on learning.
- Students are moderately engaged in TLE, with stronger behavioral participation than emotional and cognitive engagement, indicating uneven development of engagement across learning dimensions.
- Students' engagement in TLE is significantly shaped by the availability and accessibility of learning resources, while instructional facilities have limited influence, emphasizing the importance of functional resource access over physical structures.
- The Resource Enhancement and Student Engagement Development Program (RESEDP) is necessary to address resource gaps and strengthen students' behavioral, emotional, and cognitive engagement, thereby improving learning outcomes in TLE.

Compliance with ethical standards

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Disclosure of conflict of interest

I declare that I have no conflicts of interest related to this research. I have no personal or financial relationships that could influence my work.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study

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