SJIF Impact Factor (2025): 8.688| ISI I.F. Value: 1.241| Journal DOI: 10.36713/epra2016 ISSN: 2455-7838(Online)
EPRA International Journal of Research and Development (IJRD)
Volume: 10 | Issue: 5 | May 2025 - Peer Reviewed Journal

USING LOCALIZED MODULE AS AN INSTRUCTIONAL TOOL IN INTERPRETING TECHNICAL DRAWINGS AND PLANS

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Article DOI: https://doi.org/10.36713/epra22004
DOI No: 10.36713/epra22004

ABSTRACT

This study measured the use of localized module as instructional tool in interpreting technical drawings and plans of Grade 8 students at Ifugao Technical Vocational School. The conclusions of the study may serve as the standard by which educators evaluate students' electrical installation and maintenance competence and basis for administrators to implement Projects, Activities, and Programs (PAPs) that may lead to high-quality education. The mixed method, particularly sequential explanatory approach was utilized to gather and evaluate numerical data in order to spot trends or test theories and collecting narrative data to contextualize or explain the quantitative results, especially any unexpected ones. Purposive sampling was used in selecting the 46 respondents. The study found that before the use of the localized module, the competency level of the respondents in interpreting technical drawings and plans is "beginning." However, after the use of localized modules, the competency level of the respondents improved to developing. The localized module is an effective instructional tool in interpreting technical drawings and plans. The respondents have varied perceptions and experiences during the use of the localized modules which were categorized into learning process and engagement, self-assessment and feedback, content presentation, and recommendation. Four enhancements were made to enhance the localized module that include providing of more real technical plans and drawings, inclusion of the link for the teacher made video lesson in the module, inclusion of the format on how to interpret schematic diagrams of circuits and separating the answer key from the localized module so that the students will not be tempted to browse the answer key while answering the activities on the module. The study recommended that the teachers may make more localized learning resources to improve the least mastered competencies of the learners. The localized module can be distributed to the all the students in order to help them understand the lessons on interpreting technical drawing and plans. Furthermore, the enhanced tool in this study may be adopted by other teachers in any school as well which can ease teaching and learning process.

KEYWORDS: *Instructional Tool, Localized Module, Technical Drawings and Plans*

I. INTRODUCTION

Identifying and resolving the least learned competency has become increasingly trends in the field of technology education. The necessity to improve student competence, adjust to interruptions in education and improving the least mastered competency is what motivates this approach.

The significant patterns and tactics shown in current educational research includes competency assessment where educational evaluations have identified particular electrical installation and maintenance competencies that students find difficult. Students frequently struggle with wiring procedures and other practical applications of theoretical knowledge (Salazar et al., 2023).

Addressing the least mastered competency requires ongoing feedback through formative evaluations. By integrating entrepreneurship with all of the TLE disciplines, TLE adopts a comprehensive strategy that enables students to start their own companies in any of these fields. In addition to technical skills, it emphasizes work ethics, attitudes, and life skills. All of which are essential for success in both the personal and professional spheres (Balagtas & Manalastas, 2024).

A larger tendency toward more individualized and technologically enhanced learning environments is reflected in the trends in technology education that address least mastered skills, particularly in electrical installation and maintenance. In order to bridge the competency gaps that have been made worse by current educational issues, educators are concentrating on assessment-driven

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interventions and collaborative learning techniques. These approaches promise to give students the tools they need for prosperous careers in technology as they develop further and become productive citizens.

The least mastered competency in Technology and Livelihood Education includes interpreting technical drawings and plans. It varies across subjects and grade levels. It also highlights critical areas that require targeted interventions. To improve the least mastered abilities in Technology Livelihood Education, particularly in Electrical Installation and Maintenance, this study concentrated on employing localized modules as an instructional tool in interpreting technical drawings and plans. The goal of livelihood education and technology is to help students gain lifelong knowledge and skills (Demapendan et al., 2024).

Instructional environment today presents number of difficulties like poor internet connections, a lack of gadgets that are appropriate for online learning, a lack of resources like supplies and equipment, distractions from social media, gaming, and housework, and a lack of teachers are a few of the more evident ones (Pandit & Agrawal, 2021). Teachers will be able to more readily detect subject area challenges, organize appropriate interventions, and present content more effectively with the use of this extra resource. This content will also help students because it has easy-to-follow instructions with illustrations, guided activities and can be accessed offline.

The findings of this study could contribute to the solution of the problem of insufficient teaching resources in the field of technology and livelihood education. Leading the creation of educational materials in the form of brochures may inspire other educators to produce like materials, averting future problems of this kind and advancing the objective of attaining high-quality education as a component of sustainable development.

This study was aligned with the Department of Education (DepEd) research agenda, particularly in addressing gaps in Teaching and Learning, Curriculum Development, and Technical-Vocational Education. It emphasizes contextualized learning and strategies to improve learner outcomes in technical-vocational subjects like Electrical Installation and Maintenance (EIM). The DepEd 2024–2029 research agenda highlights evidence-based interventions and innovative teaching tools.

This was also aligned with the Nueva Vizcaya State University (NVSU) research program, which focuses on curriculum creation and instruction, specifically on pedagogical competency and learning management, as well as curriculum enhancement and development.

This study was also aligned to the Sustainable Development Goal 4 (SDG4), Quality Education, which is to provide inclusive, egalitarian, high-quality education and to encourage opportunities for lifelong learning for everyone by 2030. Adopted as part of the United Nation 2030 Agenda, it addresses systemic gaps in education access, equity, and relevance, with transformative implications for global development.

The potential outcome of this study may help students in Technology and Livelihood Education, Electrical Installation and Maintenance, improve their least-mastered competency in interpreting technical drawings and plans. The goal of the project was to develop an intervention that may help students improve their least proficient Technology and Livelihood Education skills so they can be used in real-world scenarios. When addressing difficulties related to least learned abilities, school heads and teachers in Technology and Livelihood Education may use the output of the study as a standard.

To improve the efficiency of teaching and learning, a number of holes in the integration of localized modules as instructional resources in Technology and Livelihood Education, particularly in Electrical Installation and Maintenance, need to be filled. This analysis identifies important areas that require more study and advancement. Research explicitly addressing the lived experiences of TLE-EIM students during modular training is scarce.

Gaining insight into their strategies and difficulties can help with module design and implementation. In addition, although some research indicates that modular learning can raise student engagement, there is not enough empirical data to establish a direct correlation between the use of modules and better learning outcomes in TLE courses, particularly in real-world settings like electrical installation and maintenance. Further, it is also possible that the competences acquired through modular training are not sufficiently measured by the assessment methods used today.

Problems associated with electrical installation and maintenance are stressful errors, particularly when the installer is unaware of the basic wiring connection and provisions that led to a bad connection. It is quite risky and dangerous, endangering the installation site, buildings, and other infrastructure. The following are examples of dangerous and often ignored electrical installation and maintenance

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issues: under sized wires that may cause overheating; improperly lengthened wiring that may cause short circuits and interruptions of connection; unprotected wiring that is vulnerable to tampering and inclement weather; and connections that may cause overheating and arcing, which may result in personal injury and fires (Bulosan, 2023).

These are the reasons that motivate the researcher to conduct this study. Further, the researcher also heard some of the sentiments of the students: *"Narigat ti Electrical Installation and Maintenance subject (Electrical Installation and Maintenance is very difficult subject); "Nagrigat met maawatan dayta diagram ti TLE-EIM" (It is hard to understand the diagram topics in TLE-EIM).*

Understanding the presence of least mastered competency and how they affect overall performance is vital as education aims to be more inclusive and sensitive to each student's particular needs. By carrying out a thorough examination, this study may add to the continuing discussion about how to enhance educational procedures and regulations so that every student can realize their greatest academic potential.

Statement of the Problem

This study ascertained the effectiveness of using localized modules as an instructional tool in interpreting technical drawings and plans of Grade 8 students at Ifugao Technical Vocational School, Bimpal, Lamut, Ifugao School Year 2024-2025.

Specifically, this study sought to answer the specific research questions of the study:

1. What is the competency level of the respondents in interpreting electrical drawing and plans before and after the use of localized modules?
2. What are the perceptions and experiences of the respondents after the use of the localized modules?
3. Is there a significant difference on the competency levels of the respondents before and after using the localized modules?
4. Based from the findings of the study, what enhancement could be made on the localized module as an instructional tool in interpreting technical drawings and plans?

Literature Review

Localized Modules as an Instructional Tool

Any print-based (print or non-print) or non-text-based (devices, tools, equipment, manipulative toys) materials that are in line with the K–12 curriculum and that are used as primary bases or supplements to the teaching and learning process resources are referred to as learning resources (LRs) (DepEd Order no. 018 s. 2020, Policy Guidelines of Learning Resources in the Implementation of the Basic Education Learning Continuity Plan).

The usefulness of contextualized courses in raising Grade 9 students' performance in Electrical Installation and Maintenance (EIM) was investigated in the study by Balagtas and Manalastas (2023). It emphasizes how to improve technical drawing understanding by using customized modules with dual coding methodologies (text + graphics). The results demonstrate that students who use these modules significantly enhance their retention and posttest scores.

According to Abdullahi (2015), instructional materials including modules are instruments that are either imported or locally produced that aid in the teaching and learning process. Eya (2015) saw them as tangible objects that might be used to greatly improve intellectual usage of the teaching materials. Bello and Shuaibu (2018) defined competency as the capacity to perform tasks.

In conclusion, educational modules offer a flexible framework for presenting material that accommodates a range of learning preferences and demands, improving the quality of the educational process as a whole. pace, taking into account various schedules and learning preferences (Vergara, 2017).

In order to carry out the goals and objectives of the educational system and environment, it investigates mass innovation and integration. It creates the framework and incorporates the creative design into the classroom and hands-on instruction in the TLE educational model for professional guidance and instruction (Yang & Ma, 2021).

Technical Drawings and Plans Competency

According to the present procedure of San Beda University Senior High School, teachers work together to identify the least mastered competency based on the findings of diagnostic tests that are required prior to the commencement of new classes. However, because the attention of the school is on the pupils who failed the quarter and are typically given remedial programs, the least learned competency

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following important evaluations, such as quarterly examinations, are not given priority. As a group or as a batch, the least-mastered competency of the students is not specifically addressed (Salazar & Caballes, 2023).

In order to solve the problem of the death of teaching resources in the fields of Technology and Livelihood Education, learning resources that meet the demands of the students for acquiring fundamental skills must be developed. Students may benefit from the output by using it to enhance their learning and enhance their performance in class and comprehension of TLE principles. The purpose of this study is to provide inexpensive, high-quality teaching resources. Brochures have been found to be an economical and practical way to distribute information (Demapendan et al., 2024).

In order to prepare students for the development of their hard and soft skills in a variety of ways, Technical Vocational Livelihood students' knowledge, mastery and competency assessment on electrical installation and maintenance exposed them to the global situation and analysis in the study, which is required in the Senior High School strand (Rosales, 2022). This is not limited to the Philippine educational system; it is evident around the world. The TVL strand was created using international best practices, which are used in Philippine schools. It emphasizes the expense and presumption of electrical installation and availability maintenance (Victoria et al., 2021). It describes how the current sustainable electricity is improved by the electrical installation of global hydropower in the reservoirs that currently supply solar compensation (Sanchez et al., 2021).

Theoretical/Conceptual Framework

Bruner's constructivist theory (Bruner 1960) cited in Vergara serves as the foundation for this investigation. He states that when using the module as a teaching tool, teachers should do the following three things: first, they should encourage students to come up with ideas, make decisions, and discover principles on their own. Second, provide the content in a way that is appropriate for the learner's present comprehension level. Third, arrange it in a spiral fashion so that the student continues to expand on their prior knowledge. Achieving the aims and objectives of the newly enhanced curriculum depends on the study of technology and livelihood education (Alsong & Alsong, 2019).

Further, because Bruner's constructivist theory places a strong emphasis on active learning, scaffolded training, and cultural relevance, it strongly relates to this study that use localized modules for reading electrical drawings and blueprints. According to Bruner's view, students build knowledge through directed investigation as opposed to passive reception. Localized modules serve as scaffolding tools in electrical drawing education by offering gradual challenges and demythologizing complicated concepts.

The experiential learning approach has emerged as a powerful teaching strategy in the realm of Technology and Livelihood Education (TLE), particularly in the context of interpreting technical drawings and plans within the Electrical Installation and Maintenance curriculum. This approach emphasizes the importance of hands-on experiences, allowing students to engage actively with the learning material and apply theoretical concepts in real-life scenarios.

In the classroom setting, students often struggle to understand the complexities of interpreting technical drawings when limited to theoretical instruction. By incorporating experiential learning, educators can facilitate activities such as workshops where students create and interpret actual electrical plans. For instance, a study by Reyes and Villanueva (2021) highlighted the efficacy of hands-on activities in improving students' ability to read and interpret technical drawings, noting significant gains in both confidence and competence.

The use of the experiential learning approach in teaching the competency of interpreting technical drawings and plans in Technology and Livelihood Education within the Electrical Installation and Maintenance context significantly enhances student engagement, understanding, and skill development. By bridging theoretical knowledge with practical application, this approach prepares students to meet the demands of the industry effectively, fostering a generation of skilled professionals ready to excel in their careers.

Localized modules are especially made instructional materials that consider the cultural, economic, and social contexts of students, making learning more relevant and effective. It is designed to reflect the specific needs and experiences of learners within a particular community. As highlighted by Ocampo (2017), these modules provide contextually relevant examples and scenarios that resonate with students, thus enhancing their understanding and retention of complex concepts such as technical drawings. By incorporating local materials, practices, and regulations, students can see the direct applicability of their learning to their immediate environment.

In the context of Electrical Installation and Maintenance education, utilizing localized modules allows educators to incorporate local industry standards, regional electrical codes, and community-specific projects. For example, a module might include technical drawings

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representing common residential wiring layouts found in a specific locality. This approach not only makes the learning experience more relatable but also increases student engagement. According to Mendoza and Cruz (2022), students who learn through localized content show higher motivation levels and a greater sense of ownership over their learning.

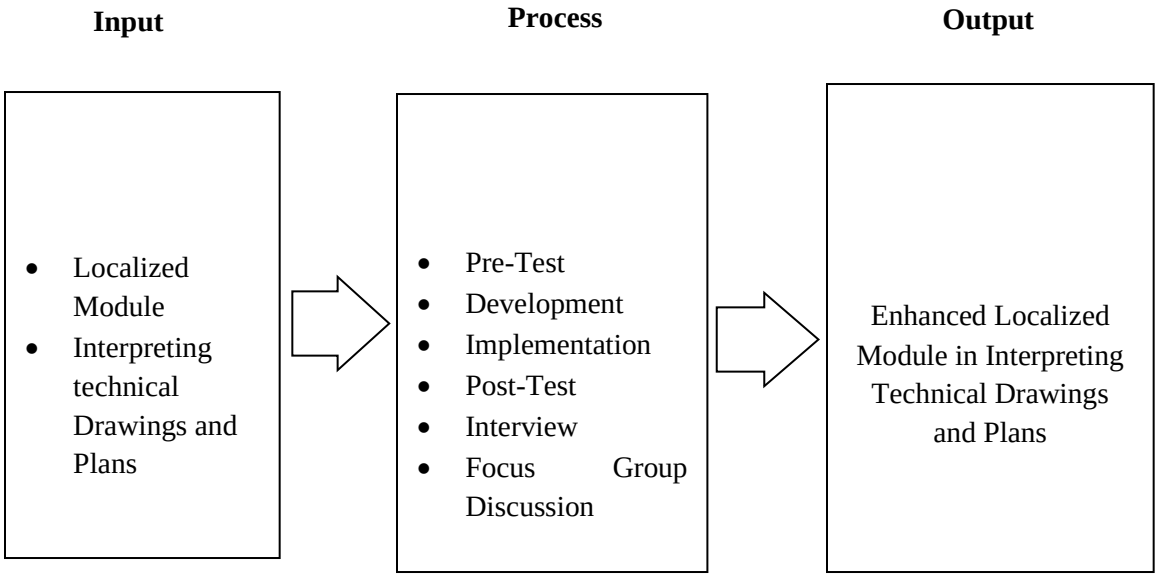


Figure 1. ***Conceptual Paradigm of the Study***

Figure 1 illustrates the conceptual paradigm of the study, focusing on the effectiveness of the localized modules as an instructional tool to improve the least mastered competency of the learners in Grade 8 Amethyst in Ifugao Technical vocational school in Bimpal, Lamut, Ifugao on interpreting technical drawings and plans in their Technology and Livelihood Education (TLE) – Electrical Installation and maintenance.

The localized modules, which are designed to reflect the specific cultural, social, and economic contexts of the students. The modules incorporate local examples, practices, and standards relevant to the field of electrical installation and maintenance, ensuring that the learning content is related and applicable to the learners.

The effectiveness of the localized modules was assessed through a combination of pre-tests, post-tests, and interviews. The pre-test establishes a baseline of students' knowledge and skills in interpreting technical drawings before the implementation of the localized modules. Following the instruction using these modules, a post-test measures the improvement in students' competencies. Additionally, interviews provide qualitative insights into students' experiences and perceptions of the localized modules, allowing for a deeper understanding of its impact on learning.

The ultimate output of this process is the development of an enhanced localized module. This module was refined based on the results from the pre-test, post-test, and interviews, ensuring that it effectively addresses the learning needs of the students.

Conceptual/Operational Definition of Terms

To help the reader better grasp this work, the following ideas were conceptually and operationally defined:

Enhanced Localized Modules. It refers to a self-paced learning resource that includes the subject to be learned and the answers to the questions (Vergara, 2017). In this study, this was used as the instructional tool in interpreting electrical drawing and plans.

Interpreting Technical Drawings and Plans. This refers to the competency in Technology and Livelihood Education, particularly in Electrical Installation and Maintenance which was not mastered by the Grade 8 students based from the Most Essential Learning Competency which is interpret technical drawings and plans (TLE_IAEI7/8ID-0e-2). In this study, this was measured using the 30 items teacher-made questions.

Significance of the Study

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The study highlighted the effectiveness of the localized modules as an instructional tool in improving least mastered competency in interpreting technical drawings and plans. The result of this study may be valuable to the following:

Technology and Livelihood Education- Electrical Installation and Maintenance Students. As the focal point of the educational process, the findings of the study may help students enhance their least-mastered Technology and Livelihood Education competency, especially in electrical installation and maintenance, interpreting electrical drawing and plans.

Technology and Livelihood Education- Electrical Installation and Maintenance Teachers. The conclusions of the study may serve as the standard by which educators evaluate students' electrical installation and maintenance in relation to technology and livelihood education. As a result, the teachers teaching this topic would switch to more effective teaching methods and exercises that would improve the students' least-mastered Technological and Livelihood Education competencies—namely, electrical installation and maintenance, interpreting electrical drawing and plans.

School Heads/Administrators. To improve these areas, school administrators may implement Projects, Activities, and Programs (PAPs) that may lead to high-quality education and to improve the least mastered skills of the students in TLE-EIM.

Parents. The results of this study would motivate parents and community members to participate in the students' education. This will help enhance the quality of education of the students.

Stakeholders. The findings of the study may encourage the stakeholders to actively support the school in developing the competencies of the learners by providing materials and equipment in electrical installation and maintenance.

Future Researchers. It is a great reference for researchers who do comparable studies on other variables not covered in this study.

Objectives of the Study

Generally, this study determined the use of localized modules as an instructional tool in interpreting electrical drawing and plans in Ifugao Technical Vocational School, Bimpal, Lamut, Ifugao.

Specifically, this study aimed to:

1. Disclose the competency level of the respondents in interpreting electrical drawing and plans before and after the use of localized modules;
2. Disclose the perceptions and experiences of the respondents during the use of the localized modules;
3. Unveil if significant difference exists on the competency levels of the respondents before and after using the use of localized modules; and
4. Propose an enhancement on the localized module as an instructional tool in interpreting technical drawings and plans.

Null Hypothesis of the Study

The following null hypothesis was tested in this study.

1. There is no significant difference on the competency levels of the respondents before and after using the localized module.

Scope and Limitations

This study focused on the use of localized modules as an instructional tool in interpreting electrical drawing and plans. This study may serve as basis on how to improve the least mastered competency in Technology and Livelihood Education- Electrical Installation and Maintenance.

Respondents of the study included the 46 Grade 8 students who were officially enrolled in Ifugao Technical Vocational School, Bimpal, Lamut, Ifugao for the School Year 2024-2025.

The study was limited to evaluate the effectiveness of using localized modules as an instructional tool towards the improvement of least mastered competency before and after using the localized modules. The study also aimed to propose enhancement localized module as an instructional tool in interpreting technical drawings and plans. The least mastered competency was limited to quarter 3 and 4. The least mastered competency focused on interpreting electrical drawing and plans.

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II. METHODOLOGY

This chapter discusses the appropriate design and research methods used to conduct this investigation. The research environment, participants, and equipment needed to collect the necessary data are also shown, along with the results' interpretation and analysis.

Research Design

This study used mixed-method, particularly sequential explanatory mixed-method.

In order to obtain a thorough grasp of research problems, mixed methods research deliberately combines qualitative and quantitative approaches within a single study. In order to maximize the benefits of both approaches while minimizing their respective drawbacks, it integrates numerical data (such as surveys and experiments) with non-numerical insights (such as focus groups and interviews). As a methodology that tackles research topics that cannot be addressed by a single approach, mixed methods emphasize its function in striking a balance between contextual richness and generalizability (Scribbr, 2025).

Creswell (2014) states that when researchers want to collect numerical data that can be statistically evaluated to make inferences and generalizations about a population, a quantitative research strategy is acceptable. When objective measurement and quantification of variables are the aim, use quantitative research. This method works well in circumstances where numerical data accurately and clearly depict the phenomenon being studied. Quantitative research design was used since the study used pretest and post-test scores.

To gain a deeper understanding of human experiences, behaviors, and social events, qualitative research employs non-numerical data, including text, audio, and video. It emphasizes participant perspectives and life experiences while placing a high importance on depth, context, and subjective interpretations in order to explore the "why," "how," and "what" of complex subjects (Lim, 2023).

The study employed sequential explanatory approach. Sequential explanatory design, according to Creswell and Clark (2017), is a mixed methods research methodology that consists of two successive phases: quantitative phase: gathering and evaluating numerical data in order to spot trends or test theories. The qualitative phase involves collecting narrative data, such as focus groups and interviews, to contextualize or explain the quantitative results, especially any unexpected ones. In order to enhance comprehension of statistical results, this strategy gives priority to quantitative data first, then qualitative investigation. It is frequently employed to solve complicated issues that need for both quantitative breadth and qualitative depth in the social sciences, education, and health research.

The instrument that was used in measuring the competency level of the respondents was the teacher-made pre-test/post-test based on the least mastered skills in Technology and Livelihood Education-Electrical Installation and Maintenance.

Research Environment

Ifugao Technical Vocational School, located in Bimpal, Lamut, Ifugao is one of the most popular educational institutions in Ifugao, recognized for its alignment with the Strengthened Technical-Vocational Education Program (STVEP) of the Department of Education in the Junior High level and Technical-Vocational-Livelihood Strand (TVL) for the Senior High School level.

It was conducted in the Annex of Hapid National High School Main located at Hapid, Lamut, Ifugao since it has only few learners. The school started in the year 2003 with out of school age learners and some school age learners.

In the year 2019 its name Hapid National High School Annex became Ifugao Technical Vocational School through the initiative of the former school heads and teachers of the school and other stakeholders. It offers the four majors in Industrial arts; electrical Installation and maintenance, Carpentry, Dressmaking and Cookery. Later in the school year 2022-2023, the school achieved its highest enrolment rate of 803 learners and was categorized as medium school until present.

The school was selected due to its distinctive role in providing specialized education in both academic and vocational fields in the whole district. The school aims to equip students with the necessary knowledge and skills to meet the demands of various industries, promoting economic development and enhancing the employability of its graduates. With this, it is aligned with the objectives of the study which to find out the effectiveness of using localized modules as an instructional tool in interpreting technical drawings and plans.

The school’s commitment to education excellence displayed by producing skilled and NC II Holder learners in the different majors specifically carpentry, dressmaking, cookery, electrical installation and maintenance, food and beverage, and bread and pastry.

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Respondents of the Study

The study was conducted at Lamut District, specifically at Ifugao Technical Vocational School, located at Bimpal, Lamut, Ifugao. The school has a total population of 590 students from Grade 7 to Grade 12 along with the 36 faculty members. There are 9 TLE/TVL teachers assigned to teach Technology and Livelihood Education (TLE) and Technical-Vocational-Livelihood (TVL) track in Senior High School.

The Grade 8 students were sectioned into two, namely, Jacinth and Amethyst with a total of 90 students enrolled. The respondents of the study were the Grade 8 Amethyst students enrolled in Technology and Livelihood Education with a focus on Electrical Installation and Maintenance in the third and fourth quarter for the school year 2024-2025 using total enumeration. This includes the 46 students, 23 males and 23 females.

Table 1

Frequency and Percentage Distribution of Respondents

Grade 8 Amethyst	Sample	Percentage
Male	23	50%
Female	23	50%
Total	46	100%

Table 1 presents the total number of the Grade 8 students, with the sample of 46 students using total enumeration from the section Amethyst.

Sampling Procedure

Since the majority of students have low scores in the competency included in the modules, purposive sampling was used to choose research participants who were enrolled in Technology and Livelihood Education-Electrical Installation and Maintenance in Grade 8 at Ifugao Technical Vocational School.

Purposive sampling, according to HubPages (2024), is a non-probability sampling technique in which the units, sample, or target respondents are chosen based on the researchers' predetermined criteria. Typically, when conducting a study, researchers explore for commonalities among the target respondents. They will examine the respondents' distribution by certain units after determining the commonalities. This approach is employed because the entire population is so small and well-define.

Research Instruments

The data collection tool for this study was a pre-test and post-test questionnaire, administered among the Grade 8 Amethyst learners in Ifugao Technical Vocational School. This instrument was design to collect the significant data on the students' knowledge and skills before and after the used of localized modules. The researcher developed both the pre-test and post-test instruments, which were subsequently validated by experts in the field. Following this validation process, the researcher incorporated the experts' suggestions and prepared the final version for pilot testing. This instrument was then pilot tested with the Grade 8 Jacinth class at Ifugao Technical Vocational School. After the pilot testing phase, the questionnaire had a reliability test result of 0.70 which is described as acceptable. The instrument was utilized to collect the necessary data from the respondents.

Pre-Test/Post-Test. This was used to measure the competency level of Grade 8 students taking up Technology and Livelihood Education-Electrical Installation and Maintenance specifically interpreting electrical drawing and plans. Pre-test was used to identify the starting point for each respondent and provides a clear picture of their initial understanding before the intervention. The post-test was administered after the used of the localized modules. It allows the researcher to evaluate the effectiveness of the localized module as a tool in interpreting technical drawings and plans. By analyzing the result of the pre-test and post-test, the researcher determined the extent of the improvement of the learners' skills in interpreting technical drawings and plans.

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The table was used in determining the competency level of the respondents based on Department of Education.

Score Range	Level	Mean Percentage Score (MPS)	Descriptions
26-30	Advanced	90-100	Advanced
22-25	Proficient	80-89	Meets Expectations for Target
18-21	Approaching Proficient	70-79	Partial Mastery of Target. Demonstrates partial understanding, or can perform portions of the target with assistance.
14-17	Developing	60-69	Little or No Mastery. Cannot demonstrate mastery, even with instructor assistance
0 – 13	Beginning	0-59	Very Little or No Mastery. Cannot demonstrate mastery, even with teacher assistance

Structured Interview. This was used to gather the perceptions and experiences of the respondents during the use of the localized modules. This approach involves a set of questions that are asked in a consistent manner across all participants, ensuring reliability in the data collected. In this study, the questions were used to explore students' experiences with localized modules, their understanding of technical drawings, and the perceived impact on their learning outcomes. After the interview was conducted, the data were analyzed systematically. Patterns and key points were identified through coding and categorization, allowing the researcher to draw conclusions about the enhancement that can be made to localized modules as an instructional tool.

Data Gathering Procedure

In gathering the data, the following procedure was undertaken.

The researcher developed the pre-test/post-test that was used in measuring the mastery skills of the respondents. The test focused on the least mastered skills in Technology and Livelihood Education-Electrical Installation and Maintenance. The competency focused on interpreting technical drawing and plans.

With the assistance of the thesis adviser, the questionnaire was reviewed, revised, and altered. After that, the panel members verified the final document. A final copy was then forwarded to the respondents who were specifically targeted.

Before the data collection, the researcher obtained formal permission from the relevant school authorities that includes the school principal. This ensures the compliance with the Data Privacy Act's guidelines and institutional protocols and ethical guidelines.

Pre-test was administered to the 46 learners of the Grade 8 Amethyst section, ensuring that the instructions were clearly communicated to all respondents. After the conduct of the pre-test, the researcher personally administered the remedial class in order to use the localized modules in improving the least mastered competency in interpreting technical drawings and plans among the respondents. The post-test was administered after the used of the localized modules to evaluate the effectiveness of the localized module as an instructional tool in interpreting technical drawings and plans.

Statistical Treatment of Data

To arrive at the most relevant interpretations and analyses of the data, the study employed the following statistical tools.

Mean. Before and after using the modules as a teaching tool, the mean computation was used to gauge the respondents' competency level in Technology and Livelihood Education-Electrical Installation and Maintenance in interpreting electrical drawing and plans.

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Dependent t-test. This was utilized to determine whether the respondents' competency level in Technology and Livelihood Education—Electrical Installation and Maintenance—are significantly different before and after using the localized modules as an instructional tool at 0.05 level of significance.

Reflexive Thematic Analysis. This was used in order to analyze the perceptions and experiences of the respondents during the use of the localized modules.

The dynamic and iterative nature of reflexive theme analysis, which highlights the researcher's active engagement in interpreting qualitative data, makes it especially useful for examining respondents' perspectives and experiences through localized modules. Deep immersion in the data, such as interview transcripts using Small Group Discussion, is the first step in the process. The researcher examined the material several times to have a thorough understanding of its context and substance. First impressions and responses were recorded during this phase.

The data were then methodically coded by the researcher. These codes are dynamic. These were improved and modified when the researcher's comprehension of the data changes as a result of continued interaction with it. The procedure is simultaneously reflexive—the researcher continuously examines how their perspective influences the analysis—and inductive—themes are allowed to arise from the data itself.

Following the coding process, the researcher organizes related codes into possible themes that represent noteworthy trends or common interpretations throughout the dataset. To make sure they appropriately reflect the data and address the study questions, these themes are further examined and improved. Instead of aiming for total neutrality, the researcher remains transparent throughout by revealing how their interpretations and choices are impacted by their own perspective and insights.

The last step entails identifying and characterizing the themes and combining them into a cohesive story that incorporates data pieces and insightful commentary. The article provides a complex perspective of how respondents view and experience the use of localized modules, clearly acknowledging the interpretive role of the researcher. The results of this method are meaningful, demonstrating the complex relationship between participant voices and researcher interpretation.

III. RESULTS

This chapter presents the findings of the study. Data was gathered through questionnaires to address the problems posted in chapter 1. In determining the competency level of the respondents in interpreting technical drawings and plans before and after the use of localized module, mean was used. Tables 1 and 2 show the findings. Table 1 presents the competency level of the respondents in interpreting technical drawings and plans before the use of localized module.

Table 2

Competency Level of the Respondents in Interpreting Technical Drawings and Plans before the Use of Localized Module

Level	Score Range	Frequency		Percentage
Advanced	26-30	0		0.00
Proficient	22-25	2		4.44
Approaching Proficient	18-21	5		11.11
Developing	14-17	10		22.22
Beginning	0 - 13	28		62.22
			Mean	13.51
			Level	Beginning

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Table 2 shows the competency level of the respondents in interpreting technical drawings and plans before the use of localized module as manifested by the mean (13.51) with the level "beginning."

It shows too that 28 or 62.22% of the respondents have beginning competency level; 10 or 22.22% are developing; 5 or 11.11% are approaching proficient; and 2 or 4.44% are proficient before using the localized module in interpreting technical drawings and plans.

This means that the Grade 8 students of Ifugao Technical Vocational School have very low competency level in interpreting technical drawings and plans before using the localized module. With a mean score of 13.51 (categorized as "beginning"), the table further shows that the majority of respondents (62.22%) showed a "beginning" competency level in interpreting technical drawings and plans before using localized module. This points to serious deficiencies in fundamental technical abilities including applying electrical codes, comprehending patterns, and decoding symbols. There is an urgent need for focused instructional interventions, as only 4.44% (2 respondents) attained "proficient" levels.

Table 3
Competency Level of the Respondents in Interpreting Technical Drawings and Plans after the Use of Localized Module

Level	Score Range	Frequency		Percentage
Advanced	26-30	3		6.67
Proficient	22-25	7		15.56
Approaching Proficient	18-21	15		33.33
Developing	14-17	14		31.11
Beginning	0 – 13	6		13.33
			Mean	17.93
			Level	Developing

After the use of localized module, the competency level of the respondents in interpreting technical drawings and plans falls to be developing as evidenced by the mean (17.93). It also shows that 15 or 33.33% are approaching proficient; 14 or 31.11% are developing; 7 or 15.56% are proficient; 6 or 13.33% are beginning; and 3 or 6.67% are advanced.

It means that majority of students stayed in the "developing" stage (mean = 17.93). The findings of the study show that localized modules enhanced proficiency in understanding technical drawings and plans. This implies also that whereas localized tools improve fundamental abilities, more reinforcement is necessary for advanced mastery.

In order to determine the perceptions and experiences of the respondents during the use of the localized module, their accounts underwent analysis and were categorized. Table 4 displays the findings using thematic approach.

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Table 4
Perceptions and Experiences of the Respondents during the Use of the Localized Module

Thematic Category	Specific Challenge
Learning Process and Engagement	Guided Learning and Activities
Self-Assessment and Feedback	Answer Key and Validation
Content Presentation	Use of Pictures and Complete Information
Recommendation	Helping Others Learn

The data in table 4 reveals that the respondents have different perceptions and experiences during the use of the localized module. Generally, their responses were categorized into learning process and engagement, self-assessment and feedback, content presentation, and recommendation.

This categorization highlights how the respondents perceive the use of localized module in terms of their learning process, self-assessment, content presentation, and willingness to recommend them to others. The categories were interpreted individually based on the frequency of responses given. The verbatim responses of the respondents were also presented.

Learning Process and Engagement. The category identified by the respondents include guided learning and activities.
With respect to learning process and engagement, most of the remarks of the respondents were presented below (*P refers to participants; errors in spelling and grammar were retained to ascertain authenticity of the responses given by the respondents)*:

I think the localized modules are very helpful and I like the part What's More, because it gives guided activities para matuto ako ng husto. (P1)
(……For me to learn more)

Gusto ko ung modules kasi may mga activity itong tutulong paragawin ang isang activity example sa What's More. Nakalocalized pa ito kaya madaling maintindihan. (P5)

(I like the modules because there is activity that helps in answering the activity like in What's more. This is also localized that is why it is easy to understand.)
Nagenjoy ako sa pagsagot sa modules kasi may activities itong tutulong sayo para maintindihan ang topic. (P9)
(I enjoy answering the modules because there are activities that help you to understand the topic.)

The statements above reveal that the Grade 8 students in Ifugao Technical Vocational School have enjoyed the learning process and engagement they have in using the localized modules. They also mean that the Grade 8 students engaged themselves and learned much since the modules are localized. They also indicate that localized learning modules significantly enhance students' understanding by integrating culturally relevant content and contextualized activities. Recent studies highlight their effectiveness in improving academic outcomes, engagement, and skill development.

The result of this study is confirmed by Balagtasa and Manalastas (2023) who found that the usefulness of contextualized courses in raising Grade 9 students' performance in Electrical Installation and Maintenance (EIM) was investigated in the study. It emphasizes how to improve technical drawing understanding by using customized modules with dual coding methodologies (text + graphics). The results demonstrate that students who use these modules significantly enhance their retention and post-test scores.

Self-Assessment and Feedback. This category is one of the perceptions and experiences of the respondents which include answer key and validation.
Most of the remarks of the respondents included the following (*P refers to participants; errors in spelling and grammar were retained to ascertain authenticity of the responses given by the respondents*):

I like looking at the answer key, because I can see if my answers are correct. (P 8)

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Nagustuhan ko ang module kasi naibibigay din ang sagot sa answer key para malaman kung tama ang sagot ko. (P24)
(I like the module because it provides also the answers on the answer key to know if my answer is correct.)

The statements of the respondents prove that they like the modules since these have answer keys where the Grade 8 students compare their answers.

The finding is supported by Vergara (2017) who pointed that a module is a condensed portion of a course that covers a certain skill or subject area. Modules usually run three to eight weeks. It is a self-paced learning resource that includes the subject to be learned and the answers to the questions posed.

Content Presentation. This is another category to be one of the perceptions and experiences of the respondents in using the localized module. It includes the use of pictures and complete information.

Most of the respondents included these remarks (*P refers to participants; errors in spelling and grammar were retained to ascertain authenticity of the responses given by the respondents*):

The module uses pictures to support the lesson. (P19)
Gumagamit ito ng picture at kumpletong impormasyon para madaling maintindihan ang lesson. (P3)
(The modules used picture and complete information in order to easily understand the lesson.)
Nagbibigay ito ng kumpletong impormasyon sa topic. (P7)
(It gives complete information about the topic.)

The remarks provided by the Grade 8 students in Ifugao Technical Vocational School imply that the localized modules are easy to understand since these provide pictures and complete information.

Recommendation

This was also disclosed by the respondents as one of their perceptions and experiences while using the localized modules. This included helping others learn.

The respondents included these remarks (*P refers to paticipants; errors in spelling and grammar were retained to ascertain authenticity of the responses given by the respondents*):

Irecommend ito sa iba para makatulong at sila ay pumasa. (P20)
(I recommend this to others to help them pass.)
I like to recommend this to other absent learners for them to know the lesson. (P16)

I recommend this to others because it provides activities for learning. (P14)

The respondents accepted that the localized module is very informational and helpful in their studies to understand how to interpret technical drawings and plans. As a result, the Grade 8 students in Ifugao Technical Vocational School recommend the use of the localized module to other learners to improve their competency along the lesson on interpret technical drawings and plans which is considered as least mastered skill in TLE. Moreover, the localized material can serve as supplementary learning materials in TLE.

To determine the significant difference on the competency levels of the respondents before and after using the use of localized module, dependent t-test was computed. Result is shown in table 5.

Table 5
Summary of t-test Computation on the Difference on the Competency Levels of the Respondents before and after the Use of Localized Module

Tests	Mean	Computed t-test	p-value	Remarks
Pretest	13.51	8.04	0.000	Significant
Post test	17.93			

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Table 5 reveals that there is a significant difference on the competency levels of the respondents before and after using the localized module. The significant difference is evidenced by the computed t-test (8.04) with the p-value (0.000) which led to the rejection of the null hypothesis. The mean of the pretest (13.51) and post-test (17.93) show the difference.

The finding means that localized module used in the study helped the Grade 8 students understand their lessons more in interpreting technical drawings and plans. Furthermore, the result means that the localized module is an effective instructional tool in teaching the lessons interpreting electrical drawing and plans. This is due to the reason that the modules have used local materials that made the lesson easy to understand and the students can relate with the localized module. As a result, the Grade 8 students in Ifugao Technical Vocational School have improved their competency level.

Based on the significant findings of the study, the enhancements that can be made to the localized module include the following: providing more real electrical plans and drawings, as evident in the enhanced localized module's *What I Can Do* activity and in items 21 to 30 of the pre-test and post-test, which show additional plans to be interpreted; including a link to the teacher-made video lesson in the module, as seen on the last page of the *What Is It* section and Activity 2 of the *What I Have Learned* part; incorporating a format for interpreting schematic diagrams of circuits, which was added to the *What Is It* section under the topic "Types of Circuits"; and separating the answer key from the enhanced localized module to prevent students from being tempted to browse the answers while completing the activities.

IV. DICUSSIONS/CONCLUSIONS

Based on the significant findings presented, the following conclusion were derived:

1. Before the use of the localized module, the competency level of the respondents in interpreting technical drawings and plans is “beginning.” After the use of localized module, the competency level of the respondents improved to developing.
2. The respondents have varied perceptions and experiences during the use of the localized module which were categorized into learning process and engagement, self-assessment and feedback, content presentation, and recommendation.
3. The localized module is an effective instructional tool in interpreting technical drawings and plans.
4. Four enhancements are made to enhance the localized module. These include providing of more real technical drawings and plans, inclusion of the link for the teacher made video lesson in the module, inclusion of the format on how to interpret schematic diagrams of circuits, and separating the answer key from the localized module so that the students will not be tempted to browse the answer key while answering the activities on the module.

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