

Competencies and Challenges in Technical Drawing I Among Grade 7 Students: Basis for an Intervention Program

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Abstract. This study determined the level of competencies and the challenges encountered by Grade 7 students in Technical Drawing I at Juan F. Triviño Memorial High School during the School Year 2025–2026. Specifically, it assessed learners' competencies in fundamental concepts in technical drawing, sketching and freehand drawing skills, lettering and line techniques, use of drawing instruments and tools, and interpretation of drawings and symbols. It also examined the challenges encountered by learners in terms of availability of learning resources and drawing materials, instructional delivery and teacher support, learners' spatial and mathematical skills, classroom environment and learning conditions, and practice time and hands-on activities. The study utilized a descriptive-quantitative research design. The respondents consisted of 35 Grade 7 students enrolled in Technical Drawing I. Data were gathered through performance-based assessments using structured rubrics and a researcher made questionnaire checklist. Weighted mean and ranking were employed as statistical tools in analyzing the collected data. Findings revealed that the overall level of competencies of the students was interpreted as Less Competent, with a weighted mean of 3.13. Learners showed relative strength in Lettering and Line Techniques, interpreted as Fairly Competent, while weaknesses were observed in Fundamental Concepts in Technical Drawing, Sketching and Freehand Drawing Skills, and Interpretation of Drawings and Symbols. The overall challenges encountered by the students were interpreted as Serious, with a weighted mean of 3.26. The most serious challenges involved classroom environment and learning conditions, practice time and hands-on activities, and availability of learning resources and drawing materials. Based on the findings, the DRAW-TECH Enhance Program was developed to improve learners' competencies and address identified challenges through structured skill development activities, spatial visualization exercises, instrument mastery training, and extended hands-on practice. The study concluded that learners require continuous guidance, sufficient resources, and structured interventions to strengthen their competencies in Technical Drawing I.

Introduction

Education systems around the world are continuously evolving to equip learners with 21st-century skills such as critical thinking, creativity, problem solving, and technical competencies. Among these, Technical Drawing is widely recognized as a foundational subject that develops spatial intelligence, precision, and design-related skills needed in engineering, architecture, construction, and other technical fields (National Research Council, 2012). As part of this global direction, Technical and Vocational Education and Training (TVET) is strongly promoted as a means of preparing learners for both employment and lifelong learning.

At the international level, the United Nations Educational, Scientific and Cultural Organization (UNESCO, 2015) emphasizes the integration of TVET into national education systems to strengthen employability and workforce readiness. Countries such as Germany, South Korea, and Australia have embedded Technical Drawing within their TVET programs, recognizing its role in preparing learners for technology-driven and design-oriented careers (International Labour Organization, 2010).

These global initiatives align with Sustainable Development Goal (SDG) 4: Quality Education, which promotes inclusive and equitable education and the development of relevant skills for employment, decent work, and lifelong learning. In the Philippines, the Department of Education (DepEd) has responded to these global trends by integrating Technical Drawing into the K to 12 Basic Education Curriculum. Specifically, Technical Drawing I is offered in Grade 7 under selected Technical-Vocational schools as part of the Technology and Livelihood Education (TLE) program (DepEd, 2016). This initiative supports the country's goal of producing competent and globally competitive learners who can contribute to national development as outlined in the Philippine Development Plan (PDP, 2017).

In the Schools Division Office of Camarines Sur, Technical Drawing I is implemented in selected technical-vocational secondary schools, including Juan F. Triviño Memorial High School–Pasacao, Barcelonita School of Fisheries Cabusao, Ragay National Agricultural and Fishery School, Partido Agro-Industrial High School–San Jose, and Bikal High School–Caramoan. This curriculum implementation is intended to strengthen learners' foundational competencies in technical skills that are essential for higher technical studies.

Despite these curricular efforts, various studies and reports have documented persistent challenges in Technical Drawing instruction and learning. DepEd reports (2019) and Quimba et al. (2020) noted that many learners experience difficulties due to limited instructional materials, inadequate learning resources, and large class sizes, particularly in rural and resource-constrained areas. In Region V, similar concerns were reported, including insufficient drawing tools, lack of updated instructional materials, and limited access to technology that could enhance teaching and learning processes (DepEd Regional Office V Report, 2021). In addition, learners' weak foundation in mathematics and spatial reasoning further contributes to their difficulty in mastering technical drawing competencies (Garcia & Santos, 2019). These learning gaps suggest that Grade 7 students struggle not only with the technical aspects of drawing but also with underlying cognitive and contextual factors such as instructional strategies, classroom environment, and learner readiness (DepEd Regional Assessment, 2020). UNESCO-UNEVOC (2013) also identified similar contributing factors, including insufficient teacher training, limited hands-on experiences, and varying levels of student preparedness. Given these concerns, there is a need to develop context based and learner-centered instructional strategies that directly address the specific competencies and challenges encountered by students in Technical Drawing I. Approaches such as differentiated instruction, hands-on learning activities, multimedia integration, and continuous formative assessment may help improve learner engagement and skill acquisition (Tomlinson, 2014). However, these strategies must be grounded in an in-depth understanding of students' actual learning experiences.

Therefore, this study aims to assess the competencies and challenges in Technical Drawing I among Grade 7 students in selected technical-vocational schools in the Schools Division Office of Camarines Sur. The findings will serve as a basis for developing an intervention program that enhances students' technical drawing skills through targeted instructional support.

Methodology

This study utilized a descriptive–quantitative research design. According to Creswell (2014), descriptive research design is used to systematically describe a phenomenon by collecting numerical data that represent current conditions, behaviors, or characteristics of a population. In addition, quantitative research focuses on measurable data and statistical analysis to provide objective descriptions of variables under investigation.

This design is appropriate to the present study because the main purpose is to determine the level of competencies of Grade 7 students in Technical Drawing I and to identify the challenges they encounter in the subject. The study does not involve manipulation of variables or application of treatment conditions, which makes experimental design unsuitable. Instead, it relies on actual student performance outputs and ratings using a structured rubric, which are best analyzed using descriptive statistical tools such as weighted mean and ranking.

The descriptive–quantitative approach is suitable since Technical Drawing competencies are observable and measurable through student outputs such as sketches, lettering tasks, instrument-based drawings, and interpretation exercises. Likewise, the challenges experienced by learners can be quantified using scaled responses. As emphasized by Fraenkel, Wallen, and Hyun (2012), descriptive studies are valuable in education because they provide a clear picture of current conditions, especially when the goal is to assess performance levels and identify areas for improvement.

Through this design, the study is able to present an accurate and objective assessment of learners' competencies and learning difficulties, which serves as a basis for developing an appropriate intervention program for Technical Drawing I.

Results and Discussion

This study determined the level of competencies and the challenges encountered by Grade 7 students in Technical Drawing I at Juan F. Triviño Memorial High School, Pasacao, Camarines Sur during School Year 2025–2026. It examined learners' competencies in terms of fundamental concepts in technical drawing, sketching and freehand drawing skills, lettering and line techniques, use of drawing instruments and tools, and interpretation of drawings and symbols. It also identified the challenges experienced by learners in terms of availability of learning resources and drawing materials, instructional delivery and teacher support, learners' spatial and mathematical skills, classroom environment and learning conditions, and practice time and hands-on activities. The study assumed that students demonstrate varying levels of competencies and encounter different degrees of challenges in Technical Drawing I, which may serve as bases for designing an appropriate intervention program.

This study utilized a descriptive–quantitative research design, which focused on describing and analyzing numerical data regarding the current level of competencies of learners and the challenges they encounter. The design was appropriate because it did not involve manipulation of variables or experimental treatment. Instead, it relied on actual student performance outputs assessed through a structured rubric and scaled responses, which were analyzed using descriptive statistical tools such as weighted mean and ranking. The descriptive quantitative approach was suitable since Technical Drawing competencies are observable and measurable through performance outputs such as sketches, lettering tasks, instrument-based drawings, and interpretation activities. Likewise, the challenges experienced by learners were quantified using rating scales. Through this design, the study provided an objective and systematic assessment of student competencies and learning difficulties, which served as a basis for developing an appropriate intervention program in Technical Drawing I.

The scope of the study was limited to 35 Grade 7 learners enrolled in Technical Drawing I in the said school. It excluded other grade levels and other TLE specializations. The findings are intended to inform a localized intervention program to improve learner competencies and address identified challenges in Technical Drawing I.

Conclusion and Implications

Based on the findings, the following conclusions were drawn:

1. The level of competencies of Grade 7 students in Technical Drawing I is generally low, as reflected in the overall rating of Less Competent. Learners demonstrate relative strength in Lettering and Line Techniques and Use of Drawing Instruments and Tools, which are both interpreted as Fairly Competent. However, competencies in Fundamental Concepts, Sketching and Freehand Drawing Skills, and Interpretation of Drawings and Symbols remain low. This indicates that students are more capable in procedural and basic tasks but struggle in higher-order skills such as visualization, interpretation, scaling, and application of technical concepts.
2. The challenges encountered by Grade 7 students in Technical Drawing I are generally serious, as shown by the overall rating of Serious Challenge. The most critical difficulties are related to classroom environment, practice time, and availability of learning resources, which directly affect students' ability to perform hands-on drawing activities. Spatial and mathematical skills also present moderate challenges, indicating difficulty in visualization and measurement. Instructional delivery is not considered a major problem, suggesting that the main barriers to learning are environmental, resource-based, and practice-related rather than teaching strategies.
3. The findings justify the development of the DRAW-TECH Enhance Program as an intervention to address the identified gaps in competencies and challenges. The program focuses on improving fundamental technical drawing skills, strengthening spatial and mathematical abilities, increasing practice opportunities, and addressing resource and environmental limitations. It is concluded that structured, skill-based, and hands-on interventions are necessary to enhance learner performance and improve competency levels in Technical Drawing I.

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Appendices

No appendices are attached to this study.